Screening of Traditional Chinese Medicine Plant Extracts for Antibacterial Properties

by

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DEDICATION

I would like to dedicate this work to my family and friends and not least my husband. Without their continued support and always reminding me that I had work to finish, this work might not have been completed.

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ABSTRACT

Growing antibiotic resistance intensifies the need for new, more effective treatments against problematic bacterial pathogens. New drug discovery is imperative to combat such organisms with naturally-derived products having desirable antibiotic properties as a possible route of exploration. For centuries, traditional Chinese medicine has successfully treated disease with the application of natural herbs and plants. For these studies, extracts of plants used in traditional Chinese medicine were tested for antibacterial activity against twelve common bacterial pathogens with significant resistance to current Western antibiotic treatments. Several extracts tested in this study had significant levels of antibacterial activity for these bacteria. Crude extracts, MDZ1, MDZ4, and MDZ5, inhibited at least 90% of the growth for four different bacterial species. Three compounds purified from the same plant as the MDZ extracts, along with two additional plant-derived compounds, exhibited greater than 80% inhibition of at least eight species and are ideal candidates for further study.

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CHAPTER I: THE RISE OF ANTIBIOTIC RESISTANCE

Since 1920, the life expectancy for people in the US has increased from 56.4 years to nearly 80 years old, with similar trends being observed across the world (Ventola 2015). One of the most important contributions to such an increased life span is the ever-improving sciences associated with healthcare, much of which can be ascribed to the widespread use and creation of antibiotics, starting with the introduction of penicillin shortly after its discovery in 1928 by Alexander Fleming (Davies and Davies 2010). The use of penicillin has saved countless lives over the course of nearly a century and has helped to define modern medicine practices against infectious agents, however Fleming himself gave warning shortly after the discovery that it was possible and likely for bacteria to become resistant to treatment (Perron et al. 2015). The accelerated rate of resistance by many species of bacteria observed since Fleming's prophetic warning is nothing short of alarming, as this development is now a considerable threat to healthcare. In the US alone, the CDC estimates at least 23,000 deaths per year caused by pathogens that display resistance to currently available antibiotics, many of which were able to overcome exposure to more than one class of antibiotics, limiting the success of many if not all available treatments (Munita and Arias 2016). Once dependable as treatments, current antibiotics are failing worldwide with 20-80% of healthcare-associated infections resulting from multidrug-resistant bacteria that are estimated to cause greater than 7 million deaths per year (Perron et al. 2015, Pal et al. 2016).

Fleming's discovery in 1928 was a monumental catalyst, ushering in the Golden Era of antibiotic discovery and changed how healthcare operates today. It was this period

of time, from the 1950s-1970s, during which most of the antibiotic classes used today had been discovered (Aminov 2010). Despite the overwhelming success of penicillin and the effect its discovery had in history, it was not long before Fleming's warning of antibiotic resistance became a reality. Even before penicillin was used as a treatment, an enzyme had been detected in 1940 that rendered the drug inactive against bacterial activity and once penicillin became widely used, penicillin-resistant strains of bacteria became prevalent (Davies and Davies 2010). Shortly thereafter, in 1941, *Staphylococcus aureus* demonstrated its ability to resist the antibacterial action of penicillin, able to persist despite the presence of the antibiotic (Perron et al. 2015). Once penicillin had been implemented as a treatment, strains of *S. aureus* able to evade this antibiotic were repeatedly reported, and by 1952 penicillin-resistant *S. aureus* infections outnumbered those caused by susceptible strains to the point that penicillin ceased to be the treatment of choice (Perron et al. 2015). A mere decade after implementation, penicillin resistance had become a substantial threat to healthcare and as a result, modifications and new active antibiotics were implemented. Methicillin, a semisynthetic penicillin, was developed to treat strains resistant to penicillin. However, sooner than later these new antibiotics followed the same trend of increasing resistance observed with penicillin.

Following the resistance to penicillin, the first strain of *S. aureus* resistant to methicillin (MRSA) was discovered in the same decade as the implementation of the drug in the UK in 1962 and US in 1968 (Ventola 2015). This trend continued with each new antibiotic developed, and vancomycin resistance, which was first reported in 1997, and had spread across the globe to the US in 2002 (Gardete and Tomasz 2014). Not only resistant to methicillin and vancomycin, MRSA strains can also evade the antibiotic

activity of aminoglycosides, macrolides, tetracyclines, chloramphenicol, and lincosamides (Nikaido 2009). More recently, Gram-negative pathogens, most notably *Pseudomonas aeruginosa* and *Acinetobacter baumannii*, have shown they are an aggressive threat with few if any treatment options such that there are almost no agents that have been developed to utilize against infections with these bacteria (Nikaido 2009).

The Golden Era of the mid 1900s was a period of great discovery and production of antibiotics. Most antibiotics were discovered from a limited number of ecological niches and taxonomic groups, primarily soil Actinomyces with no new novel classes having been discovered since 2000 (Aminov 2010). Following the end of the Golden Era in the 1970s, a strategy was developed to modify existing antibiotics to combat the already growing resistance a strategy was developed to modify existing antibiotics, and while immediately successful, these too shortly followed with developed resistance by bacteria (Aminov 2010). As the decades have passed, with so little antibiotic development, the CDC declared the post-antibiotic era in 2013 (Perron et al. 2015). Shortly thereafter in 2014, the World Health Organization gave warning of an antibiotic resistant crisis and, as such, the Infectious Diseases Society of America, the Institute of Medicine, and the federal Interagency Task Force on Antimicrobial Resistance consider multidrug-resistant (MDR) bacteria to be a considerable health threat to the public (Ventola 2015). These MDR pathogens are particularly problematic to healthcare due to the capability of such infectious agents to evade the activity of many, if not all, available treatments. A threat of global concern, it is imperative to increase the efforts to discover new compounds capable of acting against a wide range of bacteria.

CHAPTER II: ESKAPE PATHOGENS

Bacteria that are able to display a significant degree of antibiotic resistance are becoming more difficult to treat every day, even possibly threatening to return humankind to the pre-antibiotic era. The ability to evade the action of antibiotics allows bacteria to continue to thrive in environments in which they were previously unable to exist, allowing a disease to continue and progress leading to possible lifelong disabilities and even death. Becoming increasingly common, the most challenging nosocomial infections are caused by a collection of bacterial species that exhibit increased resistance to many of the antibiotics currently available (Hassani 2014). Described by the Infectious Disease Society of America, these ESKAPE pathogens are often the cause of infections that are difficult to treat due to their increasing rates of antibiotic resistant strains (Umland et al. 2014). Initially referring to *Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Enterobacter* spp., *Escherichia coli* is now included in this group due to the fact that it can obtain various enzymes from the environment, increasing its level of resistance (Umland et al. 2014). While this collection of species appears to be a limited list of resistant organisms, the ESKAPE pathogens currently cause the majority of US nosocomial, or healthcare-acquired, hospital infections (Boucher et al. 2009).

Enterococcus faecium is considered part of the normal microbiota found in the human intestinal tract and, together with *Enterococcus faecalis,* accounts for more than 90% of clinical isolates cultured from humans (Fraser 2017). In the 1970s, *E. faecium* began to emerge as a problematic hospital-acquired pathogen causing various infections

involving the bloodstream, urinary tract, and surgical wounds causing between 10,000 and 20,000 deaths every year (Lebreton et al. 2013). Isolates resistant to vancomycin emerged in the late 1980s, but by 2002, resistance had increased to 61% of isolates in North America (Pendleton et al. 2013). As of 2015, 30% of hospital-acquired enterococcal infections are vancomycin resistant contributing to infections in 20,000 patients with 1,300 ending in deaths (Ventola 2015). The high level of antibiotic resistance of enterococci is likely related to the ability of a species to acquire mechanisms of resistance in addition to the intrinsic qualities they already possess, as is the case with *E. faecium* obtaining the ability to resist vancomycin, while *E. faecalis* remains generally susceptible (Kristich et al. 2014). Currently, the FDA has approved linezolid and quinupristin-dalfopristin as treatments of vancomycin-resistant enterococci infections, though treatment can be slowed or interrupted due to significant side effects (Kristich et al. 2014).

While all the ESKAPE pathogens are alarming, *Staphylococcus aureus* is particularly concerning as a multidrug resistant organism given the ease of transmission, commonality and severity of disease, as well as a history of obtaining resistance following introduction of treatments. A common human commensal organism, *S. aureus* colonizes the nasal nares of nearly 30% of healthy adults, but can be located on the skin, within the gastrointestinal tract, the perineum, and the inside of the throat as well (Tong et al. 2012). Infections of the skin account for 90% of staphylococcal infections, but disease can also occur in the bloodstream, respiratory tract, bone and joint, surgical wounds and devices (Tong et al. 2012). Prior to modern use of antibiotics, the mortality rates for these infections reached over 80% (Lowy 2003). Once penicillin was introduced,

staphylococcal infections were able to be treated with great success due to the high susceptibility of the organism to penicillin. By the mid-1940s, strains of *S. aureus* had begun to show resistance to penicillin in hospitals, and within a decade these resistant strains had become prevalent in community-associated infections as well (Chambers and DeLeo 2010). To combat the rising resistant strains, newer drugs were in demand to treat *S. aureus* infections. In 1959, methicillin was successfully synthesized and provided the public with a new novel drug with which to treat infections (Stapleton and Taylor 2002). This relief of a new antibiotic was short lived, however, with the first strain of methicillin-resistant *S. aureus* identified in the early 1960s in the UK with additional resistant strains emerging across the world in the following 20 years (David and Daum 2010). MRSA has been used as an acronym for the widespread resistance of *S. aureus,* initially to methicillin, and now to multiple antibiotics.

With MRSA infections increasing in hospital settings, healthcare officials had to become more reliant on the last possible method of treatment with vancomycin (Chambers and DeLeo 2010). As the pattern goes with *S. aureus*, even vancomycin would not be able to be relied upon indefinitely as a treatment option, with the first MRSA strain showing vancomycin resistance in 1997 (Loomba et al. 2010). Initially susceptible to all antibiotics in use, *S. aureus* has shown to be exceptionally capable to quickly obtain mechanisms that aid in its resistance, culminating to a point in which few, if any, drugs remain effective against this pathogen. With any additional treatment options still in developmental stages, healthcare officials are left with a limited list of antibiotics to utilize, including linezolid and quinupristin-dalfopristin to treat those staphylococcal infections that are exceptionally resistant to current treatment options

(Loomba et al. 2010). Given the history of this organism to gain resistance, it is likely only a matter of time before these few treatment choices become ineffective as well.

Able to colonize mucosal surfaces, *Klebsiella pneumoniae* can be found in the human nasopharynx and gastrointestinal tract (Podschun and Ullmann 1998). As the most clinically relevant species of *Klebsiella, K. pneumoniae,* is often the cause of human healthcare-acquired (nosocomial) infections and is responsible for a great percentage of urinary tract infections (UTIs), pneumonia, septicemias, and infections of soft tissues (Podschun and Ullmann 1998). The ability to produce carbapenemases is a key feature in the antimicrobial resistance of this organism, allowing it to evade the action of carbapenem antibiotics (Kumar et al. 2011). The widespread transmission of *K. pneumoniae* that can produce carbapenemase (also known as carbapenem-resistant *K. pneumoniae,* or CRKp) in healthcare environments has led to it becoming the most common among *Enterobacteriaceae* with carbapenem resistance in the US and such a trend, with few treatment options, *K. pneumoniae* threatens to extend such resistance to the community (Sanchez et al. 2013). By studying the resistance trends of *K. pneumoniae* from 1998-2010, scientists were able to demonstrate significant increases in the resistance ability of this organism to nearly all classes of antimicrobials studied, with carbapenem resistance increasing from <1% in 2000 to 8% in 2007 (Sanchez et al. 2013). With different strains showing diverse resistance profiles, *K. pneumoniae* exhibits an array of resistance to a variety of antibiotics and classes with a history of resistance to fluoroquinolones, aminoglycosides, trimethoprim, and sulfamethoxazoles (Kumar et al. 2011). Current treatment options have varying rates of success with *K. pneumoniae* able to exhibit resistance to any currently administered antibiotic (Hirsch and Tam 2010).

Several candidates for antibiotics to treat *K. pneumoniae* are in development, though none have yet been publically administered (Hirsch and Tam 2010).

Among the ESKAPE pathogens, *Acinetobacter baumannii* is especially problematic. Known as one of the most difficult of the resistant organisms to treat, *A. baumannii* is able to persist on surfaces in a range of environments (Eliopoulos et al. 2008). Because of this, *A. baumannii* is often associated with ICU patients, increasing the morbidity and length of hospitalization, and many times associated with an increased rate of mortality among these already ill patients. Mortality rates have been known to reach up to 68%, often from a variety of illnesses that includes bacteremia, pneumonia, meningitis, UTIs, and wound infections (Eliopoulos et al. 2008). The ability of *A. baumannii* to resist antimicrobials has been increasing along with the frequency of infections. A recent study of such infections revealed that 53% of isolates were multidrug resistant, most of which showed resistant rates greater than 60% to available treatments when susceptibility tests were performed (Zhao et al. 2015). Currently, resistant strains of *A. baumannii* are uninhibited by all beta lactams and fluoroquinolones, leaving colistin, amikacin, or tigecycline as remaining options for treatment of those strains. There have been reports of resistance to colistin and amikacin, as was the case for a patient possessing a strain able to evade all commercially available antibiotics (Doi et al. 2009). With a lack of promising antimicrobial candidates in development, it is likely that the resistance capabilities of *A. baumannii* will continue to develop, resulting in higher morbidity and mortality rates among patients worldwide.

First observed by production of its characteristic blue-green pigment on the bandages of surgical wounds in the 1800s, *Pseudomonas aeruginosa* can be found in a wide variety of environments, both in hospitals as well as community locations such as respiratory equipment, cleaning equipment, hydrotherapy pools, swimming pools, hot tubs, and even contact lens solution (Lister et al. 2009). An opportunistic organism, *P. aeruginosa* is rarely part of the normal colonization in humans. However, like other healthcare-acquired nosocomial infections, the colonization rate of hospitalized patients has dramatically increased in frequency and can often exceed 50%, especially in those with compromised cutaneous or mucosal barriers and in immunocompromised patients (Lister et al. 2009). With an ability to easily cause infections in hospitalized patients, *P. aeruginosa* was shown to be the 5th most common nosocomial organism, the 2nd most common cause of nosocomial pneumonia, and overall responsible for 9% of all hospital-acquired infections, such as those resulting in urinary tract, surgical site, and bloodstream infections from 1986-1998 (Lister et al. 2009).

Pseudomonas aeruginosa is an especially dangerous organism, particularly threatening cystic fibrosis patients. A condition that affects 1 out of every 3500 births, cystic fibrosis (CF) often results in death due to chronic lung disease (Brüssow 2012). Ultimately, 80-90% of CF patients will succumb to respiratory failure from chronic bacterial infection with *P. aeruginosa,* known to be the causative agent responsible for such high mortality rates in CF patients (Lykzak et al. 2002). Antibiotic therapy in these critical patients is further complicated by multidrug resistant *P. aeruginosa*. In national surveillance studies, multidrug resistance of *P. aeruginosa* increased from only 4% in 1993 to 14% in 2002 (Lister et al. 2009). With such an alarming inclination expected to

continue, new treatment options must be explored and produced to combat the multidrug resistance of *P. aeruginosa* that allows it to persist despite the use of currently available antibiotics.

Like the other ESKAPE pathogens, members of the *Enterobacter* genus have increased in their rates of hospital-acquired infections which are, consequently, now more often associated with higher morbidity and mortality, which are further complicated by a lack of treatment options due to higher rates of resistance (Boucher et al. 2009). *Enterobacter* species are commonly found as commensal organisms in humans and animals, allowing these pathogens to be isolated from a range of biological specimens involved in respiratory, urinary, and bloodstream infections (Davin-Regli and Page 2015). *Enterobacter aerogenes* began its emergence as a problematic pathogen in the past several decades, particularly in Europe where it has been regularly responsible for numerous outbreaks beginning in 1993 and since 2010 ranks as the 5th highest *Enterobacteriaceae* in addition to being the 7th most frequently isolated Gram-negative bacillus responsible for healthcare-associated infections in France (Davin-Regli and Page 2015). Members of *Enterobacteriaceae* are frequent causes of septic shock in patients, and that, combined with the broad ability to develop multidrug resistance to most beta lactams, cephalosporins, aminoglycosides, and quinolones, leads to a higher mortality rate among infected patients (Davin-Regli and Page 2015). Carbapenems are the most powerful treatment option available to deploy against these types of infections, however even these antibiotics have limitations given data with isolates showing a reduced susceptibility to the carbapenems during treatment with imipenem, rendering treatment with this drug ineffective (Davin-Regli and Page 2015). Those strains displaying such

resistance to carbapenems have asserted themselves as a leading cause of infections and death in nosocomial infections and those often associated with long-term care, with a 2013 report conducted by the CDC revealing an estimated 730,000 infections and 3,400 deaths a year in the US (Philippe et al. 2015). Currently, treatment options for *Enterobacter* spp. are few, and resistance is ever increasing with strains associated with colistin resistance displaying resistance to all available antibiotics as well (Davin-Regli and Page 2015).

Escherichia coli, first isolated in 1885, is normally a natural commensal organism of the intestines of humans and animals (Croxen et al. 2013). Pathogenic strains can be further separated with intestinal pathogens responsible for diarrheal infections and extraintestinal *E. coli* responsible for many infections such as UTIs, meningitis, and septicemia (Jafari et al. 2012). Responsible for an estimated 100-140 million UTI cases, *E. coli* infection can lead to secondary infections that could further progress to life-threatening conditions (Jafari et al. 2012). Extraintestinal *E. coli* is the 2nd leading cause of meningitis in neonatal patients, often resulting in severe neurological lesions increasing the mortality rate of such infected infants to 20-40% (Jafari et al. 2012). Intestinal *E. coli* can be further divided into pathotypes, each capable of causing disease with unique virulence factors, and are collectively a leading cause of fatal diarrheal illnesses worldwide, particularly in children (Croxen et al. 2013). Antibiotic resistance varies depending on the causative agent. While treatment of Enteropathogenic *E. coli* (EPEC) is usually self-limiting and antibiotic treatment not always necessary, strains resistant to penicillins, aminoglycosides, and cephalosporins have been found across the globe (Croxen et al. 2013). Antibiotics are not recommended for infections caused by

Shiga toxin producing *E. coli* (STEC), but isolates commonly carry resistant genes, with resistance to sulfonamides and tetracycline common, with reports of ampicillin, streptomycin, and trimethoprim as well (Croxen et al. 2013). Collected from 1970-2000 across multiple continents, 48% of Enteroinvasive *E. coli* (EIEC) isolates were reported to be resistant to tetracycline, with a single isolate from Japan known to be resistant to all first-line antibiotics (Croxen et al. 2013). For Enterotoxigenic *E. coli* (ETEC) isolates from 2001-2004, 60% persisted in the presence of trimethoprim-sulfamethoxazole and tetracycline, and 50% were resistant to ampicillin, with some data showing an increase in resistance to ciprofloxacin from 1% in 1994-1997 to 8% in 2001-2004 (Croxen et al. 2013). While the different pathotypes display individual abilities to resist a variety of antibiotics, the ease with which these bacteria can transfer genetic material will likely continue to aid this organism to increase its multi drug resistant capabilities.

CHAPTER III: ADDITIONAL BACTERIA OF CONCERN

While the ESKAPE pathogens are collectively the most significant causes of clinical morbidity and mortality, there are additional organisms that were included in this study due to their unique abilities to cause severe disease as well as an ability to develop antimicrobial resistance. These additional organisms include *Bacillus anthracis, Cronobacter sakazakii, Enterococcus faecalis, Salmonella enterica,* and *Streptococcus pyogenes.*

Bacillus anthracis is easily the best recognized species of the *Bacillus* genus, given its history in recent decades as a powerful biological weapon as it is the biological origin of anthrax and can result in lethal systemic infections when introduced into cutaneous, gastrointestinal, or respiratory tissues (Koehler 2009). For decades, *B. anthracis* has been considered by biodefense experts as a strong candidate to be used as a biological weapon, given the ease with which it can cause severe disease as demonstrated in the 1979 accidental deployment in a Russian military microbiology lab wherein 66 of the 75 patients died from inhalation (Hendricks et al. 2014). The terrorist attacks of 2001 affirm the danger of *B. anthracis* as a biological weapon that could be easily deployed and decimate a targeted population. While uncomplicated cutaneous infections are easily treated, with a mortality rate of less than 2% thereafter, the same cannot be said for gastrointestinal or respiratory infections for which mortality rates increase to an alarming 40% or greater and 45% respectively, and even with antimicrobial treatment, anthrax meningitis is almost always fatal (Hendricks et al. 2014).

Naturally occurring *B. anthracis* has been shown to display multidrug resistance, as well as develop such resistance in vitro and regularly shows resistance to beta lactams, especially cephalosporins, with individual susceptible strains displaying the ability to become resistant during the course of treatment (Hendricks et al. 2014). Current treatment involves a 60-day prophylactic antibiotic course, generally using as first-line the FDA-approved ciprofloxacin and doxycycline for inhalation anthrax (Hendricks et al. 2014). Levofloxacin is also an FDA-approved option for inhalation anthrax; however, there is no safety data available after 30 days of treatment, and thus it is only considered if the first-line choices are unable to be used. Other options for anthrax treatment include moxifloxacin, clindamycin, amoxicillin, penicillin, if the strain is susceptible, though there is the risk of resistance development when using penicillins (Hendricks et al. 2014). The necessity for *B. anthracis* treatments is also imperative due to its potential use as a biological weapon. In 2006, the Department of Homeland Security issued a Material Threat Determination for multidrug resistant anthrax as a result of multiple publications describing methods for the generation of laboratory strains of antibiotic resistant *B. anthracis* (Stroud et al. 2012).

While *Cronobacter sakazakii* can be found in a variety of environmental sources, it is most notably a foodborne pathogen associated with severe infections of neonates generally via powdered infant formula. Its survival is due to its ability to live in extremely dry environments, and the bacterium is a regular cause of hospital outbreaks as well as occasional cases in homes and hospitals (Feeney et al. 2014, Farmer 2015). While the morbidity and mortality rates vary depending on the immune capabilities of the individual patient, manifesting disease can be quite severe including bacteremia, sepsis,

brain abscesses, cyst formation, necrotizing enterocolitis, and meningitis (Feeney et al. 2014). Necrotizing enterocolitis is of particular concern and one of the leading neonatal gastrointestinal infections, responsible up to 80% of infant deaths associated with *C. sakazakii* infection with survivors often suffering neurological symptoms such as delayed brain development, brain abscesses, or hydrocephaly (Feeney et al. 2014). One of the most severe outbreaks occurred in France in 1994 wherein out of 17 infected children, 7 cases resulted in necrotizing enterocolitis and 3 cases in neonatal deaths (Feeney et al. 2014). Originally, *C. sakazakii* was treatable with a variety of antibiotics, including beta lactams; however, clinical and environmental strains have been identified as possessing resistance to tetracycline, neomycin, and trimethoprim with a single strain having been observed with resistance to cephalosporin. Genomic sequencing has indicated that the *C. sakazakii* genome contains many sequences and mechanisms known to confer with antibiotic resistance, including resistance to the fluoroquinolones (Feeney 2014). As of 2015, the powdered infant formula industry has yet to be able to generate products free of contamination from a variety of microorganisms, including *Cronobacter*, other members of the *Enterobacteriaceae*, and other potential pathogens (Farmer 2015). Given the ease of transmission and severity of associated disease, the International Commission on Microbiological Specification for Foods has classified *C. sakazakii* as a "severe hazard for restricted populations, life-threatening, or with substantial chronic sequelae over long duration," as well as the World Health Organization and the Food and Agricultural Organization calling for more data on this particularly problematic pathogen (Feeney et al. 2014).

Together with the related species *E. faecium, Enterococcus faecalis* has become a problematic leading opportunistic pathogen in recent decades and is responsible for many hospital-acquired infections, including UTIs, bacteremia, meningitis, wound and neonatal infections (Anderson et al. 2016). Enterococci infections are now some of the most prevalent among those associated with health care, with *E. faecalis* responsible for approximately 60% of enterococcal infections (Prieto et al. 2016). While not considered a part of the normal oral microbiota, *E. faecalis* is found to be responsible for a number of dental diseases, such as periodontal disease, and are commonly found in previously filled root canals where they are more likely to form biofilms (Anderson et al. 2016). This capability to form biofilms is also associated with increased antibiotic resistance in those infections involving artificial medical devices, with successful treatment even further complicated by strains exhibiting the multidrug resistance common among enterococci (Anderson et al. 2016). A significant difference among the commonly encountered enterococci is that while *E. faecium* is primarily associated with hospitalized patients, *E. faecalis* has been detected in the community with strains isolated from healthy individuals identical to those found in hospitalized patients (Prieto et al. 2016). Already resistant to aminoglycosides, enterococci resistant to vancomycin has been on the rise since the 1980s, though that resistance is more often with *E. faecium* (Anderson et al. 2016, Prieto et al. 2016). Alarmingly, drugs used against vancomycin resistant enterococci (VRE), such as linezolid, tigecycline, and daptomycin, are becoming less effective as the frequency of VRE infections increases (Prieto et al. 2016).

Similar to *E. coli*, *Salmonella enterica* is another leading cause of diarrheal diseases, and as one of the most common foodborne pathogens, it is also known to be

responsible for typhoid and paratyphoid fevers (Curiao et al. 2016). A highly diverse species, *S. enterica* consists of over 2600 serovars, which are further separated into typhoid and non-typhoid, with typhoid serovars most often causing enteric fever (Card et al. 2016). A causative agent for foodborne illnesses worldwide, in the US alone *S. enterica* causes an estimated 1.4 million cases annually, leading to 17,000 hospitalizations and almost 600 deaths (Leekitcharoenphon et al. 2016). Of the foodborne outbreaks from 2007-2011, 89% were confirmed serovars from a variety of sources including eggs, meats, vegetables, dairy, and peanut butter (Andino and Hanning 2015). Typhoid and paratyphoid fevers may manifest as gastroenteritis, septicemia, or enteric fever, the last of which has been attributed to 22 million cases globally per year and 200,000 deaths requiring a dangerously low infection load of only 10,000 bacteria as able to cause enteric fever (Andino and Hanning 2015). Enteric fever can result in fatal damage to a variety of tissues such as the respiratory, hepatic, splenic, and/or neurological tissues. If not treated, mortality can reach 20%, however this can be dramatically improved to a mortality rate of less than 1% with successful treatment, although success is now complicated by increasing frequency of antibiotic-resistant strains leading to treatment failures (Fabrega and Vila 2013, Curiao et al. 2016). Antibiotic therapy is usually successful using fluoroquinolones and expanded spectrum cephalosporins; however, these first options are in danger of eventually becoming irrelevant as the rate of infections from those resistant to quinolones, fluoroquinolones and third generation cephalosporins has increased, with several serovars now considered to be multidrug resistant to more than five antimicrobials (Andino and Hanning 2015).

A commonly encountered bacterium, *Streptococcus pyogenes*, can cause multitude of infections from self-limiting illnesses, such as pharyngitis, impetigo, and cellulitis, to more serious clinical manifestations including pneumonia, toxic shock syndrome, necrotizing fasciitis, and endocarditis. Such infections can trigger secondary disorders such as post-streptococcal glomerulonephritis, acute rheumatic fever, and rheumatic heart disease (Walker et al. 2014). With industrialization and antibiotic production, there was a significant decrease in infections caused by *S. pyogenes*; however, along with many other bacterial caused infections, there has been a steadily increasing rate of infections with *S. pyogenes* ranked as the 9th leading infectious cause of mortality (Walker et al. 2014). The World Health Organization has estimated 18.1 million cases of severe streptococcal disease increasing by 1.78 million new cases and 517,000 deaths annually, with mortality often caused by invasive infections and, rheumatic heart disease, especially in underdeveloped countries (Walker et al. 2014). *Stretptococcus pyogenes* currently remains susceptible to penicillin, with only a single case of naturally occurring resistance ever reported, and thus it is the treatment of choice, along with cephalosporins, macrolides, and clindamycin, though there have been some reports of increased resistance to macrolides, clindamycin, and lincosamide (Walker et al. 2014). Antibiotic resistance of *S. pyogenes* varies across the globe, as is the case with macrolides, with resistance rates reported as high as 42% in Poland, and as low as 1.9% in Turkey, with the US coming in at 6.9% (Walker et al. 2014). An alarming trend has been increasing resistance to fluoroquinolones as was observed in Belgium where resistance rates increased from 4.3 to 21.6% from 2008-2010 with a similar trend observed in Spain, with resistance increasing from 1.9 to 30.8% in the span of only two

years (Walker et al. 2014). While *S. pyogenes* generally remains susceptible to penicillin, this potentially dangerous bacterium exhibits the same trends of increasing resistance as the previously discussed pathogens, collectively threatening to regress humans to a time before viable treatment options were available, thus increasing mortality rates worldwide.

CHAPTER IV: TRADITIONAL CHINESE MEDICINE

Due to the severity of disease and the increasing antibiotic resistance abilities of many bacterial species, it is becoming ever more imperative to focus clinical research on the discovery and manufacturing of new, more effective treatment options. One such research opportunity focuses on identifying compounds contained in plants that are used in Traditional Chinese Medicine (TCM). Traditional Chinese herbal medicine is an important component of the TCM system, overall accounting for 10% of prescription drugs, although some treatments can also be obtained over-the-counter (Li and Peng 2013). TCM has evolved and been actively practiced for the past 3,000 years with archeologists discovering medical texts inscribed on divination bones from 1,000 BCE (Schoenbart and Shefi 1997). The first reference to infectious disease appeared in text during the 1st or 2nd century CE, with the early practioners' understanding of infection progressing further into the Ming (14th-17th centuries) and Qing (17th-20th centuries) dynasties (Chen 2009). Medical texts have been written and are still used in current practice, dividing Chinese herbs into categories based on their uses, including those used to treat disease and toxicity (Schoenbart and Shefi 1997). Chinese medicinal herbs and herbal formulas have been shown to be extremely effective for treatment of various infections, and a main benefit of their use is attributed to the wide spectrum of activity combined with minimal side effects (Chen 2009). Modern research has confirmed that many plants described in Chinese culture do in fact contain compounds that have significant value and the potential to treat specific conditions (Schoenbart and Shefi 1997, Soare et al. 2012, Xie et al. 2013). For instance, a TCM formula designated by the

code name HZJW has been employed in Chinese clinics for the treatment of gastrointestinal complications, most commonly caused by peptic ulcers from *Helicobacter pylori* infections (Xie et al. 2013). Another study focused on extracts using the peony plant against five bacterial species, *P. aeruginosa* and *E. faecalis* among them. This research identified the *Paeonia officinals* ethanolic extract to contain compounds that effectively hindered the growth rates of all bacteria in the study (Soare et al. 2012).

Natural products, often derived from microorganisms themselves, represent the majority of compounds that have been used as antibiotics (Demain 2009). Many of the current antibiotics used are semisynthetic modifications of various natural compounds from fungi and bacteria, such as the fungal-derived beta-lactam antibiotics, which include the penicillins, the cephalosporins, and the carbapenems (Demain 2009). The importance of research devoted to identification of natural compounds that can be reproduced as antibacterial treatments has great potential in a field that is suffering from the increased antibiotic resistance of highly pathogenic organisms. If identified, these compounds can be used in designing more effective treatments to replace those that are no longer potent antibacterial compounds.

The long and well-documented history of medical practices using traditional Chinese herbal medicines allows for the likelihood of discovering active compounds from extracts studied in biological screening assays (Li and Peng 2013). With some research institutions successfully isolating anti-infective compounds, it is becoming evident that plants used in TCM may contain compounds that can be used to manufacture new treatment options for a wide range of medical disorders. Active compounds derived

from Chinese herbal medicines have been shown to be better lead components for further chemical improvements and offer substantial opportunities for the discovery of novel structures against a variety of infectious agents (Li and Peng 2013).

In an attempt to discover new antibacterial compounds, particularly for those bacteria described above, the overarching goal of this research was to identify the extracted fractions of plants used in TCM with antibacterial activity. The aims of this study were 1) to screen a library of extracts from plants for inhibitory activity against the twelve bacteria described above, and 2) test compounds purified from plant extracts for antibacterial activity. Although narrow-spectrum treatments for specific organisms can be desirable, antibacterial treatments are often administered empirically without specific diagnosis of a particular bacterium, thus necessitating broad-spectrum treatments. Thus, for this study, significance was placed on those extracts that show broad-spectrum capabilities, inhibiting the growth of multiple species as opposed to a single pathogen.

CHAPTER V: MATERIALS AND METHODS

Bacterial Strains

The bacteria tested in this study were obtained from the American Type Culture Collection (ATCC; Rockville, MD). The Gram-positive bacterial strains used for this study were as follows: *Bacillus anthracis* ATCC 4229, *Enterococcus faecalis* ATCC 29212, *Enterococcus faecium* ATCC 19434, *Staphylococcus aureus* ATCC 29213, and *Streptococcus pyogenes* ATCC 19615. Gram-negative bacterial strains used in this study included the following: *Acinetobacter baumanii* ATCC 19606, *Enterobacter aerogenes* ATCC 13048, *Escherichia coli* ATCC 25922, *Klebsiella pneumoniae* ATCC 13883, *Pseudomonas aeruginosa* ATCC 27853, and *Salmonella enterica* ATCC 13076. The Gram-negative bacterium *Cronobacter sakazakii* was an ampicillin-resistant, gentamicin-sensitive clinical isolate from the Alvin C. York Veterans Administration hospital (Murfreesboro, TN). All bacteria were cultured aerobically in either tryptic soy broth (TSB) or on tryptic soy agar (TSA) (both from Difco-Becton Dickinson, Sparks, MD) at 37°C in a humidified atmosphere for 18 – 24 h. Bacterial stocks on TSA were subcultured weekly and stored for 1 week at 4°C. Every 4 – 6 weeks, new stocks were cultured from bacterial stocks frozen at -80°C in TSB with 10% glycerol.

Plant Extracts and Pure Compounds

For these studies, crude plant extracts were provided by Guangxi Botanical Garden of Medicinal Plants (GBGMP) in Nanning, China. These samples were prepared from extraction of plant compounds from 37 different plants used in TCM and the parts of the plants used for extraction (whole plant, stems, leaves, roots, bark, and/or seeds) was dependent upon how they have been used in TCM. Extracts of plant material were prepared in at least four organic solvents, including petroleum ether, acetaldehyde, ethyl acetate, chloroform, butanol, methanol, ethanol, and water. Each extracted fraction was dried and resuspended in dimethyl sulfoxide (DMSO) to a concentration of 10 mg/mL (w/v). DMSO was chosen as the solvent because it has low toxicity for prokaryotic and eukaryotic cells. Each plant or crude extract was designated with a letter and/or number code. The crude plant extracts amounted to 151 samples for testing. Resuspended crude extracts or compounds were stored at 4°C in sterile glass vials or sterile microcentrifuge tubes and thawed on ice for use.

As part of another Tennessee Center for Botanical Medicinal Research (TCBMR) project, one of the crude ethanol plant extracts (CP1) was further fractionated. One subfraction (CPB1A) was also tested for antibacterial activity. Additionally, several purified compounds extracted from plant material were also provided by Dr. Iris Gao of the TCBMR. The purified compounds were resuspended in DMSO to concentrations of 10 mM and stored at 4°C in sterile glass vials or sterile microcentrifuge tubes and thawed on ice for use.

Antibacterial Assays

The methods for screening the plant extracts were based on the protocols for bacterial antibiotic resistance screening techniques outlined by the Clinical and Laboratory Standards Institute for bacteria that grow aerobically (CLSI 2006). The screens begin with direct colony suspension of the bacterium to be tested in TSB from a TSA plate that had been incubated for 18-24 h. The turbidity of that suspension was adjusted to reach an optical density at 600 nm of 0.100 as read by an Amersham Biosciences GeneQuant Pro spectrophotometer (GE Healthcare, Pittsburgh, PA), to achieve a suspension containing approximately $1x10^8$ colony forming units (CFU)/mL (CLSI 2006). From this point, the organism was transferred from TSB to Cation Adjusted Mueller-Hinton broth (CAMHB; Difco-Becton Dickinson) for a dilution of 1:20 and a final concentration of $5x10^6$ CFU/mL for testing. CAMHB is the standard testing medium of antibiotic susceptibility because it shows acceptable reproducibility for susceptibility testing, it supports satisfactory growth of most pathogens, and it is low in inhibitors that affect many antibiotics used in susceptibility tests (CLSI 2006).

Once the proper concentration of bacteria in CAMHB was achieved, a series of sample tubes were prepared containing the necessary components for the susceptibility testing. The crude sample extracts at a concentration of 10 mg/mL dissolved in DMSO were diluted 1:100 in CAMHB by adding 3 µL of crude extract to 297 µL of CAMHB broth for a final concentration of 100µg/mL and for purified compounds a final concentration of 100µM was obtained. The bacteria were added to the sample tube at 30 µL per sample tube for a total volume of 330µL, and a concentration of bacteria of

approximately 5 x 10^4 CFU/mL. The samples were then added in 100 µL volumes to triplicate wells of black-walled, clear bottom 96-well plates (Corning, Corning, NY).

Appropriate controls were also included for every 96-well plate. The control for inhibition of the bacteria was the bacteria with 2 µg/mL tetracycline (Sigma-Aldrich, St. Louis, MO). DMSO diluted 1:100 in CAMBH to which 5 x 10^4 CFU/mL was added was also used as a control to ensure that there was no growth interference from the primary diluent. There was also a bacterial growth control with 5 x 10^4 CFU/mL of bacteria in CAMHB for comparison of growth inhibition in the extract-treated samples. The final control used was CAMHB with no cells or extract to insure the sterility of the media and to use as the background control. All controls were tested in triplicate. A sample plate set up for testing plant extracts against a single species of bacteria is depicted in Figure 1. Once all samples were loaded into the 96 well plates, the plates were incubated aerobically at 37˚ C in a humidified atmosphere for 18-24 h. Following incubation, the susceptibility data was collected spectrophotometrically.

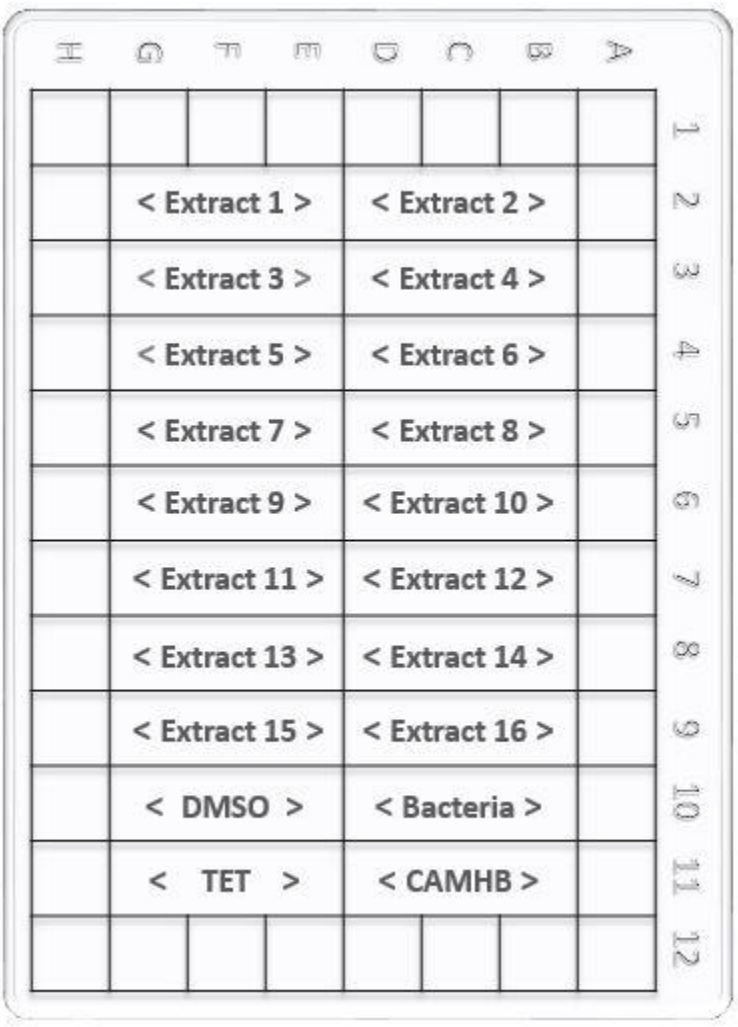

Figure 1. Sample 96-well plate setup. Extract and control samples (100 μL/well) were pipetted into triplicate wells of a black-walled 96 well plate. When possible, edge wells were left blank and inoculated with only sterile water to avoid evaporation during overnight incubation. Controls include: CAMBH (cation-adjusted Mueller-Hinton broth alone); Bacteria – 5 x 10^4 CFU/mL of test bacteria in CAMBH; DMSO – 1:100 dilution in CAMBH with 5 x 10^4 CFU/mL of test bacterium; and TET – 2 μg/mL tetracycline in CAMBH with 5 x 10^4 CFU/mL of test bacterium.

In order to determine active growth, a dye, Alamar Blue (Life Technologies, Grand Island, NY), was used to determine the level of metabolic activity in the bacterial cells. Typically, optical density measurements of bacteria at wavelengths of 595 - 600 nm are used to assess bacterial growth for antibiotic susceptibility testing. However, the dye was used in order to reduce false results, possibly due to plant pigments contained in some of the extracts, which might have absorbed light in the 595 – 600 nm range. The Alamar Blue reagent contains resazurin (blue and nonfluorescent), which is reduced to resorufin (pink and highly fluorescent) in living cells (O'Brien at al. 2000). Using a Molecular Devices SpectraMax M5 spectrophotometer (Sunnyvale, CA), the level of fluorescence was measured at wavelengths of 560 nm for excitation and 590 nm for emission. Alamar Blue was added used according to the manufacturer's guidance, and for these studies was the addition of 10 µL of dye reagent per well and incubation at 37°C for 1 h before quantification on the spectrophotometer. Inhibition of bacteria was considered significant for this study if the fluorescence was 50% or less than that of the uninhibited control. Purity checks for bacterial contamination were performed on selected wells from 96-well plates by plating on TSA and overnight incubation at 37°C.

Purified compounds from plants were diluted to 100 µM in DMSO. Procedures for testing these samples for bacterial inhibition were the same to those described above for the crude plant extracts.

Dilutions of Purified Compounds

For available pure compounds that exhibited greater than 50% inhibition of the measured fluorescence of uninhibited bacteria, a dilution series was performed to assess the minimum inhibitory concentration (MIC) at which 90-100% of bacteria were inhibited, as well as the concentration at which 50% of the bacteria were inhibited (IC50). To assess these concentrations, pure compounds were serially diluted two-fold from 100 µM to 3.125 µM in CAMBH, as appropriate, in 96-well plates for final volumes of 100 µL/well. Bacteria were adjusted as described above to a concentration of approximately 5 x 10^4 CFU/mL and added in 10 µL volumes to each well. All samples were tested in triplicate and appropriate controls as described for antibacterial screens were also added in triplicate to each plate. IC50 values were used to calculate the selectivity index for potential toxicity to mammalian cells by dividing the IC50 value for the mammalian cell line by the IC50 value for the bacterium (Polaquini et al. 2017).

Data and Statistical Analyses

Spectrophotometric data was adjusted by subtracting the average of at least three media blanks from values using the SoftMax Pro software (version 6.2, Molecular Devices) or MARS data analysis software for samples analyzed using the CLARIOstar microplate reader (BMG Biotech, Cary, NC). Triplicate values for each test sample were averaged in Microsoft Excel along with calculations of standard deviations and standard error of the mean. All crude extracts were tested against all bacteria at least twice. Extracts with greater than 50% inhibition were tested an additional 1-2 times. Pure

compounds were tested 1-2 tunes. The limited amounts of extracts and compounds prevented repeat testing of material.

Because triplicate values were used for all bacterial treated samples and controls, a *z*-score was calculated for all data points in order to compare the test results against the normal, uninhibited bacterial growth for each species and was done to provide statistical validity to the observed results. To calculate the *z*-score, the mean value for each triplicate was subtracted from the individual sample data and subsequently divided by the standard deviation. Only values with *z*-scores between -1.645 to 1.645 were considered for a significance level of 0.05.

Calculation of MIC and IC50 values was performed using GraphPad PRISM statistical software (San Diego, CA). Spectrophotometric values were normalized using the low and high values and sigmoidal curves generated by plotting the normalized fluorescence versus the $\log_{10}$ value of the pure compound concentration. The MIC and IC50 values were calculated from the best-fit curve.

CHAPTER VI: RESULTS

Crude extracts of plant material and seven plant-derived pure compounds were tested for inhibition against *Acinetobacter baumannii, Bacillus anthracis, Cronobacter sakazakii, Enterobacter aerogenes, Enterococcus faecalis, Enterococcus faecium, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Salmonella enterica, Staphylococcus aureus,* and *Streptococcus pyogenes* (Appendix A). The most desirable candidates of the crude extracts and pure compounds considered ideal for further study would be those with inhibitory activity of at least 50% of the control growth and effective against multiple organisms. DMSO was the solvent used to resuspend dried plant extracts or purified compounds. DMSO did not inhibit growth of any of the organisms by more than 5%.

Crude Extracts

A total of 30 crude extracts used in this study were observed to hinder the growth of 1-2 different organisms, primarily *B. anthracis* and *S. pyogenes*, which still exhibit susceptibility to many antibiotics and for which penicillins are still the antibiotics of choice. These extracts included CP1, CP2, CP3, 1A, and 1B. Though only active against these two organisms, these five extracts consistently showed high levels of inhibition against both *B. anthracis* and *S. pyogenes* with inhibition between 84-92% and as high as 99% in the screening of CP1 against *S. pyogenes*. Additionally, extracts 21B and 21C were moderately active against both *C. sakazakii* and *E. aerogenes* at 69% and 55% inhibition, respectively. Any additional crude extracts that displayed inhibition by at least 50% of the uninhibited control were active against only one organism, primarily either *C.*

sakazakii or *S. pyogenes* with varying rates of inhibition ranging from 52-94%. None of the crude extracts included in this study were inhibitory for the Gram-negative bacteria, *A. baumannii*, *K. pneumoniae*, *P. aeruginosa*, or *S. enterica.*

Crude extracts of the MDZ family, primarily MDZ1 and MDZ5 were > 50% inhibitory to six species of bacteria. As shown in Figure 2, both MDZ1 and MDZ5 were active to a similar extent against the same six bacteria, including the Gram-positive species *B. anthracis, E. faecalis, E. faecium, S. aureus, and S. pyogenes,* and a single Gram-negative bacterium, *E. coli*. Both extracts displayed exceptionally high levels of inhibition with 90% inhibition against *B. anthracis, E. faecalis, E. faecium*, and as high as 96% inhibition against *S. aureus*. The extracts were the least effective at inhibiting *E. coli*, and MDZ4 was less than 50% inhibitory for *E. coli*. It should be noted that none of the extracts were bactericidal at the concentrations tested, but only inhibited growth. Although there was variation in the number of species of bacteria for which these extracts were inhibitory, their high levels of inhibition, compared to the approximate 120 extracts that had less than 50% bacterial inhibition, distinguish them as extracts warranting further purification and study.

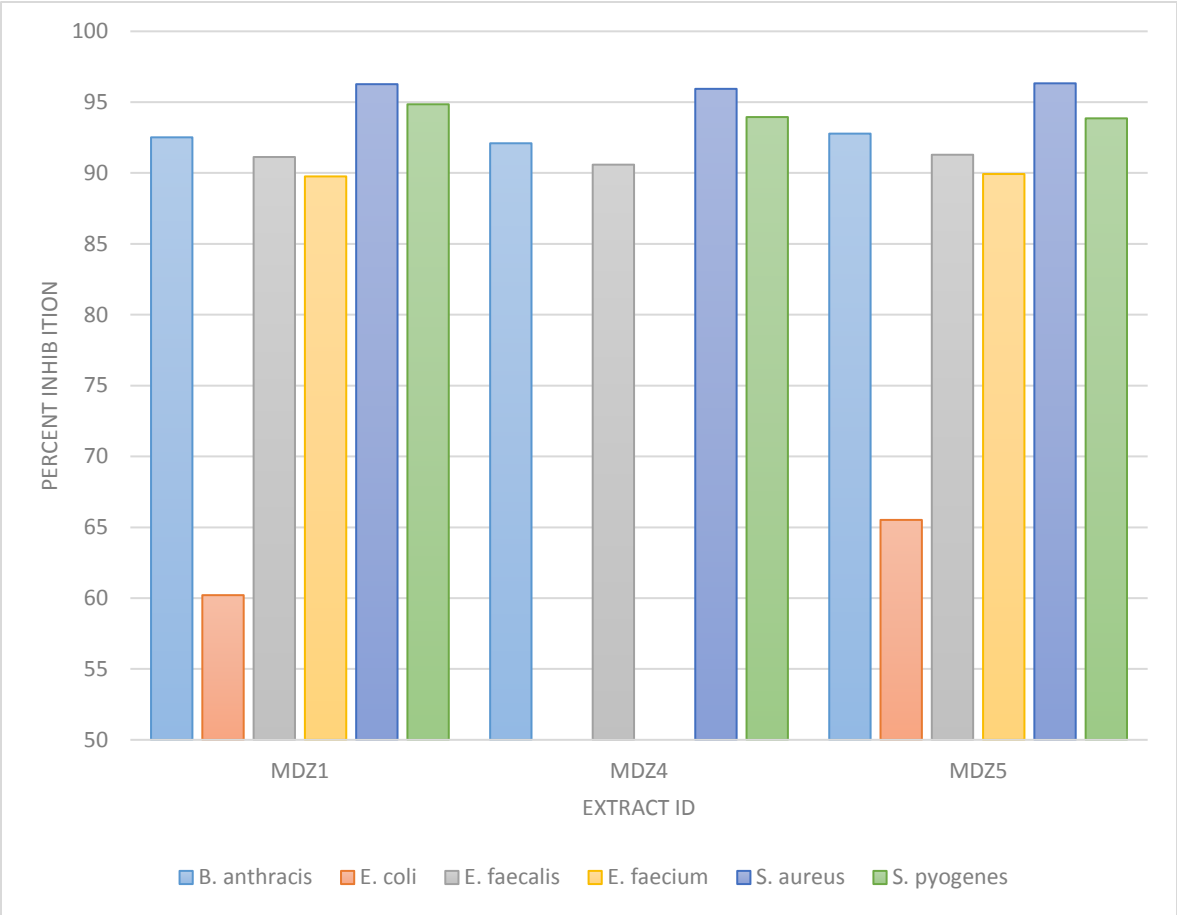

Figure 2. Inhibition of bacteria by crude plant extracts. Crude plant extracts (100 µg/mL) were tested for their inhibitory activity of twelve bacteria in a microdilution assay with Alamar Blue detection of metabolic activity. Plant extracts designated MDZ were > 50% inhibitory for at least four different species of bacteria. Bars represent the average percentage of fluorescence of triplicate extract-treated bacteria compared to fluorescence for triplicate samples of untreated bacteria. *Z*-scores were calculated for all raw data, and all z-scores were within the range for 95% certainty.

Purified Compounds

Although multiple interacting substances might be present in crude extracts, thus making the extracts beneficial as treatment options, pure compounds would allow for characterization of the active molecule, and possible synthesis of that molecule, thereby removing reliance on plant growth or harvest for that compound. Additionally, purified compounds might exhibit a broader spectrum of activity compared to the crude extracts in which the concentrations of the active compounds are unknown.

Through Dr. Iris Gao, the TCBMR received compounds from China that had been purified from plant material. Thirteen of these compounds were screened similarly to the crude plant extracts to assess inhibition of bacteria at a concentration of 100µM (Appendix A). The compound designated DSK4, purified from the same plant as the LP extracts, was active against 9 of the 12 bacterial pathogens, making DSK4 the most active of any of the extracts or compounds included in this study. While the LP extracts showed levels of acceptable activity (at least 50% inhibition) against only *S. pyogenes*, the purified compound DSK4 showed significant activity against *B. anthracis, C. sakazakii, E. coli, E. faecium, K. pneumoniae, P. aeruginosa, S. aureus,* as well as *S. pyogenes* (Figure 3). The degree of inhibitory activity of DSK4 varied amongst the pathogens from as low as 53% against *E. coli* to 95% inhibition of *S. aureus.* While there were additional purified compounds that inhibited *P. aeruginosa,* DSK4 had the highest rate of inhibition against this organism at approximately 90% of the control, which was greater than inhibition by the other purified compounds against this particular pathogen. Additionally, DSK4 was the only purified compound that was successful against *E. coli*, as well as

being the only plant extract or compound that was inhibitory to *K. pneumoniae* (63.73% inhibition, Appendix A). Although below the minimum percentage of 50% inhibition, DSK4 was also the most successful at inhibiting *S. enterica* (43.19% inhibition, Appendix A), which was able to evade antibacterial action by almost all of the plant extracts tested throughout the study.

Several purified compounds, derived from the same plant as the MDZ crude extracts, and referred to as the "Y" compounds, were observed to have significant activity against a number of the pathogens used in this study. Of these compounds, Y8 was more inhibitory against *B. anthracis*, *C. sakazakii*, *E. faecalis*, *E. faecium*, *P. aeruginosa*, *S. aureus*, and *S. pyogenes* with consistently high levels of inhibition, the lowest being 84.37% against *S. pyogenes* and as high as precisely 97.73% against *C. sakazakii* (Figure 3). While there were individual crude plant extracts that were inhibitory for *C. sakazakii*, levels of inhibition were between 52-70%, and only two of these extracts were inhibitory against another species, specifically the closely-related bacterium, *E. aerogenes*. Y8 was the only Y compound with inhibitory activity against *C. sakazakii* and had the highest observed antibacterial activity against this organism.

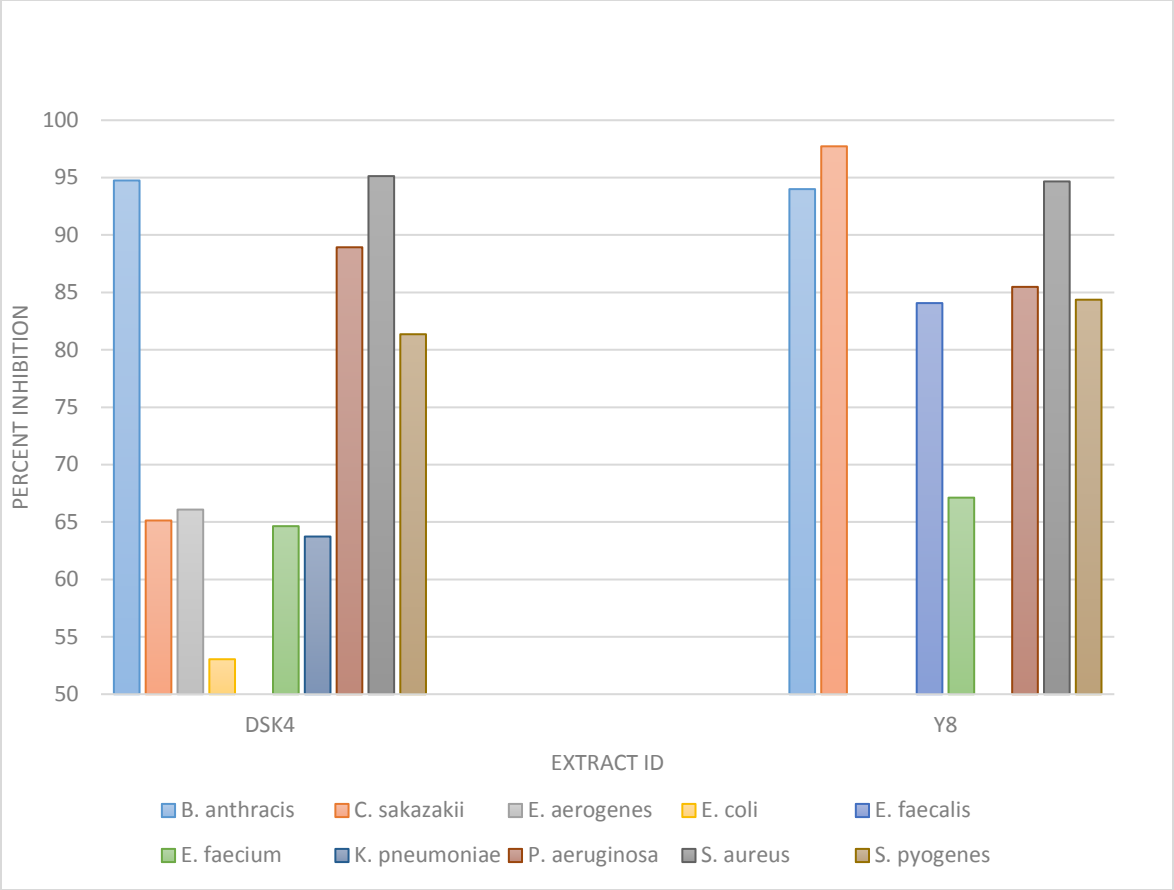

Figure 3. Inhibition of bacteria by pure compounds DSK4 and Y8. Compounds purified from plants designated as LP (DSK4) and MDZ (Y8) were tested for their inhibitory activity of twelve bacteria at 100 µM concentrations in a microdilution assay with Alamar Blue detection of metabolic activity. DSK4 was > 50% inhibitory for nine different species of bacteria. Y8 was >50% inhibitory for 7 bacteria. Bars represent the average percentage of fluorescence of triplicate extract-treated bacteria compared to fluorescence for triplicate samples of untreated bacteria. *Z*-scores were calculated for all raw data, and all z-scores were within the range for 95% certainty.

While not as inhibitory as Y8, Figure 4 displays the antibacterial activity for the Y compounds. Each compound was >50% inhibitory for four bacteria. Though both compounds were almost identical in their percent inhibition of *B. anthracis* and *S. aureus*, Y15 was also inhibitory for *P. aeruginosa* and *S. pyogenes*, whereas Y16 was inhibitory to *E. faecalis* and *E. faecium*. Interestingly, Y15 provided the highest percent inhibition against *A. baumannii* (39.56%, Appendix A). Compounds Y8 and Y16 also exhibited slight levels of activity against *A. baumannii* (30.60% and 29.01%, respectively; Appendix A). Compound Y8' inhibited *B. anthracis* (72.85%) and *S. aureus* (89.85%), while Y13 was inhibitory for *B. anthracis* (70.43%) and *E. faecalis* (80.67%) (Appendix A); however, these compounds were not as broadly inhibitory as compounds Y8, Y15, and Y16, and limited material prevented repeat testing of these compounds.

Two compounds were purified in the Chemistry Department of MTSU from the crude plant extract CPB and designated as CPB1A and CPB1B. The compound designated CPB1A was the only one of these purified compounds with qualities that implicate it as a desirable candidate for further study of its antibacterial capabilities (Figure 4). CPB1A was observed to be inhibitory to four organisms: Gram-positive bacteria, *B. anthracis, E. faecium,* and *S. pyogenes*, and *P. aeruginosa*, a Gram-negative bacterium. While its activity against *B. anthracis* was 94%, an inhibitory percentage similar to previously discussed compounds for *B. anthracis*, CPB1A was only moderately inhibitory for *E. faecium* (76.77%), *P. aeruginosa* (65.88%), and *S. pyogenes* (82.8%) (Appendix A). Though many of the same species were affected by this compound, CPB1A was not isolated from the same plant source as the Y compounds. Further study

of these compounds, including repeated trials, is required to be able to determine their usefulness as candidates that could be further developed as antibacterial compounds.

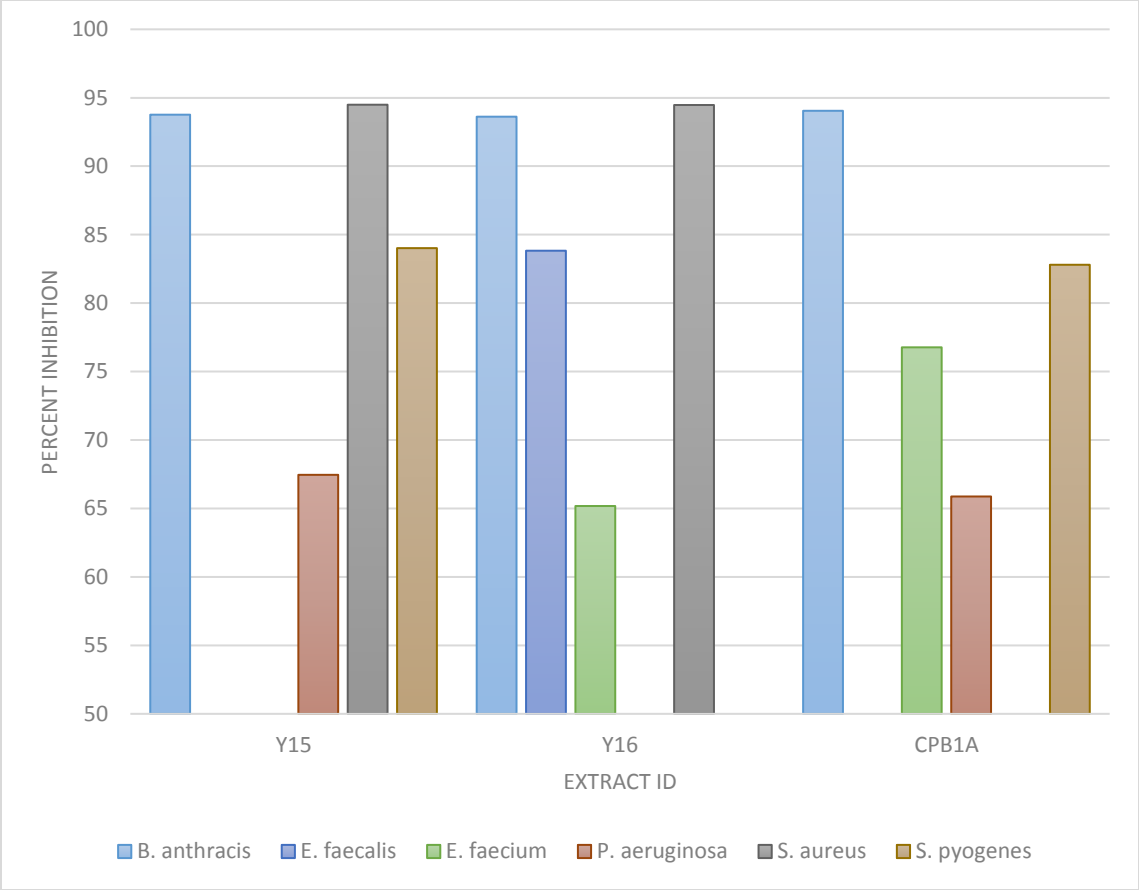

Figure 4. Inhibition of bacteria by pure compounds Y15, Y16, and CPB1A. Compounds purified from plants designated as MDZ (Y15 and Y16) and CP (CPB1A) were tested for their inhibitory activity of twelve bacteria at 100 µM concentrations in a microdilution assay with Alamar Blue detection of metabolic activity. Each compound was > 50% inhibitory for four different species of bacteria. Bars represent the average percentage of fluorescence of triplicate extract-treated bacteria compared to fluorescence for triplicate samples of untreated bacteria. *Z*-scores were calculated for all raw data, and all z-scores were within the range for 95% certainty.

The remaining purified compounds that exhibited >50% inhibition against the twelve pathogens tested in this study were moderately active (50-70%, Appendix A), primarily against *P. aeruginosa*. No purified compounds or crude extracts successfully inhibited the growth of *A. baumannii* or *S. enterica* by at least 50%, with Y15 being the most active against *A. baumannii* (39.56% inhibition, Appendix A) and DSK inhibiting *S. enterica* at 43.19%, which was the highest percent inhibition observed for any extract or compound included in this study against this pathogen.

MIC and IC50 Determination

The MIC value is used to determine the concentration of an antibacterial that is 90-100% inhibitory for a bacterium, whereas the IC50 is useful for estimating the toxicity of antimicrobials for mammalian cell lines. Both of these values were calculated from the dose response curves generated in GraphPad Prism. Unfortunately, lack of material prevented additional testing on the purified compounds, and as such MIC and IC50 values were only obtained for Y8, Y15, and Y16 and a subset of the ESKAPE pathogens against which these compounds were effective.

The dose response curve, IC50, and MIC values for Y8 against *S. aureus* are displayed in Figure 5. Using GraphPad Prism software, the IC50 value was determined to be 51.02 µM and the MIC was 56.10 µM. There was not much difference between the IC50 and MIC concentrations demonstrating that Y8 is effective for *S. aureus* over a narrow concentration range. In discussion with Hyo S. Park of MTSU, the IC50 value for Y8 against THP-1 human monocytes was 5 µM which results in a calculated selectivity index of 0.098 µM.

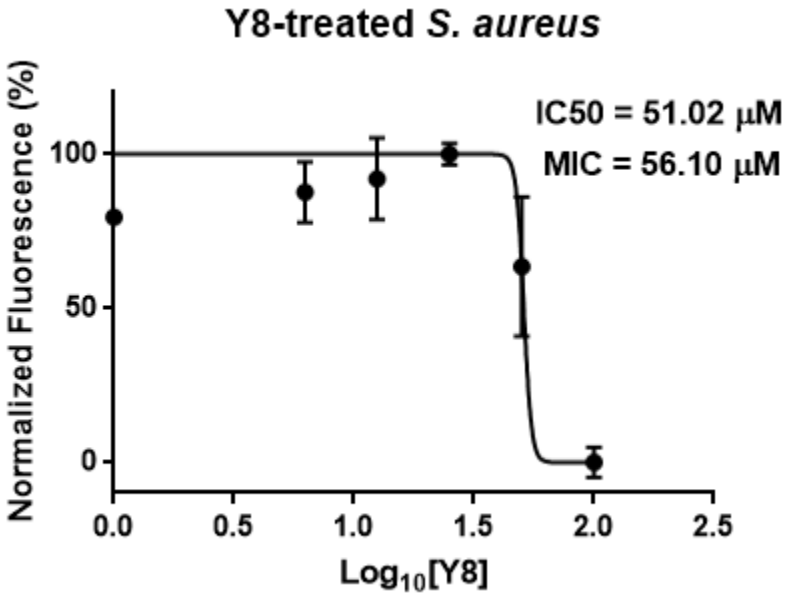

Figure 5. Dose response curve for Y8 against *S. aureus*. *S. aureus* was treated with two-fold dilutions of Y8 from 100 to 3.13 μM. The y axis represents the percent growth of the bacterium compared to the untreated control using Alamar Blue fluorescent values normalized to the high and low value. The x axis values are the $\log_{10}$ converted concentrations of the purified compound. Log_{10} MIC = 1.749, Log_{10} IC50 = 1.708, R^2 = 0.837.

Similar to *S. aureus*, the IC50 value of Y8 against *E. faecalis* was calculated at 59.05 µM, but the MIC was 100.7 µM which is the maximum test concentration of the compound, demonstrating that Y8 loses effectivity with dilution (Figure 6A). The selectivity index for THP-1 monocytes was calculated at 0.085. *E. faecium* was also tested against Y8. The MIC was 54.49 µM and the IC50 was lower than for *S. aureus* or *E. faecalis* at 28.06 µM; however, the selectivity index was still a low value, calculated at 0.18. A dose response curve for Y8 was also performed for *P. aeruginosa*, however, the R^2 value for the curve was low and not enough material was available to repeat the curve.

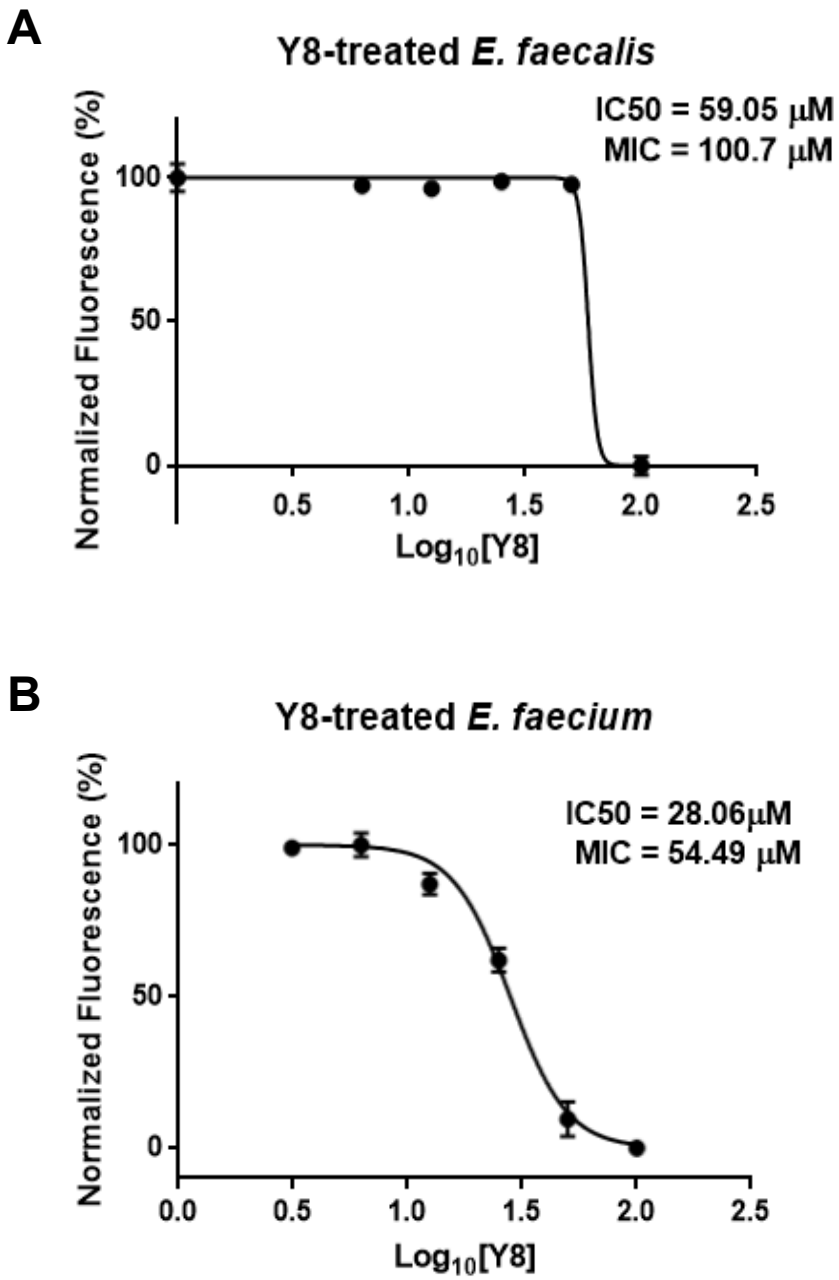

Figure 6. Dose response curves for Y8 against *E. faecalis* and *E. faecium*.
A) *E. faecalis* and B) *E. faecium* were treated with two-fold dilutions of Y8 from 100 to 3.13 μM. The y axis represents the percent growth of the bacterium compared to the untreated control using Alamar Blue fluorescent values normalized to high and low values. X axis values are the $\log_{10}$ converted concentrations of the purified compound. *E. faecalis:* Log_{10} MIC = 2.003, Log_{10} IC50 = 1.771, R^2 = 0.948. *E. faecium*: Log_{10} MIC = 1.736, Log_{10} IC50 = 1.448, R^2 = 0.981.

Compound Y15 was only able to be successfully tested against a single organism, *S. aureus*, before resources were exhausted. As for Y8, the R^2 value for the dose response curve for *P. aeruginosa* was low. The *S. aureus* dose response curve, MIC, and IC50 values are displayed in Figure 7. At 9.406 µM, the IC50 for Y15 against *S. aureus* is the lowest IC50 value for the tested compounds and bacteria. Using the IC50 value of 49.8 µM from Gao et al. (2015) for the HMEC human cell line, the selectivity index was calculated at 5.29. Hyo S. Park of MTSU did not calculate an IC50 value for the THP-1 monocytes because she reported having > 90% viability at a 100 µM concentration, but had one been calculated, would result in a selectivity index of > 10 (personal communication).

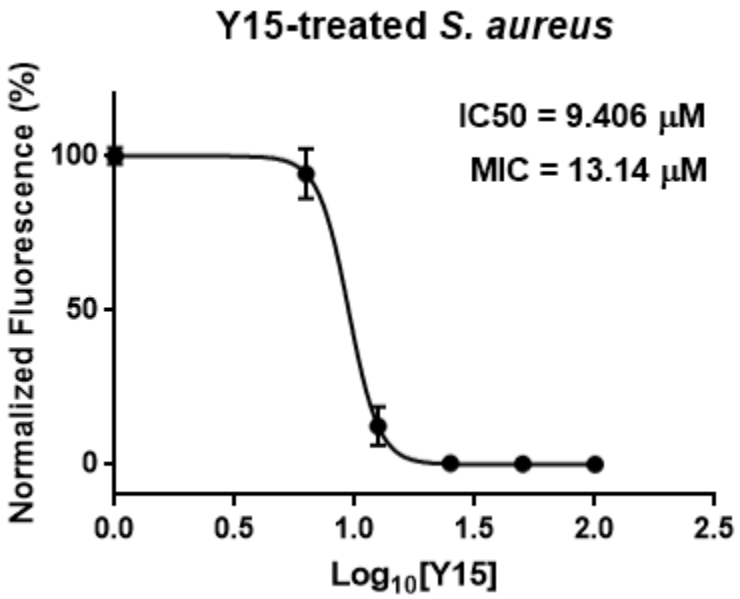

Figure 7. Dose response curve for Y15 against *S. aureus*. *S. aureus* was treated with two-fold dilutions of Y15 from 100 to 3.13 μM. The y axis represents the percent growth of the bacterium compared to the untreated control using Alamar Blue fluorescent values normalized to the high and low value. The x axis values are the $\log_{10}$ converted concentrations of the purified compound. Log_{10} MIC = 1.119, Log_{10} IC50 = 0.9734, R^2 = 0.973.

Additionally, Y16 was able to be tested against several species before the stock of material required replenishing. Gao et al. (2015, reported the IC50 for Y16 against HMEC human cell lines as 49.3 µM, and this was the value used to calculate the selectivity index for Y16 against the tested bacteria. As for Y15, an IC50 for human THP-1 monocytes was not calculated because cells were >90% viable at the 100 µM concentration (Hyo S. Park, MTSU, personal communication).

Figure 8 displays the dose response curve, IC50, and MIC for Y16 against *S. aureus*. With an MIC of 48.43 and an IC50 value of 25.17 µM, the selectivity index was determined to be 1.96. Y16 was able to be diluted more than Y8 or Y15 and still retain inhibitory activity against *S. aureus.* The dose response curves, MIC, and IC50 values for Y16 against *E. faecalis* and *E. faecium* are displayed in Figure 9. Similar to *S. aureus*, the values were lower than for Y8-treated enterococci. For *E. faecalis*, the MIC and IC50 were 13.37 µM and 12.27 µM, respectively. Although lower than for Y8, these values represent a narrow concentration gradient for inhibition. For *E. faecium,* the Y16 MIC and IC50 values were 24.89 µM and 21.66 µM, respectively, again with a narrow concentration range for effectiveness. The selectivity indices for HMEC cells with *E. faecalis* were 4.02 for and 2.28 for *E. faecium,* which were both higher than those observed for Y8. Given that Y16 was not toxic for THP-1 cells at 100 µM, the selectivity for *S. aureus* and the enterococci would be > 10.

For all of the organisms for which the pure compounds were effective, more of the purified compound would have facilitated further testing, including checkerboard

assays to determine whether these compounds would have been synergistic or antagonistic to known antibiotics.

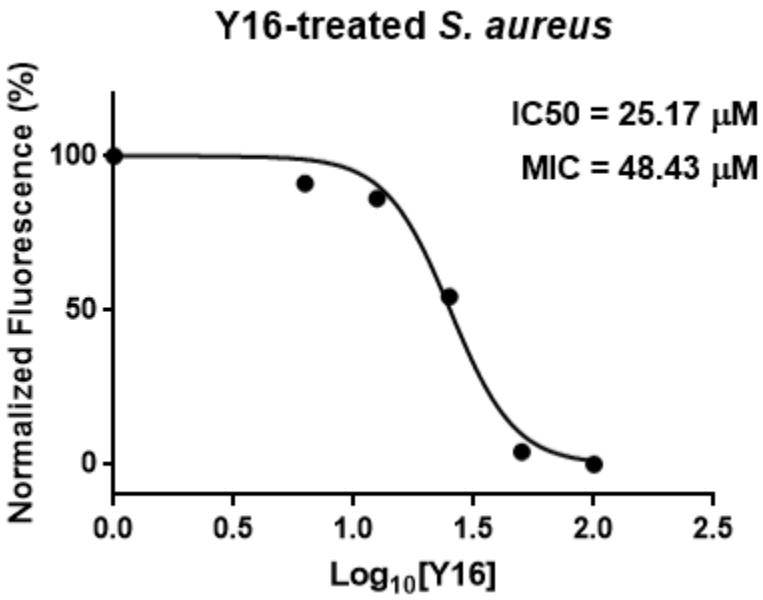

Figure 8. Dose response curve for Y16 against *S. aureus*. *S. aureus* was treated with two-fold dilutions of Y15 from 100 to 3.13 μM. The y axis represents the percent growth of the bacterium compared to the untreated control using Alamar Blue fluorescent values normalized to the high and low value. The x axis values are the $\log_{10}$ converted concentrations of the purified compound. Log_{10} MIC = 1.689, Log_{10} IC50 = 1.401, R^2 = 0.987.

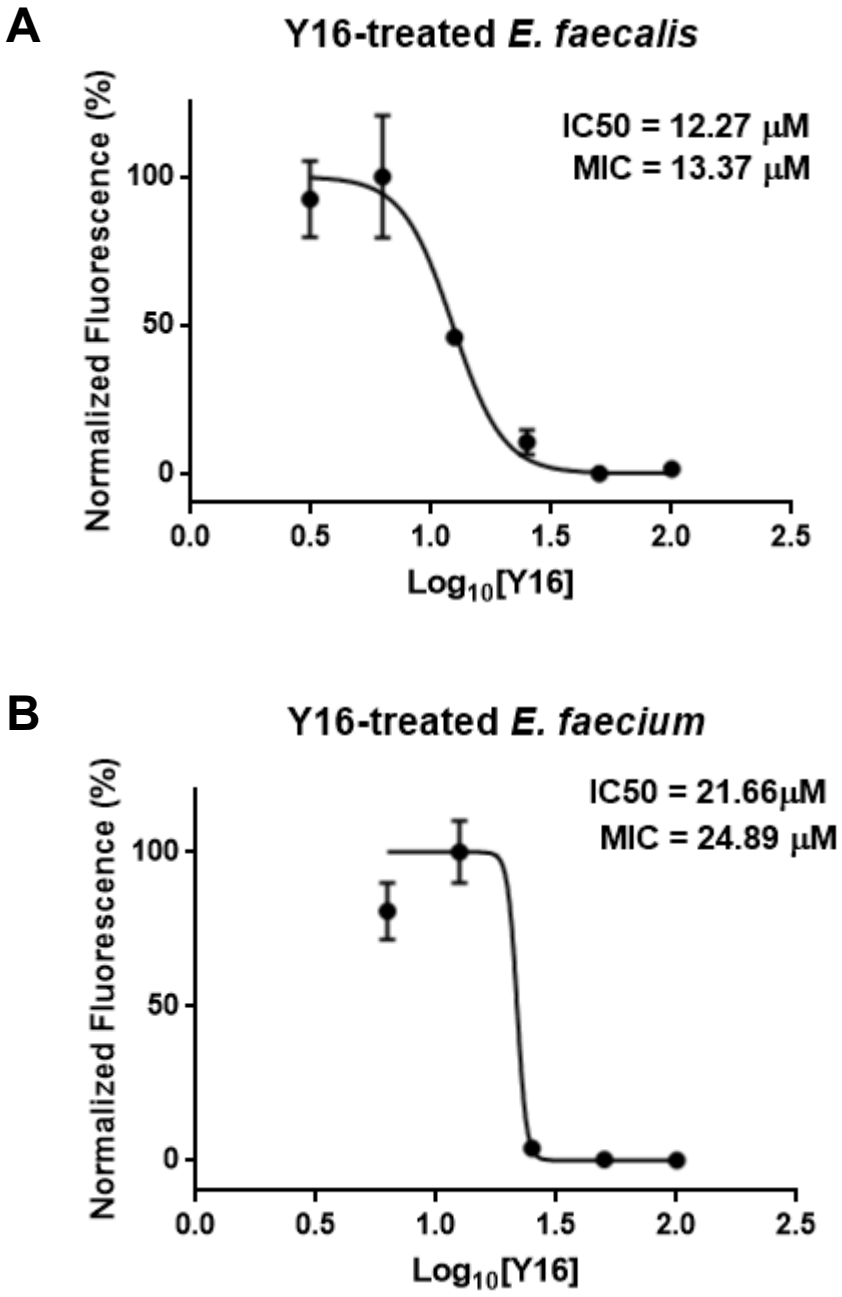

Figure 9. Dose response curves for Y16 against *E. faecalis* and *E. faecium*.
A) *E. faecalis* and B) *E. faecium* were treated with two-fold dilutions of Y8 from 100 to 3.13 μM. The y axis represents the percent growth of the bacterium compared to the untreated control using Alamar Blue fluorescent values normalized to high and low values. X axis values are the $\log_{10}$ converted concentrations of the purified compound. *E. faecalis:* Log_{10} MIC = 1.126, Log_{10} IC50 = 1.089, R^2 = 0.9502. *E. faecium*: Log_{10} MIC = 1.396, Log_{10} IC50 = 1.4336, R^2 = 0.948.

CHAPTER VII: DISCUSSION

Previously confined to healthcare associated institutions, the ESKAPE pathogens are now encountered in community settings with increasing frequency, allowing these highly antibiotic resistant species to spread easily with limited treatment options to the point that in 2010, the Infectious Diseases Society of America called for ten new antibiotic drugs by 2020 as a response to the growing threat that this collection of bacteria represents (Wright 2012). One possible route to discover novel compounds is to explore bioactive compounds derived from natural sources, such as plant material. Though the overall rate has been on decline through the decades, naturally derived compounds comprise 69% of all antibacterial agents and since 2000, 77% of approved antibiotics are natural products derived exclusively from microbes (Patridge et al. 2015).

During the Golden Age of antibiotic discovery, plant-derived antibacterial products represented 22% of all approved new molecular entities but has been reduced to only 8.7% since the 1950s (Patridge et al. 2015). The lack of plant-derived antibiotics over time can likely be attributed to the inherent difficulties in developing antibiotics derived from plant material. Obtaining testable material can be costly and time consuming with the requirement of harvesting enough plant material, as well as having constraints on the length of time devoted to growing large quantities to maturity. Additionally, it is not only common for the same compound to be isolated from different plant sources, but the extracts derived from plant material can be chemically complex, in that they are composed of a variety of compounds that often act in synergistically further complicating the ability to observe or even determine antibiotic capability (Quave 2016).

These complications have led to plant material being an underutilized source in the research for antibiotic discovery.

Despite the lack of new drugs attributed to plant-derived products, the therapeutic benefits of plants have been well documented in human history across many cultures. In 2002, the WHO reported that 80% of the African population uses a primarily botanical-based medicinal practice in addition to the 40% of all healthcare delivered remedies in China (Quave 2016). While challenging, plants provide a diverse network of structural compounds that provide a particular function to the plant, including defense mechanisms, which could provide a platform to study for any possibly bioactive properties (Quave 2016).

With the history and thorough documentation associated with Traditional Chinese Medicine, extracts obtained with cooperation of the TCBMR were screened with varying rates of success. The most desirable candidates for further study would have been those that were observed to hinder growth rates to multiple organisms by 50% or greater of the control growth. Out of more than 150 of the extracts tested, only 10 extracts inhibited 2 or more of the 12 bacteria tested by > 50%, and only three of those extracts (MDZ1, MDZ4, and MDZ5) inhibited more than three bacteria by >50% to be considered as candidates for broad-spectrum study and subsequent testing.

Because purified compounds were obtained that were isolated from some of the plants with inhibitory activity, these compounds were chosen for further testing. The purified compound designated DSK4 (from the plant designated as LP) is classified as a phloretin, belonging to a class of polyphenols that can be found from a variety of plants

such as those included in the TCBMR, as well as fruits such as apples and strawberries (Lee et al. 2011). Phloretin has been shown in previous studies to possess antibacterial properties as well as a variety of other useful biological functions in cancer research and cardiovascular disease (Lee et al. 2011). Specifically, the bioactivity of phloretin results in inhibition of biofilm formation by *E. coli* O157:H7, while not inhibiting commensal *E. coli* (Lee et al. 2011). Similar results were obtained when several species of pathogenic bacteria were treated with phloretin and the observed inhibitory activity validated the possibility that phloretin could be useful as a future treatment against a range of infectious agents (Barreca et al. 2014). This study has expanded on the research of Barreca et al. (2014) by including a panel of 12 selected species, of which the phloretin DSK4 inhibited the growth of 9 species making it an excellent candidate as a broad-spectrum antibiotic. No remaining compound was available for dose response testing, but additional research into cellular toxicity will be conducted to determine if phloretin as a future treatment in human disease.

All purified Y compounds were derived from the same source as the MDZ compounds. Compounds from this plant have been shown to have bioactive properties that include antibiotic activity. Resveratrol is another natural plant-based compound, a polyphenol known to be present in wine, grapes, berries, and peanuts that has been shown to possess antibiotic activity against both Gram-negative and Gram-positive species prevalent as causes of foodborne illnesses such as those caused by *S. aureus* and *E. coli* (Ma et al. 2018). The resveratrol (E)-form, designated as compound Y3, did not show any significant activity in this study, however several derivatives of resveratrol did have strong antibacterial activity and have been cited in additional studies as well. After

DSK4, Y8, a trans-ε-viniferin, was inhibitory for the majority of the bacteria included in this study. This derivative of resveratrol belongs to a class of stillbenoids, which have been shown to exhibit antibacterial activity against MRSA (Basri et al. 2014). Research done by Basri et al. (2014) provided insight into trans-ε-viniferin by utilizing the microdilution checkerboard method to determine the fractional inhibitory concentration and determined that this compound is likely to act similarly to the antibiotic protein inhibitor, linezolid.

Additional derivatives of resveratrol, termed gnetin H, are the compounds designated Y15 (*cis* form) and Y16 (*trans* form) were shown in this study to have antibacterial activity against primarily the Gram-positive species included in the panel. Within the TCBMR research, both compounds from *Paeonia suffruticosa* have demonstrated significant activity in anticancer and anti-inflammatory studies (Gao et al. 2015, Park et al. 2016). These oligostillbenes have been shown in additional studies to possess antibacterial activity against *Streptococcus* and *Staphylococcus* species (Liu et al. 2014). With no information as to the identity of compound CPB1A, this would be an ideal compound to investigate further.

Dose response curves allowed for calculations of MIC concentrations to assess whether dilutions of the compounds could be still be inhibitory. By performing IC50 calculations, selectivity indices could be determined which would provide some insight as to the ability of the compound to possibly be used as a treatment by measuring the IC50 of the bacterial activity against the IC50 of mammalian cell lines. Generally, the efficacy of a compound is determined by a selectivity index of ≥ 10, while a value of ≤ 1

indicates toxicity (Polaquini et al. 2017). For Y8, no IC50 data is available for HMEC cells as this compound was toxic for these cells. For THP-1 cells, the IC50 was 5 µM. Unfortunately, all compounds for which selectivity indices were determined had selective indices less than a value of 10, and therefore might be considered unacceptable as an injectable drug. However, Y15 and Y16 both had selective indices greater than 1 for HMEC cells and potentially greater than 10 for THP-1 cells which make them candidates for further consideration. It is possible that DSK4 or CPB1A could also be candidate drugs, and DSK4 had low toxicity for THP-1 cells (Hyo S. Park, MTSU, personal communication); however, due to limited availability of these compounds, dose response curves could not be generated. More availability of the compounds could also have allowed for human erythrocyte hemolysis assays and checkerboard assays for synergism or antagonism with known antibiotics.

While difficult to produce, especially if plant material is limited, this research could be further improved by an increased availability of any purified compounds. Not only are purified compounds easier to study, but they also revealed inhibitory activity not observed for the crude plant extracts, as was the case with DSK4 which was purified from the plant designated as LP.

To some extent, it is not surprising that many of the plant extracts did not exhibit overt antibacterial activity. Plants produce a variety of secondary metabolites that can used to protect the plant from adverse environmental conditions (Gupta and Birdi 2017). While it would be beneficial for a plant to produce a compound inhibitory for a plant pathogen, production of a broad-spectrum antibacterial could be detrimental to the plant.

Plants have commensal bacteria as part of their plant tissue, including the seeds, and studies have shown that veterinary antibiotics in soils can be harmful to plants (Finkel et al. 2017, Minden et al. 2017).

Despite the inactivity of many of the crude plant extracts and limited supply of purified compounds, the results of this study are promising for future inclinations, not only in terms of the extracts included in this study, but in the search for more antibiotics using plant material as a base for discovery which must be utilized as much as possible against a highly active arsenal of pathogenic bacteria that threaten current and future medical capabilities of which antibiotics are a most critical tool necessary to most if not all of modern medicine. Additional research should be dedicated to the continuation of this study as well as possible routes to reduce the toxicity of those compounds that were inhibitory to bacterial cells but toxic to human cells such as possible modifications that could reduce such a detrimental effect.

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APPENDICES

APPENDIX A

Raw Data for Plant Extracts

Microorganism:		A. Baum								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.6	Untreated	29699	30703	33379	31260.333	1902.253	0	-0.82078	-0.29299	1.113767
	17B	19355	24877	24995	23075.667	3222.732	26.182	-1.15451	0.558946	0.595561
	17C	29930	28438	27206	28524.667	1364.066	8.751	1.030253	-0.06354	-0.96672
	17D	28209	27804	26452	27488.333	920.052	12.066	0.783289	0.343096	-1.12639
	18A	25505	22513	22950	23656.000	1616.120	24.326	1.144098	-0.70725	-0.43685
	18B	16196	27249	31772	25072.333	8012.887	19.795	-1.10776	0.271646	0.836111
	18C	16157	32158	32241	26852.000	9262.235	14.102	-1.15469	0.572864	0.581825
	18D	27993	25369	24587	25983.000	1784.084	16.882	1.126629	-0.34415	-0.78247
	19A	21134	26781	26784	24899.667	3261.163	20.347	-1.1547	0.57689	0.57781
	19B	22397	25428	26434	24753.000	2101.443	20.817	-1.12113	0.321208	0.799927
	19C	25513	25185	24958	25218.667	279.027	19.327	1.054854	-0.12066	-0.9342
	19D	26858	26790	26295	26647.667	307.305	14.756	0.684445	0.463166	-1.14761
	20A	23507	28046	28758	26770.333	2848.464	14.363	-1.14565	0.447844	0.697803
	20B	22737	24028	24524	23763.000	922.503	23.984	-1.11219	0.287262	0.82493
	20C	24141	28614	28363	27039.333	2513.166	13.503	-1.15326	0.626567	0.526693
	20D	27420	27680	18279	24459.667	5354.193	21.755	0.5529	0.60146	-1.15436
	21A	26430	28651	20648	25243.000	4131.432	19.249	0.28731	0.824896	-1.11221
	21B	28846	34174	33336	32118.667	2865.017	-2.746	-1.14229	0.71739	0.424896
	21C	31317	33155	29450	31307.333	1852.519	-0.150	0.005218	0.997381	-1.0026
	21D	27004	26619	21409	25010.667	3125.069	19.992	0.637853	0.514655	-1.15251
	SB1	31626	26802	33200	30542.667	3333.738	2.296	0.324961	-1.12206	0.797103
	SB2	27792	28006	25377	27058.333	1460.004	13.442	0.50251	0.649085	-1.1516
	SB3	26327	27861	30748	28312.000	2244.741	9.432	-0.88429	-0.20091	1.085203
	SB5	25655	22972	29698	26108.333	3385.838	16.481	-0.13389	-0.92631	1.0602
	SB6	22592	25340	29255	25729.000	3348.490	17.694	-0.93684	-0.11617	1.053012
	CP1	20433	23529	27667	23876.333	3629.486	23.621	-0.94871	-0.0957	1.044409
	CP2	28239	30531	32022	30264.000	1905.581	3.187	-1.06267	0.140115	0.922553
	CP3	23401	30427	31574	28467.333	4424.896	8.935	-1.14496	0.442873	0.702088
	CP4	29655	31715	34168	31846.000	2259.350	-1.874	-0.96975	-0.05798	1.027729

Microorganism:		A. Baum								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.9	Untreated	8518	8672	21598	12929.333	7507.680	0	-0.58758	-0.56706	1.15464
	1A	17484	19516	20033	19011.000	1347.449	-47.038	-1.13325	0.374782	0.75847
	1B	13665	29596	20145	21135.333	8011.539	-63.468	-0.93245	1.05606	-0.12361
	1C	15064	24943	21064	20357.000	4977.303	-57.448	-1.06343	0.921382	0.142045
	1D	23490	14628	12857	16991.667	5696.961	-31.420	1.140667	-0.4149	-0.72577
	2A	15172	14689	12790	14217.000	1259.194	-9.959	0.758422	0.374843	-1.13326
	2B	16395	17349	18484	17409.333	1045.806	-34.650	-0.96991	-0.05769	1.027597
	2C	20421	11111	8395	13309.000	6307.105	-2.936	1.127617	-0.3485	-0.77912
	2D	10756	10802	10363	10640.333	241.276	17.704	0.479395	0.670047	-1.14944
	3C	21307	19370	21601	20759.333	1212.145	-60.560	0.451816	-1.14618	0.694362
	3D	8199	11325	7596	9040.000	2001.705	30.081	-0.42014	1.141527	-0.72139
	4A	11814	11715	10197	11242.000	906.349	13.050	0.631103	0.521874	-1.15298
	4D	7963	7179	6201	7114.333	882.778	44.975	0.961359	0.073254	-1.03461
	5A	11129	8356	7558	9014.333	1874.316	30.280	1.128234	-0.35124	-0.77699
	5B	12660	24102	18522	18428.000	5721.579	-42.529	-1.00811	0.991684	0.016429
	5D	18411	7802	7992	11401.667	6071.004	11.816	1.154559	-0.59293	-0.56163
	6A	16835	13335	10238	13469.333	3300.551	-4.177	1.019729	-0.0407	-0.97903
	6B	6534	16126	6223	9627.667	5629.870	25.536	-0.54951	1.15426	-0.60475
	6C	13725	6555	6700	8993.333	4098.385	30.442	1.15452	-0.59495	-0.55957
	6D	16730	7638	17793	14053.667	5581.494	-8.696	0.479501	-1.14945	0.669952
	7A	16944	15415	17496	16618.333	1078.047	-28.532	0.30209	-1.11622	0.814127
	7B	14902	15994	10688	13861.333	2801.901	-7.208	0.371414	0.76115	-1.13256
	7C	8124	7208	7902	7744.667	477.838	40.100	0.793853	-1.12311	0.329261
	7D	7630	13941	10783	10784.667	3155.500	16.588	-0.99974	1.000264	-0.00053
	8D	19062	22366	11479	17635.667	5581.891	-36.400	0.255529	0.847443	-1.10297
	9A	17451	10288	10989	12909.333	3948.785	0.155	1.150143	-0.66383	-0.48631
	9B	15239	15887	8215	13113.667	4254.724	-1.426	0.499523	0.651824	-1.15135
	9C	6376	19029	7870	11091.667	6914.402	14.213	-0.68201	1.147942	-0.46594
	9D	8163	7722	15017	10300.667	4090.412	20.331	-0.5226	-0.63042	1.153022

Microorganism:		A. Baum								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.3	Untreated	39510	39560	36044	38371.333	2015.685	-	0.564903	0.589709	-1.15461
	CP4	34879	43389	39297	39188.333	4256.041	-2.129	-1.01252	0.986989	0.025532
	CP5	43662	42584	38246	41497.333	2866.862	-8.147	0.755065	0.379044	-1.13411
	CP6	41545	40247	42370	41387.333	1070.246	-7.860	0.147318	-1.06549	0.918169
	CT1	42225	40346	41965	41512.000	1018.119	-8.185	0.700311	-1.14525	0.444938
	CT2	34792	36360	37048	36066.667	1156.251	6.006	-1.10241	0.253693	0.84872
	CT3	31812	32057	32939	32269.333	592.745	15.902	-0.77155	-0.35822	1.129772
	CT4	28802	35768	35405	33325.000	3921.236	13.151	-1.15346	0.623018	0.530445
	CT5	41677	40675	40399	40917.000	672.491	-6.634	1.130127	-0.35986	-0.77027
	CT6	42917	36957	43046	40973.333	3478.845	-6.781	0.55871	-1.1545	0.595792
	MDZ1	41984	37260	37580	38941.333	2639.880	-1.485	1.152578	-0.6369	-0.51568
	MDZ2	38027	40985	44440	41150.667	3209.708	-7.243	-0.97319	-0.05161	1.024808
	MDZ3	35036	34820	34771	34875.667	140.998	9.110	1.137135	-0.39481	-0.74233
	MDZ4	37674	33664	36775	36037.667	2104.227	6.082	0.777641	-1.12805	0.350406
	MDZ5	42494	37611	39010	39705.000	2514.596	-3.476	1.109125	-0.83274	-0.27639
	MDZ6	43050	44422	40983	42818.333	1731.165	-11.589	0.133821	0.926351	-1.06017
	LP1	41237	40638	46963	42946.000	3491.693	-11.922	-0.48945	-0.661	1.150445
	LP3	42683	40568	38926	40725.667	1883.456	-6.136	1.039224	-0.08371	-0.95551
	LP4	40744	41219	27689	36550.667	7678.103	4.745	0.546142	0.608006	-1.15415
	LP5	36780	34299	35462	35513.667	1241.307	7.447	1.020162	-0.97854	-0.04162
	LP6	36662	37122	37219	37001.000	297.562	3.571	-1.13926	0.406638	0.732621
	DEA	39284	38134	39729	39049.000	823.058	-1.766	0.28552	-1.11171	0.826187
	FLA	37232	36860	36308	36800.000	464.913	4.095	0.929206	0.129056	-1.05826
	PAA	39978	42448	42154	41526.667	1349.217	-8.223	-1.14783	0.682865	0.464961
	RIB	40205	41965	42135	41435.000	1068.597	-7.984	-1.15104	0.495977	0.655064
	ANB	33795	34220	36225	34746.667	1297.790	9.446	-0.7333	-0.40582	1.139116
	DED	36770	37921	37033	37241.333	603.119	2.945	-0.78149	1.12692	-0.34543
	PAB	36644	36759	38538	37313.667	1061.862	2.756	-0.63065	-0.52235	1.153006
	PAC	38784	40666	39604	39684.667	943.590	-3.423	-0.95451	1.04	-0.08549
	RIA	35865	39222	37967	37684.66667	1696.215	1.789530379	-1.07278	0.906331	0.166449

Microorganism:		A. Baum								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.18	Untreated	40177	32574	33755	35502.000	4091.504	-	1.142611	-0.71563	-0.42698
	1A	37004	45085	44987	42358.667	4637.536	-19.313	-1.15464	0.587884	0.566752
	1B	39198	34025	32446	35223.000	3531.824	0.786	1.125481	-0.3392	-0.78628
	1C	39229	31566	34965	35253.333	3839.628	0.700	1.03543	-0.96034	-0.07509
	1D	39739	31542	31209	34163.333	4831.539	3.771	1.154015	-0.54255	-0.61147
	2A	36949	37217	35395	36520.333	983.736	-2.868	0.435754	0.708184	-1.14394
	2B	47595	35872	33845	39104.000	7422.937	-10.146	1.143887	-0.43541	-0.70848
	2C	37994	35485	32590	35356.333	2704.297	0.410	0.975361	0.047579	-1.02294
	2D	39688	38659	38816	39054.333	554.358	-10.006	1.143065	-0.71314	-0.42993
	3C	34166	34289	36379	34944.667	1243.691	1.570	-0.62609	-0.52719	1.153288
	3D	39233	37112	37710	38018.333	1093.601	-7.088	1.110704	-0.82876	-0.28194
	4A	30421	31370	31264	31018.333	520.014	12.629	-1.14869	0.676264	0.472423
	4D	34250	36530	34037	34939.000	1381.956	1.586	-0.49857	1.151267	-0.6527
	5A	38034	34397	35273	35901.333	1898.169	-1.125	1.123539	-0.79252	-0.33102
	5B	28268	30222	33965	30818.333	2894.937	13.193	-0.88096	-0.20599	1.086955
	5D	37648	39389	37696	38244.333	991.601	-7.724	-0.60138	1.154362	-0.55298
	6A	35611	39587	35826	37008.000	2236.065	-4.242	-0.62476	1.153365	-0.52861
	6B	33528	33168	31485	32727.000	1090.561	7.816	0.734484	0.404379	-1.13886
	6C	33234	30013	27434	30227.000	2905.916	14.858	1.034786	-0.07364	-0.96114
	6D	34788	33114	33340	33747.333	908.300	4.942	1.14573	-0.69727	-0.44846
	7A	33005	30970	35242	33072.333	2136.796	6.844	-0.03151	-0.98387	1.015383
	7B	35720	34040	34851	34870.333	840.167	1.779	1.011307	-0.9883	-0.02301
	7C	42888	41285	43401	42524.667	1103.799	-19.781	0.329166	-1.12309	0.793925
	7D	40806	36188	44731	40575.000	4276.182	-14.289	0.05402	-1.02592	0.971895
	8D	32141	33119	36412	33890.667	2237.624	4.539	-0.78193	-0.34486	1.12679
	9A	35192	35175	39089	36485.333	2254.857	-2.770	-0.57358	-0.58112	1.154692
	9B	37188	34571	39272	37010.333	2355.531	-4.249	0.075425	-1.03558	0.960152
	9C	31210	27746	37469	32141.66667	4928	9.465194449	-0.18906	-0.89198	1.081034
	9D	30825	30570	40337	33910.66667	5566.828	4.48237658	-0.5543	-0.6001	1.154398

Microorganism:		A. Baum								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.19	Untreated	44122	44132	43888	44047.33333	138.0773	-	0.54076	0.613183	-1.15394
	10A	37230	42157	41499	40295.33333	2674.966	8.518109307	-1.14593	0.695959	0.449975
	10B	40318	41041	35590	38983	2960.577	11.49747998	0.450926	0.695135	-1.14606
	10C	43678	37007	34410	38365	4780.908	12.90051611	1.111295	-0.28405	-0.82725
	10D	43087	41088	41973	42049.33333	1001.684	4.536029423	1.035922	-0.95972	-0.07621
	11A	42954	39125	39619	40566	2082.767	7.903618834	1.146552	-0.69187	-0.45468
	11B	42808	37836	38289	39644.33333	2749.162	9.996064839	1.150775	-0.65778	-0.493
	11C	42227	36774	39129	39376.66667	2734.923	10.60374446	1.042199	-0.95164	-0.09056
	11D	43378	36587	46718	42227.66667	5162.532	4.131161932	0.222823	-1.09262	0.869793
	12A	39457	37616	37740	38271	1028.976	13.1139229	1.152603	-0.63656	-0.51605
	12B	38941	38206	37752	38299.66667	600.0086	13.0488414	1.068874	-0.15611	-0.91276
	12C	36567	35719	40229	37505	2396.854	14.85296121	-0.39135	-0.74514	1.13649
	13C	35779	37455	40079	37771	2167.347	14.2490654	-0.9191	-0.1458	1.064897
	13D	43393	46006	38766	42721.66667	3666.39	3.009641144	0.183105	0.895795	-1.0789
	14A	38563	39959	39841	39454.33333	774.1688	10.42741899	-1.15134	0.651882	0.49946
	14C	43615	41871	44326	43270.66667	1263.202	1.763254681	0.272588	-1.10803	0.835443
	15A	44352	39301	40084	41245.66667	2718.502	6.360581798	1.142664	-0.71534	-0.42732
	15D	44454	44063	42990	43835.66667	758.0134	0.480543658	0.815729	0.299907	-1.11564
	16C	36136	35387	33600	35041	1302.924	20.44694344	0.840417	0.265557	-1.10597
	16D	45687	44246	45314	45082.33333	747.912	-2.349744971	0.808473	-1.11822	0.309751
	17A	45358	41622	40263	42414.33333	2638.295	3.707375399	1.115746	-0.30032	-0.81543
	17B	40541	40641	42611	41264.33333	1167.319	6.318203145	-0.61965	-0.53399	1.153641
	17C	44752	44203	43896	44283.66667	433.6638	-0.536544021	1.079946	-0.18601	-0.89393
	17D	40635	44722	44642	43333	2336.879	1.621740249	-1.15453	0.594383	0.560149
	18A	40526	39235	43507	41089.33333	2191.005	6.715503019	-0.25711	-0.84634	1.103451
	18C	33138	40503	43822	39154.33333	5468.194	11.10850449	-1.10024	0.246638	0.853603
	18D	45272	44439	44221	44644	554.6792	-1.354603381	1.132186	-0.36958	-0.7626
	19A	42066	42965	44122	43051	1030.694	2.261960618	-0.95567	-0.08344	1.039105
	19C	51909	42712	45222	46614.33333	4753.961	-5.827821586	1.113738	-0.82086	-0.29288

Microorganism:		B. anthracis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.5	Untreated	12505	8138	7075	9239.333333	2877.66	-	1.134834	-0.38272	-0.75212
	17A	22934	25028	27062	25008	2064.073	-170.6688794	-1.00481	0.00969	0.99512
	17B	1412	21366	13657	12145	10062.56	-31.44887799	-1.06663	0.916367	0.15026
	17C	7960	13238	11234	10810.66667	2664.344	-17.00699906	-1.06993	0.911043	0.158888
	17D	13414	12048	10612	12024.66667	1401.146	-30.14647521	0.991569	0.016653	-1.00822
	18A	23551	23899	23449	23633	235.9407	-155.7868533	-0.34754	1.127402	-0.77986
	18B	1296	1399	1391	1362	57.29747	85.25867667	-1.15188	0.645753	0.506131
	18C	19244	15593	16055	16964	1988.004	-83.6063208	1.146879	-0.68964	-0.45724
	18D	13333	13413	17793	14846.33333	2552.202	-60.6861967	-0.59295	-0.56161	1.154559
	19A	11404	11086	24175	15555	7466.832	-68.35630276	-0.55593	-0.59851	1.154439
	19B	15288	14271	19993	16517.33333	3052.665	-78.77191717	-0.40271	-0.73586	1.138568
	19C	14702	15339	15603	15214.66667	463.1893	-64.67277581	-1.10682	0.268429	0.83839
	19D	15808	13991	15744	15181	1031.067	-64.30839166	0.608108	-1.15414	0.546036
	20A	13820	14450	11986	13418.66667	1280.088	-45.23414388	0.31352	0.805674	-1.11919
	20B	34533	28718	30587	31279.33333	2968.678	-238.5453496	1.095998	-0.86279	-0.23321
	20C	15688	16043	8459	13396.66667	4279.827	-44.99603146	0.53538	0.618327	-1.15371
	20D	8403	7076	14331	9936.666667	3863.011	-7.547442095	-0.39701	-0.74053	1.137541
	21A	18770	22087	18516	19791	1992.446	-114.2037665	-0.51244	1.152352	-0.63992
	21B	21639	26601	21836	23358.66667	2809.67	-152.8176636	-0.61205	1.153991	-0.54194
	21C	20370	20584	21985	20979.66667	877.1946	-127.0690526	-0.69502	-0.45106	1.146078
	21D	17202	14663	15002	15622.33333	1378.492	-69.08507107	1.145938	-0.69593	-0.45001
	SB6	16282	16900	14747	15976.33333	1108.569	-72.91651634	0.275731	0.833206	-1.10894
	SB1	15760	14961	8118	12946.33333	4200.5	-40.12194242	0.669841	0.479625	-1.14947
	SB2	26472	21903	7408	18594.33333	9953.365	-101.2518941	0.791458	0.332417	-1.12387
	SB3	13769	17082	15156	15335.66667	1663.792	-65.98239411	-0.94162	1.049611	-0.10799
	SB5	19006	13649	14694	15783	2839.684	-70.82401328	1.134986	-0.75149	-0.38349
	CP1	31851	31032	33634	32172.33333	1330.429	-248.2105491	-0.24153	-0.85712	1.098643
	CP2	1268	1273	1164	1235	61.53861	86.63323472	0.536249	0.617499	-1.15375
	CP3	1408	1319	1246	1324.333333	81.13158	85.66635399	1.031247	-0.06574	-0.96551

Microorganism:		B. anthracis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.25A	Untreated	7885	17083	15149	13372.33333	4849.558	-	-1.13151	0.765156	0.366356
	1A	1188	1294	1288	1256.666667	59.5427	90.60248772	-1.15323	0.627001	0.526233
	1B	1475	1525	1476	1492	28.58321	88.84263529	-0.59475	1.154524	-0.55977
	1C	17977	21553	19639	19723	1789.479	-47.49108857	-0.9757	1.022644	-0.04694
	1D	13027	19544	17186	16585.66667	3299.715	-24.02971309	-1.07848	0.896542	0.181935
	2A	16947	19096	17304	17782.33333	1151.587	-32.97853778	-0.72538	1.140745	-0.41537
	2B	17446	21140	19881	19489	1877.94	-45.74120697	-1.08789	0.879155	0.208739
	2C	18938	20227	25592	21585.66667	3528.939	-61.42034549	-0.75027	-0.38501	1.13528
	2D	15605	12391	21322	16439.33333	4523.58	-22.93541391	-0.18444	-0.89494	1.079381
	3C	16640	16151	18047	16946	984.3429	-26.72433133	-0.31087	-0.80765	1.118513
	3D	20073	17195	19111	18793	1465.116	-40.53643094	0.873651	-1.0907	0.217048
	4A	25173	22238	28642	25351	3205.709	-89.5779844	-0.05553	-0.97108	1.026606
	4D	22543	21124	21722	21796.33333	712.4144	-62.99573747	1.048079	-0.94374	-0.10434
	5A	23254	22908	29190	25117.33333	3531.273	-87.83059551	-0.52767	-0.62565	1.153314
	5B	16226	20232	14314	16924	3020.113	-26.55981255	-0.23112	1.095323	-0.86421
	5D	20344	17999	18768	19037	1195.419	-42.3610938	1.09334	-0.86831	-0.22503
	6A	12676	29390	20484	20850	8363.009	-55.91893711	-0.9774	1.021164	-0.04376
	6B	19582	16653	18417	18217.33333	1474.673	-36.2315228	0.925403	-1.0608	0.135397
	6C	24969	13791	14524	17761.33333	6252.773	-32.82149712	1.152715	-0.63497	-0.51774
	6D	14304	11061	23283	16216	6331.361	-21.265299	-0.30199	-0.8142	1.11619
	7A	21455	17966	23614	21011.66667	2849.98	-57.12790089	0.155557	-1.06866	0.913106
	7B	21502	22332	20083	21305.66667	1137.282	-59.32647008	0.172634	0.902444	-1.07508
	7C	19985	14595	20466	18348.66667	3259.655	-37.21365007	0.501996	-1.15155	0.649558
	7D	21900	19570	17247	19572.33333	2326.501	-46.36438418	1.000501	-0.001	-0.9995
	8D	16798	16281	19657	17578.66667	1818.358	-31.45549268	-0.42933	-0.71365	1.142973
	9A	18981	21924	23447	21450.66667	2270.313	-60.41079841	-1.08781	0.208488	0.879321
	9B	26067	28353	26430	26950	1228.515	-101.5355086	-0.71875	1.142029	-0.42328
	9C	12636	15767	12700	13701	1789.495	-2.457810903	-0.59514	1.154516	-0.55938
	9D	13116	12673	21360	15716.33333	4892.575	-17.52872847	-0.53149	-0.62203	1.153517

Microorganism:		B. anthracis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.25B	Untreated	16495	15428	16291	16071.33333	566.403	-	0.747995	-1.13582	0.387828
	19C	20802	20624	26993	22806.33333	3626.852	-41.906915	-0.55264	-0.60172	1.154353
	19D	17036	14330	15646	15670.66667	1353.169	2.493051811	1.00899	-0.99076	-0.01823
	20C	21370	24859	23225	23151.33333	1745.666	-44.05359439	-1.02043	0.978232	0.0422
	20D	16932	17778	17835	17515	505.6965	-8.982868047	-1.15287	0.520075	0.632791
	21A	20722	20442	17153	19439	1984.678	-20.95449455	0.646452	0.505372	-1.15182
	21C	18958	19730	16895	18527.66667	1465.673	-15.28394242	0.293608	0.820329	-1.11394
	SB1	24342	22797	25964	24367.66667	1583.656	-51.62193554	-0.01621	-0.9918	1.008005
	SB2	21200	20269	25138	22202.33333	2584.627	-38.14867051	-0.38781	-0.74801	1.135819
	SB3	18392	19581	20966	19646.33333	1288.243	-22.24457626	-0.97368	-0.05072	1.024393
	SB5	14801	19741	19096	17879.33333	2685.351	-11.24984444	-1.14634	0.693268	0.453076
	SB6	20306	17431	17851	18529.33333	1552.903	-15.29431286	1.144094	-0.70728	-0.43682
	CP1	1340	1353	4685	2459.333333	1927.495	84.6973908	-0.58072	-0.57397	1.154694
	CP2	1288	1284	1279	1283.666667	4.50925	92.01269341	0.960988	0.073922	-1.03491
	CP3	28200	24069	27383	26550.66667	2187.664	-65.20512714	0.753924	-1.13439	0.380467
	CP4	16107	19413	19266	18262	1867.732	-13.63089559	-1.15381	0.616256	0.53755
	CP5	18546	17672	18792	18336.66667	588.6131	-14.09549094	0.355638	-1.12921	0.77357
	CP6	19179	17830	20601	19203.33333	1385.66	-19.48811549	-0.01756	-0.9911	1.008665
	CT2	21688	17326	26599	21871	4639.208	-36.08702866	-0.03945	-0.97969	1.01914
	CT3	24375	25657	23175	24402.33333	1241.226	-51.83764052	-0.02202	1.010829	-0.98881
	CT4	16054	19967	20687	18902.66667	2493.146	-17.61728958	-1.1426	0.426904	0.715696
	CT5	26993	21710	25746	24816.33333	2761.473	-54.41365578	0.788227	-1.12488	0.336656
	CT6	20208	17971	18117	18765.33333	1251.517	-16.762766	1.152735	-0.6347	-0.51804
	MDZ1	1245	1116	1244	1201.666667	74.19119	92.52291865	0.584077	-1.15467	0.570598
	MDZ2	24533	23084	21134	22917	1705.643	-42.59551168	0.947443	0.09791	-1.04535
	MDZ3	25654	26852	24007	25504.33333	1428.393	-58.69457004	0.10478	0.943485	-1.04826
	MDZ4	1247	1300	1262	1269.666667	27.3191	92.09980504	-0.8297	1.110334	-0.28063
	MDZ5	1158	1184	1137	1159.666667	23.54428	92.78425354	-0.07079	1.033513	-0.96272
	MDZ6	20699	20224	13263	18062	4162.836	-12.38644377	0.633462	0.519357	-1.15282

Microorganism:		B. anthracis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.2-1	Untreated	1098	1234	1168	1166.666667	68.0098	-	-1.00966	0.990053	0.019605
	10A	1214	1316	1308	1279.333333	56.72154	-9.657142857	-1.15183	0.646433	0.505393
	10B	1403	1447	1343	1397.666667	52.20473	-19.8	0.102162	0.944997	-1.04716
	10C	1291	1377	1263	1310.333333	59.40819	-12.31428571	-0.32543	1.12218	-0.79675
	10D	1296	1346	1315	1319	25.23886	-13.05714286	-0.91129	1.069779	-0.15849
	11A	1284	30689	1291	11088	16974.96	-850.4	-0.57756	1.154701	-0.57714
	11B	1281	1366	1279	1308.666667	49.66219	-12.17142857	-0.5571	1.154466	-0.59737
	11C	1285	1407	1322	1338	62.55398	-14.68571429	-0.84727	1.103047	-0.25578
	11D	1313	1301	1193	1269	66.09085	-8.771428571	0.66575	0.484182	-1.14993
	12A	1329	1375	1253	1319	61.61169	-13.05714286	0.162307	0.908918	-1.07123
	12B	1335	1372	1155	1287.333333	116.0876	-10.34285714	0.410609	0.729334	-1.13994
	12C	1379	1336	1211	1308.666667	87.27161	-12.17142857	0.805913	0.313198	-1.11911
	Empty									
	13C	1431	1491	1284	1402	106.5035	-20.17142857	0.272291	0.835653	-1.10794
	13D	1459	1474	1397	1443.333333	40.82075	-23.71428571	0.383792	0.751252	-1.13504
	14A	1312	1308	1150	1256.666667	92.39769	-7.714285714	0.598861	0.555569	-1.15443
	14C	1500	1505	1432	1479	40.7799	-26.77142857	0.51496	0.637569	-1.15253
	15A	1300	1307	1244	1283.666667	34.53018	-10.02857143	0.473016	0.675737	-1.14875
	15D	1325	1312	1266	1301	31	-11.51428571	0.774194	0.354839	-1.12903
	16C	1533	1589	1502	1541.333333	44.0946	-32.11428571	-0.18899	1.081009	-0.89202
	16D	1526	1585	1630	1580.333333	52.15681	-35.45714286	-1.04173	0.089474	0.952257
	17A	1362	1429	1271	1354	79.30322	-16.05714286	0.100879	0.945737	-1.04662
	17B	1354	1322	1153	1276.333333	108.0015	-9.4	0.719126	0.422833	-1.14196
	17C	1297	1249	1322	1289.333333	37.09897	-10.51428571	0.206654	-1.08718	0.880528
	17D	1318	1278	43	879.6666667	724.8506	24.6	0.604722	0.549539	-1.15426
	18A	1299	1259	974	1177.333333	177.224	-0.914285714	0.686514	0.460811	-1.14732
	18C	1588	1747	1512	1615.666667	119.918	-38.48571429	-0.23071	1.095193	-0.86448
	18D	1482	1481	1262	1408.333333	126.7294	-20.71428571	0.581291	0.5734	-1.15469
	19A	1340	1314	1213	1289	67.08949	-10.48571429	0.760179	0.372637	-1.13282

Microorganism:		B. anthracis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.3-2	Untreated	12477	8491	7431	9466.333333	2660.636	-	1.131559	-0.36658	-0.76498
	CP4	30577	38754	43372	37567.66667	6479.471	-296.8555231	-1.07889	0.183091	0.895804
	CP5	24801	23588	25016	24468.33333	769.9327	-158.4774112	0.432072	-1.14339	0.711318
	CP6	17226	18942	17245	17804.33333	985.294	-88.08056622	-0.58697	1.154647	-0.56768
	CT1	34465	39064	34702	36077	2589.531	-281.1084897	-0.62251	1.153491	-0.53098
	CT2	27248	14944	31106	24432.66667	8440.802	-158.1006373	0.333539	-1.12414	0.790604
	CT3	29584	33146	29880	30870	1976.622	-226.1030318	-0.6506	1.151459	-0.50085
	CT4	31535	33739	28146	31140	2817.345	-228.9552449	0.140203	0.9225	-1.0627
	CT5	38151	33010	25823	32328	6192.232	-241.5049826	0.940372	0.110138	-1.05051
	CT6	18087	17723	21310	19040	1974.284	-101.1338427	-0.48271	-0.66708	1.149784
	MDZ1	1266	1282	1209	1252.333333	38.371	86.77066094	0.356172	0.773153	-1.12933
	MDZ2	4796	13210	19390	12465.33333	7325.442	-31.68069298	-1.04694	0.101655	0.94529
	MDZ3	31063	31069	29631	30587.66667	828.5031	-223.1205324	0.573725	0.580967	-1.15469
	MDZ4	1403	1362	1394	1386.333333	21.5484	85.35511814	0.773453	-1.12924	0.355788
	MDZ5	1388	1376	1407	1390.333333	15.63117	85.31286313	-0.14927	-0.91697	1.066246
	MDZ6	20759	20574	18723	20018.66667	1125.886	-111.4722349	0.657556	0.493241	-1.1508
	LP1	30429	36780	37048	34752.33333	3746.514	-267.1150393	-1.15396	0.541214	0.612747
	LP3	43447	41267	40804	41839.33333	1411.395	-341.9803514	1.139062	-0.40551	-0.73355
	LP4	41389	31137	39107	37211	5382.563	-293.0877848	0.77621	-1.12846	0.352249
	LP5	29472	32820	31998	31430	1744.776	-232.0187331	-1.12221	0.796664	0.325543
	LP6	17084	20817	12979	16960	3920.471	-79.16123807	0.031629	0.98381	-1.01544
	DEA	15262	15031	14710	15001	277.2201	-58.46684742	0.94149	0.108217	-1.04971
	FLA	16854	24710	21486	21016.66667	3948.973	-122.0148597	-1.05411	0.935264	0.118849
	PAA	19504	21848	19183	20178.33333	1454.854	-113.158914	-0.46351	1.147652	-0.68415
	RIB	28013	28863	38827	31901	6013.13	-236.9942604	-0.64659	-0.50523	1.151813
	ANB	36176	34930	33409	34838.33333	1385.776	-268.023522	0.965284	0.066148	-1.03143
	DED	33836	31685	30649	32056.66667	1625.683	-238.6386845	1.094515	-0.22862	-0.86589
	PAB	34116	36277	34772	35055	1107.947	-270.3123349	-0.84751	1.102941	-0.25543
	PAC	30223	39442	20715	30126.66667	9363.872	-218.2506426	0.010288	0.994816	-1.0051
	RIA	21510	19319	19443	20090.66667	1230.741	-112.2328251	1.153234	-0.62699	-0.52624

Microorganism:		C. saka								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
1.28	Untreated	48236	48677	49693	48868.667	747.171	0	-0.84675	-0.25652	1.103273
	LP1	46918	49117	48365	48133.333	1117.655	1.505	-1.0874	0.880117	0.207279
	LP3	48982	51156	49861	49999.667	1093.613	-2.314	-0.93055	1.057351	-0.1268
	LP4	48989	49474	49818	49427.000	416.494	-1.143	-1.05164	0.112847	0.93879
	LP5	50042	47686	51438	49722.000	1896.359	-1.746	0.168744	-1.07364	0.904892
	LP6	49356	52034	50951	50780.333	1347.133	-3.912	-1.05731	0.930619	0.126689
	DEA	51674	55302	52586	53187.333	1887.272	-8.837	-0.80186	1.120488	-0.31863
	FLA	48706	51398	53598	51234.000	2450.120	-4.840	-1.03179	0.066935	0.964851
	PAA	50447	50388	49861	50232.000	322.647	-2.790	0.666363	0.483501	-1.14986
	RIB	49773	50844	50183	50266.667	540.380	-2.861	-0.91355	1.068384	-0.15483
	ANB	51114	50923	49841	50626.000	686.505	-3.596	0.710847	0.432626	-1.14347
	DED	49801	48908	50083	49597.333	613.406	-1.491	0.332026	-1.12378	0.791755
	PAB	49054	49925	51958	50312.333	1490.243	-2.954	-0.84438	-0.25991	1.104294
	PAC	48722	51768	48343	49611.000	1877.604	-1.519	-0.47348	1.148805	-0.67533
	RIA	52282	47310	55874	51822.000	4300.491	-6.043	0.106965	-1.04918	0.942218
	CT1	47162	48318	49182	48220.667	1013.511	1.326	-1.04455	0.096036	0.948518
	CT2	48386	49540	48541	48822.333	626.331	0.095	-0.69665	1.145827	-0.44918
	CT3	45064	44392	45759	45071.667	683.532	7.770	-0.01122	-0.99434	1.005561
	CT4	46734	45490	46028	46084.000	623.888	5.698	1.041854	-0.95209	-0.08976
	CT5	49288	47757	44307	47117.333	2551.366	3.584	0.850786	0.250715	-1.1015
	CT6	57115	47660	53254	52676.333	4753.896	-7.792	0.93369	-1.0552	0.121514
	CP2	48365	59301	60866	56177.333	6810.780	-14.956	-1.14705	0.458636	0.688418
	CP3	49612	50160	48130	49300.667	1050.201	-0.884	0.296451	0.818256	-1.11471
	CP4	51076	51459	49908	50814.333	807.931	-3.981	0.323873	0.797923	-1.1218
	CP5	50202	49341	48141	49228.000	1035.136	-0.735	0.940939	0.109164	-1.0501
	CP6	48868	50287	45798	48317.667	2294.544	1.128	0.239844	0.858268	-1.09811
	SB2	50866	49826	51183	50625.000	709.875	-3.594	0.339496	-1.12555	0.786054
	SB3	48820	48414	52250	49828.000	2107.314	-1.963	-0.47833	-0.671	1.14933
	SB5	52008	47359	49874	49747.000	2327.101	-1.797	0.971595	-1.02617	0.054574

Microorganism:		C. saka								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.1	Untreated	21514	20482	20735	20910.33333	537.8776	-	1.122312	-0.79634	-0.32597
	17D	13709	16396		15052.5	1899.996	28.01406003	-0.70711	0.707107	-7.92239
	18A	21994	17967	16900	18953.66667	2686.511	9.357414994	1.131703	-0.36727	-0.76444
	18B	20421	20978	18426	19941.66667	1341.826	4.63247836	0.357225	0.772331	-1.12956
	18C	22305	21230	22298	21944.33333	618.6407	-4.944923563	0.582999	-1.15468	0.571683
	18D	18089	18874	18056	18339.66667	463.0403	12.29376225	-0.54135	1.153967	-0.61262
	19A	21259	20621	19046	20308.66667	1139.081	2.877365258	0.834298	0.274198	-1.1085
	19B	22793	18972	21540	21101.66667	1947.848	-0.915018093	0.868309	-1.09334	0.225035
	19C	15871	13173	14593	14545.66667	1349.623	30.43790152	0.982003	-1.01707	0.035072
	19D	13676	11818	10457	11983.66667	1615.882	42.69021696	1.047313	-0.10252	-0.94479
	20A	14269	13043	11365	12892.33333	1457.851	38.34467807	0.944312	0.103348	-1.04766
	20B	16678	17351	16012	16680.33333	669.503	20.22923276	-0.00349	1.001738	-0.99825
	20C	20198	21370	21935	21167.66667	886.0002	-1.230651512	-1.09443	0.228367	0.866065
	20D	12824	12688	11198	12236.66667	902.0783	41.48028885	0.651089	0.500326	-1.15142
	21A	14178	12840	13343	13453.66667	675.8301	35.6601999	1.071768	-0.90802	-0.16375
	21B	6496	6376	6363	6411.666667	73.32348	69.33732923	1.150154	-0.48643	-0.66373
	21C	5645	6408	7319	6457.333333	838.0897	69.11893641	-0.96927	-0.05886	1.028132
	21D	10500	10809	12060	11123	826.043	46.80620427	-0.7542	-0.38013	1.134324
	SB1	12440	13084	13465	12996.33333	518.093	37.84731632	-1.07381	0.16921	0.9046
	SB2	15756	20721	26207	20894.66667	5227.664	0.074923084	-0.98298	-0.03322	1.016196
	SB3	13410	16996	21323	17243	3962.278	17.53837815	-0.96737	-0.06234	1.029711
	SB5	11594	14129	16599	14107.33333	2502.57	32.53415377	-1.0043	0.008658	0.995643
	SB6	11352	14816	20199	15455.66667	4458.053	26.0859862	-0.92051	-0.14349	1.063992
	CP1	16668	20494	21778	19646.66667	2658.29	6.043264096	-1.12052	0.318751	0.801769
	CP2	21697	19322	25689	22236	3217.54	-6.339768217	-0.16752	-0.90566	1.07318
	CP3	20774	28571	28976	26107	4622.951	-24.85214647	-1.15359	0.532993	0.620599

Microorganism:		C. saka								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.21	Untreated	13657	12903	8496	11685.33333	2787.654	-	0.707285	0.436807	-1.14409
	1A	20619	26135	22727	23160.33333	2783.415	-98.20002282	-0.91303	1.068711	-0.15568
	1B	28076	23785	24222	25361	2361.39	-117.0327476	1.149747	-0.6674	-0.48234
	1C	24997	16940	18576	20171	4258.736	-72.61809676	1.1332	-0.75868	-0.37452
	1D	15127	11788	10016	12310.33333	2595.227	-5.348585121	1.085326	-0.20127	-0.88406
	2A	18068	13658	13190	14972	2691.406	-28.12642629	1.150328	-0.48822	-0.66211
	2B	18957	13018	11691	14555.33333	3869.268	-24.56070288	1.137597	-0.39732	-0.74028
	2C	29330	22656	15510	22498.66667	6911.343	-92.53765404	0.988423	0.022765	-1.01119
	2D	12810	13139	13742	13230.33333	472.6651	-13.22170242	-0.88928	-0.19323	1.082514
	3C	20804	17318	17485	18535.66667	1966.208	-58.6233455	1.153659	-0.6193	-0.53436
	3D	20832	22020	23597	22149.66667	1387.053	-89.55100411	-0.94998	-0.09348	1.043459
	4A	10257	7594	8311	8720.666667	1377.956	25.37083524	1.114937	-0.81764	-0.2973
	4D	6545	6931	6658	6711.333333	198.4498	42.56617983	-0.83816	1.106913	-0.26875
	5A	5499	5333	5049	5293.666667	227.5639	54.69819717	0.902311	0.172845	-1.07516
	5B	8472	10179	10399	9683.333333	1054.797	17.13258786	-1.1484	0.469917	0.678488
	5D	13655	13665	14415	13911.66667	435.9281	-19.05237335	-0.58878	-0.56584	1.154625
	6A	12162	15519	13176	13619	1721.787	-16.54780922	-0.84621	1.103505	-0.25729
	6B	11155	11698	12962	11938.33333	927.1636	-2.165107257	-0.84487	-0.25921	1.104084
	6C	6334	10690	10623	9215.666667	2495.821	21.13475582	-1.1546	0.590721	0.563876
	6D	4669	6047	5291	5335.666667	690.085	54.33877225	-0.96606	1.030791	-0.06473
	7A	4425	4280	5535	4746.666667	686.5554	59.37927887	-0.46852	-0.67972	1.148244
	7B	7567	11399	12308	10424.66667	2516.2	10.78845276	-1.13571	0.387224	0.748483
	7C	26709	27792	30945	28482	2200.681	-143.7414423	-0.80566	-0.31354	1.119199
	7D	18388	22213	28115	22905.33333	4900.319	-96.01780009	-0.92184	-0.14128	1.063128
	8D	6916	11308	14119	10781	3630.303	7.739046098	-1.06465	0.145167	0.919483
	9A	7794	7532	14315	9880.333333	3842.768	15.44671383	-0.54292	-0.6111	1.154029
	9B	10014	15779	20236	15343	5124.929	-31.30134642	-1.03982	0.085074	0.954745
	9C	5628	8447	11739	8604.666667	3058.549	26.36353263	-0.97323	-0.05155	1.024778
	9D	7339	8661	12771	9590.333333	2832.737	17.92845733	-0.79476	-0.32807	1.122824

Microorganism:		C. saka								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.5	Untreated	35261	33311	27203	31925	4203.997	-	0.793531	0.329686	-1.12322
	10A	37388	29677	25579	30881.33333	5995.91	3.269120334	1.085184	-0.20086	-0.88433
	10B	30434	20291	17189	22638	6927.396	29.09005482	1.125387	-0.3388	-0.78659
	10C	35591	26940	29070	30533.66667	4507.404	4.358131036	1.122006	-0.79728	-0.32472
	10D	30117	28973	28544	29211.33333	813.1324	8.500130514	1.1138	-0.29311	-0.82069
	11A	35343	29246	23154	29247.66667	6094.5	8.386322109	1.000137	-0.00027	-0.99986
	11B	31793	22179	19620	24530.66667	6418.196	23.16157661	1.131523	-0.36641	-0.76512
	11C	30994	26227	22025	26415.33333	4487.465	17.25815714	1.020324	-0.04197	-0.97835
	11D	25213	26637	23529	25126.33333	1555.811	21.29574524	0.055705	0.970983	-1.02669
	12A	21800	19794	23617	21737	1912.278	31.91229444	0.032945	-1.01607	0.98312
	12B	26281	21853	23376	23836.66667	2249.657	25.33542156	1.086536	-0.88176	-0.20477
	12C	22599	23837	17294	21243.33333	3475.786	33.45862699	0.390032	0.74621	-1.13624
	13A	25682	24041	21813	23845.33333	1941.907	25.3082746	0.945805	0.10076	-1.04657
	13C	19741	20538	18223	19500.66667	1176.064	38.91725398	0.204354	0.882038	-1.08639
	13D	25484	26358	15313	22385	6140.102	29.8825372	0.504715	0.647058	-1.15177
	14A	22492	18974	22621	21362.33333	2069.363	33.08587836	0.545901	-1.15414	0.608239
	14C	7687	10940	12161	10262.66667	2312.629	67.85382407	-1.11374	0.292885	0.820855
	15A	22371	21457	24309	22712.33333	1456.316	28.85721744	-0.23438	-0.86199	1.096374
	15D	18240	23753	27455	23149.33333	4637.064	27.48838423	-1.05872	0.130183	0.928533
	16C	12605	7093	8245	9314.333333	2907.429	70.82432785	1.131813	-0.76402	-0.36779
	16D	16366	15723	16636	16241.66667	469.027	49.12555469	0.265088	-1.10584	0.840748
	17A	23996	23886	24176	24019.33333	146.4013	24.76324719	-0.15938	-0.91074	1.070118
	17B	25275	26865	26801	26313.66667	900.0807	17.57661185	-1.15397	0.612538	0.541433
	17C	18212	20983	25757	21650.66667	3816.555	32.18271992	-0.90099	-0.17494	1.075927
	17D	25145	27902	28756	27267.66667	1887.224	14.58835813	-1.12476	0.33612	0.788636
	18A	13395	16383	30593	20123.66667	9188.974	36.96580527	-0.73225	-0.40708	1.139336
	18C	14573	22543	22137	19751	4488.872	38.13312451	-1.15352	0.621983	0.531537
	18D	23051	23536	27448	24678.33333	2410.829	22.69903419	-0.67501	-0.47383	1.148844
	19A	20256	25625	31493	25791.33333	5620.346	19.21273819	-0.98487	-0.02959	1.014469

Microorganism:		C. saka								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.6	Untreated	25048	23402	22709	23719.66667	1201.422	-	1.105634	-0.26441	-0.84123
	19C	27904	21169	23002	24025	3482.09	-1.287258112	1.113986	-0.8202	-0.29379
	19D	21834	17605	18292	19243.66667	2269.441	18.87041695	1.141397	-0.72206	-0.41934
	20C	23532	13521	15001	17351.33333	5403.525	26.84832558	1.143821	-0.70886	-0.43496
	20D	18449	16008	12718	15725	2875.962	33.70480192	0.947161	0.098402	-1.04556
	21A	22131	21416	18072	20539.66667	2166.758	13.4065965	0.734431	0.404444	-1.13888
	21C	16534	17607	16181	16774	742.6769	29.28231144	-0.32316	1.121618	-0.79846
	SB1	22208	21903	21789	21966.66667	216.6341	7.390491716	1.114014	-0.29389	-0.82012
	SB2	24164	26387	25225	25258.66667	1111.882	-6.488286794	-0.98452	1.014796	-0.03028
	SB3	22132	13271	16825	17409.33333	4459.306	26.60380275	1.059059	-0.92802	-0.13104
	SB5	14964	12315	16050	14443	1921.233	39.10959963	0.27118	-1.10762	0.836442
	SB6	11146	8569	13925	11213.33333	2678.635	52.72558636	-0.02514	-0.98719	1.012332
	CP1	14386	13088	14509	13994.33333	787.3134	41.0011383	0.497472	-1.15117	0.6537
	CP2	16130	19105	14899	16711.33333	2162.422	29.54650852	-0.26883	1.106938	-0.8381
	CP3	16347	16209	11449	14668.33333	2788.878	38.15961438	0.601915	0.552432	-1.15435
	CP4	15829	16358	19423	17203.33333	1940.4	27.47228039	-0.70827	-0.43565	1.143922
	CP5	13743	15202	17934	15626.33333	2127.478	34.12077179	-0.88524	-0.19945	1.084696
	CP6	12774	14920	14004	13899.33333	1076.822	41.40164983	-1.04505	0.947851	0.0972
	MDZ6	11932	11936	13460	12442.66667	881.0388	47.54282663	-0.57962	-0.57508	1.154698
	CT2	10882	13497	16523	13634	2822.994	42.5202715	-0.97485	-0.04853	1.023381
	CT3	16142	14148	17158	15816	1531.252	33.32115404	0.212898	-1.0893	0.876407
	CT4	13964	15992	16287	15414.33333	1264.657	35.01454489	-1.14682	0.456777	0.690042
	CT5	16267	19972	28974	21737.66667	6534.917	8.3559353	-0.83714	-0.27019	1.107334
	CT6	12411	20145	21257	17937.66667	4818.42	24.37639652	-1.14699	0.458103	0.688884
	MDZ1	19539	23313	29444	24098.66667	4999.021	-1.597830211	-0.91211	-0.15716	1.069276
	MDZ2	18747	20205	23742	20898	2568.597	11.89589511	-0.83742	-0.2698	1.107219
	MDZ3	15417	21548	17287	18084	3142.244	23.75946823	-0.84876	1.102397	-0.25364
	MDZ4	16034	16074	26286	19464.66667	5907.482	17.93870066	-0.58073	-0.57396	1.154694
	MDZ5	22678	22954	27702	24444.66667	2824.307	-3.056535364	-0.62552	-0.5278	1.153321

Microorganism:		E. aerogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.1	Untreated	7651	14690	15177	12506	4211.598	-	-1.15277	0.518568	0.634201
	17D	20070	12580		16325	5296.23	-30.53734208	0.707107	-0.70711	-3.08238
	18A	18741	13398	13156	15098.33333	3156.962	-20.72871688	1.153852	-0.5386	-0.61525
	18B	17670	15648	13144	15487.33333	2267.274	-23.83922384	0.962683	0.070863	-1.03355
	18C	13520	21544	19906	18323.33333	4239.666	-46.51633882	-1.13295	0.759651	0.3733
	18D	17411	17658	13823	16297.33333	2146.391	-30.31611493	0.518855	0.633932	-1.15279
	19A	11565	14489	8299	11451	3096.574	8.435950744	0.036815	0.981084	-1.0179
	19B	16731	6855	6810	10132	5714.946	18.98288821	1.154692	-0.57341	-0.58128
	19C	4746	7504	5837	6029	1388.988	51.79114025	-0.92369	1.061924	-0.13823
	19D	6116	7341	7242	6899.666667	680.478	44.82914868	-1.15164	0.648564	0.503078
	20A	4832	10487	7568	7629	2827.993	38.9972813	-0.98904	1.010611	-0.02157
	20B	11504	13034	11210	11916	979.312	4.717735487	-0.4207	1.141618	-0.72091
	20C	11539	14637	6183	10786.33333	4276.963	13.75073298	0.175982	0.900327	-1.07631
	20D	6897	7000	7549	7148.666667	350.503	42.83810438	-0.71802	-0.42415	1.142168
	21A	5188	5466	6323	5659	591.6021	54.74972013	-0.79614	-0.32623	1.122376
	21B	6471	5132	5161	5588	764.8379	55.31744763	1.154493	-0.5962	-0.55829
	21C	4907	5736	6168	5603.666667	640.831	55.19217442	-1.08713	0.206503	0.880627
	21D	6305	7283	7733	7107	730.0877	43.17127779	-1.0985	0.241067	0.857431
	SB1	12334	6423	10075	9610.666667	2982.731	23.15155392	0.913033	-1.06871	0.155674
	SB2	10249	16630	18313	15064	4253.974	-20.45418199	-1.13188	0.368126	0.763757
	SB3	6510	12030	15711	11417	4631.029	8.707820246	-1.05959	0.132368	0.927224
	SB5	4268	8165	14616	9016.333333	5226.266	27.90393944	-0.90855	-0.1629	1.071447
	SB6	5738	11170	15546	10818	4913.466	13.49752119	-1.03389	0.07164	0.962254
	CP1	10668	10955	12645	11422.66667	1068.254	8.662508663	-0.70645	-0.43779	1.144235
	CP2	6664	12103	6775	8514	3108.661	31.92067807	-0.59511	1.154516	-0.5594
	CP3	16567	14697	17251	16171.66667	1322.099	-29.31126393	0.29902	-1.1154	0.816379

Microorganism:		E. aerogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.9	Untreated	5945	6450	6387	6260.666667	275.1842	-	-1.14711	0.688024	0.459086
	1A	17903	19040	14920	17287.66667	2127.81	-176.1314024	0.289186	0.823538	-1.11272
	1B	7742	6939	6543	7074.666667	610.9045	-13.00181024	1.092369	-0.22208	-0.87029
	1C	7434	5995	5725	6384.666667	918.7221	-1.980619742	1.142166	-0.42414	-0.71803
	1D	7513	6394	5899	6602	826.8597	-5.452028538	1.101759	-0.25155	-0.8502
	2A	7879	6116	5911	6635.333333	1081.913	-5.9844532	1.149507	-0.48001	-0.66949
	2B	7343	5737	5231	6103.666667	1102.71	2.507720158	1.123898	-0.33251	-0.79138
	2C	8454	6412	5604	6823.333333	1468.85	-8.987328293	1.110165	-0.28004	-0.83013
	2D	7545	7196	7307	7349.333333	178.3097	-17.38898946	1.097342	-0.85993	-0.23741
	3C	16146	15211	17280	16212.33333	1036.094	-158.9553828	-0.06402	-0.96645	1.030473
	3D	5255	5560	5130	5315	221.19	15.10488766	-0.27126	1.107645	-0.83639
	4A	4858	4989	4865	4904	73.69532	21.66968374	-0.62419	1.153398	-0.52921
	4D	4559	4185	4487	4410.333333	198.4372	29.55489298	0.749187	-1.13554	0.386352
	5A	5518	5827	5718	5687.666667	156.7174	9.152379938	-1.08263	0.889074	0.193554
	5B	5522	5552	5265	5446.333333	157.754	13.00713449	0.47965	0.669819	-1.14947
	5D	7116	6940	7302	7119.333333	181.023	-13.71525929	-0.01841	-0.99067	1.00908
	6A	4172	4457	3973	4200.666667	243.2701	32.90384411	-0.11784	1.053699	-0.93586
	6B	4108	4207	4080	4131.666667	66.72581	34.00596316	-0.35469	1.128998	-0.77431
	6C	3980	3731	3708	3806.333333	150.8388	39.20242786	1.15134	-0.49943	-0.65191
	6D	3824	4048	4182	4018	180.8756	35.82153125	-1.07256	0.16586	0.9067
	7A	4171	4173	4558	4300.666667	222.8594	31.30657012	-0.58183	-0.57286	1.154689
	7B	4304	4955	5066	4775	411.6564	23.73016718	-1.14416	0.437258	0.7069
	7C	7214	9820	13463	10165.66667	3138.808	-62.37354914	-0.94038	-0.11013	1.050505
	7D	5468	6921	7430	6606.333333	1018.147	-5.521243744	-1.11804	0.309058	0.808986
	8D	4478	4862	6070	5136.666667	830.7812	17.9533596	-0.79283	-0.33061	1.123441
	9A	4136	4625	5654	4805	774.8426	23.25098499	-0.8634	-0.23231	1.095706
	9B	3957	4526	5836	4773	963.544	23.76211266	-0.84687	-0.25635	1.103219
	9C	4306	4930	6151	5129	938.4599	18.07581727	-0.87697	-0.21205	1.089018
	9D	4437	4893	6376	5235.333333	1013.817	16.3773826	-0.78745	-0.33767	1.125121

Microorganism:		E. aerogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.31	Untreated	34472	35734	37692	35966	1622.488	-	-0.92081	-0.14299	1.063798
	10A	32658	37244	36887	35596.33333	2550.924	1.027822573	-1.15187	0.64591	0.50596
	10B	36150	32605	32326	33693.66667	2131.816	6.318004041	1.152226	-0.51068	-0.64155
	10C	35360	33373	35819	34850.66667	1300.113	3.101076943	0.391761	-1.13657	0.744807
	10D	34036	36328	27784	32716	4422.305	9.036312073	0.298487	0.816769	-1.11526
	11A	32772	28622	25799	29064.33333	3507.481	19.18941964	1.057074	-0.12611	-0.93096
	11B	34778	29368	33317	32487.66667	2798.727	9.671170921	0.818348	-1.11467	0.296325
	11C	31548	29545	27318	29470.33333	2115.988	18.06057573	0.98189	0.035287	-1.01718
	11D	40752	41578	31705	38011.66667	5477.326	-5.687779199	0.500305	0.651108	-1.15141
	12A	40773	41348	37846	39989	1878.029	-11.18556414	0.417459	0.723631	-1.14109
	12B	39915	37677	37153	38248.33333	1466.962	-6.345808078	1.136135	-0.38947	-0.74667
	12C	38110	36195	37800	37368.33333	1027.89	-3.899052809	0.721543	-1.1415	0.419954
	13A	25565	27983	30536	28028	2485.806	22.07084469	-0.99083	-0.0181	1.008928
	13C	33315	35541	32866	33907.33333	1432.498	5.723924447	-0.4135	1.140432	-0.72694
	13D	28860	31159	34822	31613.66667	3006.892	12.10124377	-0.91578	-0.15121	1.066993
	14A	44565	44895	35520	41660	5319.955	-15.83161875	0.546057	0.608088	-1.15415
	14C	40952	41163	37972	40029	1784.536	-11.29678029	0.517221	0.635459	-1.15268
	15A	39329	35304	38408	37680.33333	2108.858	-4.766538768	0.781782	-1.12683	0.345053
	15D	38710	37419	40008	38712.33333	1294.502	-7.635915402	-0.0018	-0.9991	1.0009
	16C	29375	29677	30981	30011	853.5081	16.55730412	-0.74516	-0.39133	1.136486
	16D	35023	34412	34710	34715	305.5307	3.478285047	1.008082	-0.99172	-0.01636
	17A	32340	34446	36391	34392.33333	2026.033	4.375428646	-1.01298	0.026489	0.986493
	17B	40404	42842	40150	41132	1486.339	-14.36356559	-0.48979	1.150478	-0.66068
	17C	40255	34067	43501	39274.33333	4792.846	-9.198502289	0.204611	-1.08648	0.88187
	17D	40009	44136	41083	41742.66667	2141.122	-16.06146546	-0.8097	1.117794	-0.30809
	18A	25652	34895	35716	32087.66667	5588.548	10.78333241	-1.15158	0.502337	0.649244
	18C	31049	35091	34602	33580.66667	2206.078	6.632189661	-1.14759	0.684624	0.462963
	18D	33113	34738	39559	35803.33333	3352.451	0.452279004	-0.8025	-0.31778	1.120275
	19A	38527	36145	35916	36862.66667	1445.896	-2.493095331	1.151074	-0.49635	-0.65473

Microorganism:		E. aerogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.3	Untreated	26488	26055	26243	26262	217.1244	-	1.040878	-0.95337	-0.08751
	CP4	28427	29703	29772	29300.66667	757.4037	-11.57058361	-1.1535	0.531201	0.622301
	CP5	32100	29731	29127	30319.33333	1571.396	-15.44944533	1.133175	-0.3744	-0.75877
	CP6	31361	28325	29280	29655.33333	1552.411	-12.92107735	1.098721	-0.85695	-0.24177
	CT1	31849	29842	26550	29413.66667	2675.342	-12.0008631	0.910289	0.160104	-1.07039
	CT2	30235	27280	20050	25855	5239.897	1.549767725	0.835894	0.271952	-1.10785
	CT3	26546	28890	26868	27434.66667	1270.597	-4.465260325	-0.69941	1.145393	-0.44598
	CT4	29604	27308	27516	28142.66667	1269.818	-7.161170766	1.150821	-0.65731	-0.49351
	CT5	29615	27476	29657	28916	1247.253	-10.10585637	0.560431	-1.15454	0.594105
	CT6	29603	26831	30240	28891.33333	1812.504	-10.01193105	0.392643	-1.13673	0.74409
	MDZ1	20324	19129	20702	20051.66667	821.1007	23.64760237	0.331669	-1.12369	0.792026
	MDZ2	23341	23375	22046	22920.66667	757.6743	12.72307263	0.554768	0.599642	-1.15441
	MDZ3	24219	25085	23526	24276.66667	781.0982	7.559718732	-0.07383	1.034868	-0.96104
	MDZ4	30886	26586	28646	28706	2150.628	-9.306221918	1.013657	-0.98576	-0.0279
	MDZ5	22301	20174	21435	21303.33333	1069.595	18.88152717	0.932751	-1.05585	0.1231
	MDZ6	27222	26932	27107	27087	146.0308	-3.141421065	0.924462	-1.06142	0.136957
	LP1	25029	24812	23618	24486.33333	759.7857	6.76135354	0.714236	0.42863	-1.14287
	LP3	24455	23467	24168	24030	508.2509	8.498971899	0.836201	-1.10772	0.271519
	LP4	20791	19704	20206	20233.66667	544.0279	22.95458584	1.024457	-0.9736	-0.05086
	LP5	20984	20899	21084	20989	92.6013	20.07844033	-0.05399	-0.97191	1.025904
	LP6	22809	25939	24079	24275.66667	1574.241	7.563526515	-0.93167	1.056594	-0.12493
	DEA	26296	24763	25363	25474	772.5044	3.00053309	1.064072	-0.92038	-0.14369
	FLA	28778	27228	34689	30231.66667	3937.193	-15.11562968	-0.36921	-0.7629	1.132109
	PAA	26820	26952	30907	28226.33333	2322.463	-7.479755286	-0.60554	-0.5487	1.154234
	RIB	25225	27934	29660	27606.33333	2235.583	-5.118929759	-1.0652	0.146569	0.918627
	ANB	24561	21204	27707	24490.66667	3252.07	6.744853146	0.021627	-1.01064	0.989011
	DED	25037	25825	28664	26508.66667	1907.703	-0.939253167	-0.77143	-0.35837	1.129805
	PAB	23894	25250	30510	26551.33333	3494.705	-1.101718579	-0.76039	-0.37237	1.132761
	PAC	24501	27600	30498	27533	2999.061	-4.839692331	-1.01098	0.02234	0.988643
	RIA	21559	30170	29583	27104	4811.072	-3.206153378	-1.15255	0.63728	0.51527

Microorganism:		E. aerogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.18	Untreated	40792	39598	41878	40756	1140.426	-	0.031567	-1.01541	0.983843
	1A	36113	44186	44907	41735.33333	4882.411	-2.40291818	-1.15155	0.501938	0.649611
	1B	44170	43242	41582	42998	1311.14	-5.501030523	0.893879	0.186098	-1.07998
	1C	44821	42109	42109	43013	1565.774	-5.53783492	1.154701	-0.57735	-0.57735
	1D	44091	43319	43929	43779.66667	407.0889	-7.418948539	0.76478	-1.13161	0.366832
	2A	42312	43979	46367	44219.33333	2038.155	-8.497726306	-0.93581	-0.11792	1.053731
	2B	47910	42601	44307	44939.33333	2710.397	-10.26433736	1.096026	-0.86273	-0.2333
	2C	45621	43696	44144	44487	1007.295	-9.154480322	1.125788	-0.78527	-0.34052
	2D	44608	45640	44811	45019.66667	546.7288	-10.46144535	-0.75296	1.134627	-0.38166
	3C	39880	39765	39146	39597	394.7873	2.843753067	0.716842	0.425546	-1.14239
	3D	43048	42660	44198	43302	799.8425	-6.246932967	-0.31756	-0.80266	1.120221
	4A	41060	39394	53493	44649	7704.294	-9.551967808	-0.46584	-0.68209	1.147931
	4D	45324	44139	44494	44652.33333	608.1598	-9.560146563	1.104425	-0.84408	-0.26035
	5A	46029	45879	44425	45444.33333	885.9488	-11.50341872	0.659933	0.490623	-1.15056
	5B	43777	42153	43760	43230	932.7481	-6.070271862	0.586439	-1.15465	0.568213
	5D	44053	46447	46330	45610	1349.67	-11.90990284	-1.15362	0.620152	0.533464
	6A	41431	43096	42198	42241.66667	833.3585	-3.645271044	-0.97277	1.025169	-0.0524
	6B	37598	38714	36983	37765	877.5004	7.338796742	-0.19031	1.081481	-0.89117
	6C	41478	45271	43447	43398.66667	1896.962	-6.484116858	-1.0125	0.987017	0.025479
	6D	42650	42059	43276	42661.66667	608.5839	-4.675794157	-0.01917	-0.99028	1.009447
	7A	44068	45655	44687	44803.33333	799.8702	-9.930644159	-0.91932	1.064756	-0.14544
	7B	40872	43388	43733	42664.33333	1561.762	-4.682337161	-1.14764	0.463366	0.68427
	7C	44911	44016	43715	44214	622.0989	-8.484640298	1.120401	-0.31828	-0.80212
	7D	43200	42395	41296	42297	955.7756	-3.781038375	0.944782	0.102535	-1.04732
	8D	42266	43585	42186	42679	785.638	-4.718323682	-0.52569	1.153203	-0.62752
	9A	44634	45670	45618	45307.33333	583.7031	-11.16727189	-1.15355	0.62132	0.532234
	9B	43627	43471	44131	43743	344.9522	-7.328982236	-0.33628	-0.78852	1.124794
	9C	43881	40957	43458	42765.33333	1580.28	-4.930153433	0.705993	-1.14431	0.438319
	9D	42404	40290	43744	42146	1741.394	-3.410540779	0.148157	-1.06581	0.917656

Microorganism:		E. coli								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
1.25	Untreated	39376	38278	25463	34372.33333	7735.216	-	0.646868	0.50492	-1.15179
	LP1	37718	46388	42320	42142	4337.74	-22.60442022	-1.01989	0.978851	0.041035
	LP3	44118	45092	41707	43639	1742.595	-26.95966717	0.274877	0.833814	-1.10869
	LP4	42765	46739	40843	43449	3006.925	-26.40689702	-0.22747	1.094141	-0.86667
	LP5	43214	43887	43667	43589.33333	343.1564	-26.81517112	-1.09377	0.867437	0.22633
	LP6	40795	42292	44056	42381	1632.321	-23.29974689	-0.97162	-0.05452	1.026146
	DEA	45229	41800	44139	43722.66667	1752.002	-27.20308	0.859778	-1.09741	0.237633
	FLA	44301	41131	44129	43187	1782.624	-25.64465607	0.624921	-1.15336	0.528435
	PAA	43647	42221	49186	45018	3679.339	-30.97161477	-0.37262	-0.76019	1.132812
	RIB	45670	43998	41595	43754.33333	2048.398	-27.29520836	0.935202	0.118955	-1.05416
	ANB	45831	46437	42055	44774.33333	2374.424	-30.26271129	0.44502	0.70024	-1.14526
	DED	43153	55733	43396	47427.33333	7193.944	-37.98112823	-0.59416	1.154536	-0.56038
	PAB	43062	52448	44679	46729.66667	5017.786	-35.95139502	-0.73093	1.139613	-0.40868
	PAC	39874	44352	51761	45329	6003.423	-31.87641223	-0.90865	-0.16274	1.071389
	RIA	43248	46556	42479	44094.33333	2166.262	-28.284376	-0.39069	1.136366	-0.74568
	CT1	42720	43482	40847	42349.66667	1355.974	-23.2085883	0.273112	0.83507	-1.10818
	CT2	40879	42055	43606	42180	1367.791	-22.71497425	-0.95117	-0.09139	1.042557
	CT3	38176	35664	39904	37914.66667	2132.046	-10.30576917	0.122574	-1.05564	0.933063
	CT4	41110	38428	41209	40249	1577.809	-17.09708389	0.545693	-1.15413	0.608439
	CT5	37060	41119	41471	39883.33333	2451.405	-16.03324379	-1.15172	0.504065	0.647656
	CT6	39585	43537	43872	42331.33333	2384.285	-23.15525083	-1.15185	0.505672	0.646175
	CP2	43040	43003	43853	43298.66667	480.4231	-25.96952976	-0.53841	-0.61543	1.153844
	CP3	44842	40894	48546	44760.66667	3826.648	-30.22295063	0.021254	-1.01046	0.989203
	CP4	44733	44824	42755	44104	1169.154	-28.31249939	0.537996	0.61583	-1.15383
	CP5	44588	42332	49999	45639.66667	3940.206	-32.78023992	-0.26691	-0.83947	1.106372
	CP6	43945	36372	39145	39820.66667	3831.446	-15.85092662	1.076443	-0.9001	-0.17635
	SB2	43547	43208	42296	43017	647.0015	-25.15007225	0.819163	0.295208	-1.11437
	SB3	40692	41938	42682	41770.66667	1005.498	-21.52409399	-1.07277	0.166418	0.906351
	SB5	46425	42104	42900	43809.66667	2299.648	-27.45619054	1.137276	-0.74171	-0.39557

Microorganism:		E. coli								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
5.8	Untreated	34423	33730	31460	33204.33333	1549.867	-	0.786304	0.339169	-1.12547
	17A	31215	35115	43358	36562.66667	6199.59	-10.11414173	-0.86258	-0.23351	1.096094
	17B	35192	35396	34556	35048	438.1233	-5.552488129	0.328675	0.794297	-1.12297
	17C	34379	33572	35035	34328.66667	732.7976	-3.386104223	0.068687	-1.03257	0.963886
	17D	34686	34904	34555	34715	176.298	-4.549606979	-0.16449	1.072048	-0.90755
	18A	35024	33627	35304	34651.66667	898.3631	-4.358868822	0.414457	-1.14059	0.726135
	18B	33209	34061	35167	34145.66667	981.742	-2.834971339	-0.95409	-0.08624	1.040328
	18C	34034	33479	33589	33700.66667	293.8679	-1.494784817	1.134297	-0.75431	-0.37999
	18D	33158	36720	35511	35129.66667	1811.359	-5.798439963	-1.0885	0.877978	0.210523
	19A	37605	36455	35245	36435	1180.127	-9.72965376	0.991419	0.016947	-1.00837
	19B	34806	35290	35557	35217.66667	380.6893	-6.063465612	-1.08137	0.190006	0.891366
	19C	34574	33999	34982	34518.33333	493.8586	-3.957314808	0.112718	-1.05158	0.938865
	19D	37575	35781	34900	36085.33333	1363.221	-8.676578358	1.092755	-0.22325	-0.86951
	20A	34558	36197	35169	35308	828.294	-6.335518456	-0.90548	1.07329	-0.16781
	20B	36648	35102	35704	35818	779.2792	-7.87146256	1.065087	-0.9188	-0.14629
	20C	34931	34987	38266	36061.33333	1909.503	-8.604298636	-0.59195	-0.56262	1.154576
	20D	35352	36640	35687	35893	668.2537	-8.097336693	-0.80957	1.117839	-0.30827
	21A	35377	35040	36115	35510.66667	549.8239	-6.945880558	-0.24311	-0.85603	1.09914
	21B	33943	35601	34508	34684	842.8956	-4.456245671	-0.87911	1.087916	-0.2088
	21C	34514	35342	30604	33486.66667	2530.558	-0.850290625	0.405971	0.733172	-1.13914
	21D	35298	36479	35288	35688.33333	684.7557	-7.480951281	-0.57003	1.15467	-0.58464
	SB6	34493	35997	35169	35219.66667	753.2791	-6.069488922	-0.96467	1.031933	-0.06726
	SB1	32078	39330	31500	34302.66667	4363.38	-3.307801191	-0.50985	1.152165	-0.64232
	SB2	36009	35953	35395	35785.66667	339.4839	-7.774085712	0.657861	0.492905	-1.15077
	SB3	35352	34715	34332	34799.66667	515.244	-4.804593778	1.071984	-0.16432	-0.90766
	SB5	33948	35969	38775	36230.66667	2424.115	-9.114272234	-0.94165	-0.10794	1.049593
	CP1	40027	33193	36608	36609.33333	3417	-10.25468563	1.000195	-0.9998	-0.00039
	CP2	36519	35099	35087	35568.33333	823.3233	-7.119552669	1.15467	-0.57005	-0.58462
	CP3	36576	33842	33977	34798.33333	1540.984	-4.800578238	1.153592	-0.6206	-0.53299

Microorganism:		E. coli								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.13	Untreated	35457	38163	34311	35977	1977.947	-	-0.2629	1.105186	-0.84229
	CP4	30775	29209	36136	32040	3632.63	10.94310254	-0.34823	-0.77933	1.127558
	CP5	37852	34786	34817	35818.33333	1761.275	0.441022505	1.154656	-0.58613	-0.56853
	CP6	29001	33811	34919	32577	3146.069	9.450482253	-1.13666	0.392236	0.744421
	CT1	32651	34482	28920	32017.66667	2834.571	11.00517923	0.223432	0.869385	-1.09282
	CT2	39455	28770	29990	32738.33333	5848.701	9.002047604	1.148403	-0.6785	-0.4699
	CT3	25091	27848	24359	25766	1839.837	28.38202185	-0.36688	1.131622	-0.76474
	CT4	35612	33903	25663	31726	5319.788	11.81588237	0.73048	0.409227	-1.13971
	CT5	37428	35727	33020	35391.66667	2223.05	1.626965376	0.916009	0.150844	-1.06685
	CT6	31281	28732	31626	30546.33333	1580.699	15.0948291	0.464773	-1.1478	0.683031
	MDZ1	16097	14452	12400	14316.33333	1852.23	60.20698409	0.961364	0.073245	-1.03461
	MDZ2	28172	28181	25920	27424.33333	1302.799	23.77259545	0.573893	0.580801	-1.15469
	MDZ3	29801	40360	26982	32381	7052.306	9.995274759	-0.36584	1.131403	-0.76557
	MDZ4	24956	27247	26207	26136.66667	1147.118	27.35173398	-1.02925	0.967933	0.061313
	MDZ5	12334	12305	12572	12403.66667	146.5003	65.52334362	-0.47554	-0.67349	1.149031
	MDZ6	32272	30340	36268	32960	3023.294	8.385913222	-0.22757	-0.8666	1.094171
	LP1	35182	29266	33183	32543.66667	3009.373	9.543134039	0.876705	-1.08915	0.212447
	LP3	33679	25687	40231	33199	7283.871	7.721599911	0.065899	-1.03132	0.965421
	LP4	27915	23938	34909	28920.66667	5554.209	19.61345675	-0.18106	-0.8971	1.078161
	LP5	31377	23988	24654	26673	4087.371	25.86096673	1.150862	-0.6569	-0.49396
	LP6	27042	28378	29972	28464	1466.892	20.88278622	-0.9694	-0.05863	1.028024
	ANA	28107	28370	28352	28276.33333	146.9229	21.40441578	-1.15253	0.637523	0.515009
	BEA	36295	34291	38865	36483.66667	2292.829	-1.408307159	-0.08229	-0.95631	1.0386
	DEA	31669	32459	35861	33329.66667	2227.501	7.358404907	-0.74553	-0.39087	1.1364
	EUA	36868	31820	35640	34776	2632.574	3.338243878	0.794659	-1.12286	0.328196
	FLA	27531	36253	40371	34718.33333	6556.127	3.498531469	-1.09628	0.234081	0.862196
	PAA	29470	30582	34371	31474.33333	2569.464	12.51540336	-0.78006	-0.34728	1.127343
	MAA	26665	28045	38426	31045.33333	6428.98	13.70783186	-0.68134	-0.46669	1.148031
	RZA	36659	33051	17614	29108	10116.25	19.0927537	0.746423	0.389769	-1.13619

Microorganism:		E. coli								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.9	Untreated	17482	16733	16681	16965.33333	448.2012	-	1.152756	-0.51837	-0.63439
	1A	25004	18744	16431	20059.66667	4435.349	-18.23915435	1.114756	-0.29663	-0.81812
	1B	14181	14682	13865	14242.66667	411.9761	16.04841245	-0.14969	1.066405	-0.91672
	1C	15465	16733	15988	16062	637.2307	5.324583464	-0.93687	1.052994	-0.11613
	1D	18699	21584	19895	20059.33333	1449.503	-18.23718956	-0.93848	1.051854	-0.11337
	2A	18978	20617	18856	19483.66667	983.3892	-14.8439956	-0.51421	1.152477	-0.63827
	2B	19058	19659	18643	19120	510.8297	-12.70040868	-0.12137	1.055146	-0.93377
	2C	18819	22401	22202	21140.66667	2013.083	-24.61097139	-1.15329	0.626071	0.527218
	2D	15130	15991	16119	15746.66667	537.8702	7.183275699	-1.1465	0.454261	0.692236
	3C	20966	19001	18574	19513.66667	1275.749	-15.02082678	1.138416	-0.40186	-0.73656
	3D	6826	6867	7057	6916.666667	123.2491	59.23058787	-0.73564	-0.40298	1.138616
	4A	18681	17322	16694	17565.66667	1015.663	-3.538588494	1.098133	-0.23991	-0.85822
	4D	15218	14787	13830	14611.66667	710.417	13.87338887	0.853489	0.246803	-1.10029
	5A	18279	17238	16814	17443.66667	753.8437	-2.819475008	1.108099	-0.27282	-0.83527
	5B	19284	17481	16687	17817.33333	1330.768	-5.022005659	1.102121	-0.25274	-0.84938
	5D	16489	16692	16697	16626	118.6718	2.000157183	-1.15444	0.556156	0.598289
	6A	14456	14749	14896	14700.33333	224.0007	13.35075448	-1.09077	0.217261	0.873509
	6B	11306	10881	10730	10972.33333	298.6642	35.32497642	1.117197	-0.30581	-0.81139
	6C	15327	15122	15359	15269.33333	128.5937	9.996856334	0.448441	-1.14573	0.697287
	6D	16694	17338	16770	16934	351.9318	0.184690349	-0.68195	1.14795	-0.466
	7A	16076	17008	17614	16899.33333	774.7369	0.389028607	-1.06273	0.140263	0.922464
	7B	15254	15454	14852	15186.66667	306.5964	10.48412449	0.219616	0.871939	-1.09155
	7C	15719	17752	19379	17616.66667	1833.749	-3.839201509	-1.03486	0.073801	0.961055
	7D	15194	17306	16498	16332.66667	1065.663	3.729173216	-1.06851	0.91336	0.155146
	8D	18263	20541	20364	19722.66667	1267.203	-16.25275071	-1.15188	0.645779	0.506102
	9A	16426	17510	17763	17233	710.2387	-1.57772713	-1.13624	0.39001	0.746228
	9B	12609	14461	13803	13624.33333	938.8383	19.69309965	-1.08148	0.891172	0.190306
	9C	16912	16707	15887	16502	542.379	2.731059415	0.755929	0.377964	-1.13389
	9D	19326	21396	17535	19419	1932.179	-14.46282616	-0.04813	1.023197	-0.97506

Microorganism:		E. coli								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.17	Untreated	46760	46918	46149	46609	406.1293	-	0.371803	0.760841	-1.13264
	10A	39775	46855	47571	44733.66667	4309.228	4.023543379	-1.15071	0.492277	0.658432
	10B	47034	44721	42886	44880.33333	2078.585	3.708868816	1.036121	-0.07665	-0.95947
	10C	47028	45501	45819	46116	805.6606	1.05773563	1.13199	-0.76335	-0.36864
	10D	46055	46022	44698	45591.66667	774.1139	2.18269719	0.598534	0.555904	-1.15444
	11A	45691	43044	43075	43936.66667	1519.376	5.733513556	1.15464	-0.58752	-0.56712
	11B	47766	48088	45524	47126	1396.683	-1.109227832	0.458228	0.688775	-1.147
	11C	45815	46702	46263	46260	443.5076	0.748782424	-1.00336	0.996601	0.006764
	11D	47398	46866	46684	46982.66667	371.022	-0.801704964	1.11943	-0.31445	-0.80498
	12A	48739	48107	48550	48465.33333	324.3953	-3.982778719	0.843621	-1.10462	0.260998
	12B	45759	45615	48166	46513.33333	1433.061	0.205253635	-0.52638	-0.62686	1.153242
	12C	45224	45010	41988	44074	1809.695	5.438863739	0.635466	0.517214	-1.15268
	13C	43301	42478	42799	42859.33333	414.804	8.044941249	1.06476	-0.91931	-0.14545
	13D	46494	46717	46597	46602.66667	111.6079	0.01358822	-0.97365	1.024419	-0.05077
	14A	46772	47324	46656	46917.33333	356.9276	-0.66153175	-0.40718	1.139353	-0.73217
	14C	46820	47513	47072	47135	350.7692	-1.128537407	-0.89803	1.077632	-0.17961
	15A	45727	45843	47087	46219	753.9443	0.836748268	-0.65257	-0.49871	1.151279
	15D	45588	46899	46206	46231	655.8575	0.811002167	-0.9804	1.018514	-0.03812
	16C	44043	44150	47768	45320.33333	2120.417	2.76484513	-0.6024	-0.55194	1.154333
	16D	46799	46040	47819	46886	892.6853	-0.594305821	-0.09746	-0.9477	1.045161
	17A	66983	45677	46743	53134.33333	12005.13	-14.00015734	1.153562	-0.62118	-0.53238
	17B	30	46436	46284	30916.66667	26748.75	33.66803264	-1.1547	0.580189	0.574507
	17C	47749	48212	45877	47279.33333	1236.324	-1.438205783	0.37989	0.754387	-1.13428
	17D	48324	48147	48046	48172.33333	140.7208	-3.354144765	1.077785	-0.18003	-0.89776
	18A	45451	47694	46599	46581.33333	1121.604	0.059359065	-1.00778	0.992031	0.015751
	18C	44245	46513	44334	45030.66667	1284.509	3.38632739	-0.61165	1.154007	-0.54236
	18D	46154	47762	46571	46829	834.4693	-0.472011843	-0.8089	1.118076	-0.30918
	19A	47303	48230	47224	47585.66667	559.4053	-2.095446516	-0.5053	1.151818	-0.64652
	19C	47208	49178	45741	47375.66667	1724.624	-1.644889757	-0.09722	1.045059	-0.94784

Microorganism:		E. faecalis								
Plate ID	Extract ID	RFU 1	RFU 2	RFU 3	Sample Mean	stdev	% inhibition	ZRFU 1	ZRFU 2	ZRFU 3
2.17	Untreated	15200	14868	15266	15111.33333	213.301	-	0.415688	-1.1408	0.72511
	LP1	12605	12536	11672	12271	519.8952	18.79604712	0.642437	0.509718	-1.15216
	LP1	11707	12549	8395	10883.66667	2195.982	27.97679446	0.374927	0.758355	-1.13328
	LP3	13709	14170	13343	13740.66667	414.4084	9.070454846	-0.07641	1.036015	-0.9596
	LP3	14038	13143	13899	13693.33333	481.6434	9.383685534	0.715606	-1.14262	0.42701
	LP4	14391	14346	13337	14024.66667	595.9617	7.19107072	0.614693	0.539185	-1.15388
	LP4	11609	15528	12128	13088.33333	2128.69	13.38730313	-0.69495	1.146088	-0.45114
	LP5	8494	8386	8709	8529.666667	164.4273	43.55450655	-0.21691	-0.87374	1.090654
	LP5	10468	10907	10702	10692.33333	219.6596	29.24295231	-1.02128	0.97727	0.044007
	LP6	12401	12389	13136	12642	427.8586	16.34093616	-0.56327	-0.59132	1.154587
	LP6	12837	14044	14103	13661.33333	714.5029	9.595447126	-1.15372	0.535571	0.618145
	DEA	14813	12816	14283	13970.66667	1034.488	7.548418406	0.814251	-1.11617	0.301921
	DEA	13998	14111	14480	14196.33333	252.076	6.055058014	-0.7868	-0.33852	1.125322
	FLA	12141	12255	12498	12298	182.3431	18.61737327	-0.86101	-0.23582	1.096833
	FLA	11976	12688	12451	12371.66667	362.5691	18.12988044	-1.09129	0.872477	0.218809
	PAA	14758	14459	15126	14781	334.0943	2.185997265	-0.06884	-0.9638	1.032643
	PAA	14576	14971	14448	14665	272.6224	2.953633035	-0.32646	1.122431	-0.79597
	RIB	12345	13403	14187	13311.66667	924.3902	11.90938369	-1.04573	0.098804	0.946931
	RIB	12924	14294	13148	13455.33333	734.8914	10.95866237	-0.72301	1.141212	-0.4182
	ANB	13952	13849	12393	13398	871.8779	11.33806856	0.63541	0.517274	-1.15268
	ANB	13515	15375	14335	14408.33333	932.1659	4.652137469	-0.95834	1.037011	-0.07867
	DED	13090	12983	13622	13231.66667	342.246	12.43878766	-0.41393	-0.72657	1.140505
	DED	12240	12914	14161	13105	974.6389	13.27701063	-0.88751	-0.19597	1.083478
	PAB	13352	13739	14930	14007	822.4287	7.307980765	-0.79642	-0.32586	1.122286
	PAB	14177	13789	14048	14004.66667	197.5964	7.323421714	0.872148	-1.09145	0.219302
	PAC	13240	14142	13790	13724	454.6075	9.180747342	-1.06465	0.919474	0.14518
	PAC	13967	42030	14584	23527	16027.04	-55.69109278	-0.59649	1.154487	-0.55799
	RIA	15045	15363	13826	14744.66667	811.3214	2.426434905	0.370178	0.762131	-1.13231
	RIA	15498	15317	15644	15486.33333	163.8119	-2.481581153	0.07122	-1.03371	0.962486

Microorganism:		E. faecalis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.7	Untreated	30378	30533	14090	25000.33333	9448.944	0	0.569129	0.585533	-1.15466
	1A	23202	30074	29592	27622.66667	3835.988	-10.48919348	-1.15242	0.639036	0.513384
	1B	32037	29645	29054	30245.33333	1579.516	-20.97972027	1.134313	-0.38007	-0.75424
	1C	29858	26967	27559	28128	1527.184	-12.51049986	1.132804	-0.76022	-0.37258
	1D	13711	30739	27623	24024.33333	9066.477	3.903947947	-1.13752	0.740604	0.39692
	2A	28486	26007	11752	22081.66667	9031.216	11.67451101	0.709133	0.434641	-1.14377
	2B	29624	35016	29981	31540.33333	3015.304	-26.1596512	-0.63554	1.152675	-0.51714
	2C	11906	31195	30227	24442.66667	10867.85	2.230636925	-1.15355	0.621312	0.532242
	2D	14606	14783	27928	19105.66667	7640.877	23.57835229	-0.58889	-0.56573	1.154623
	3C	15027	16257	31129	20804.33333	8962.549	16.78377622	-0.64461	-0.50737	1.151979
	3D	29860	29146	29964	29656.66667	445.2969	-18.625085	0.456624	-1.1468	0.690176
	4A	15325	30958	27249	24510.66667	8168.324	1.958640551	-1.12455	0.789309	0.335238
	4D	30162	14934	31701	25599	9268.16	-2.394634738	0.492331	-1.15071	0.658383
	5A	14227	14748	30464	19813	9227.714	20.74905668	-0.60535	-0.54889	1.15424
	5B	13413	28708	30929	24350	9536.597	2.601298649	-1.14685	0.456976	0.689869
	5D	27366	30495	28621	28827.33333	1574.672	-15.3077959	-0.92802	1.059057	-0.13103
	6A	16254	16100	31307	21220.33333	8735.649	15.1197984	-0.56851	-0.58614	1.154656
	6B	16247	16884	30073	21068	7805.06	15.72912361	-0.61768	-0.53606	1.153739
	6C	32418	28107	13801	24775.33333	9745.418	0.899988	0.784232	0.34187	-1.1261
	6D	15402	32284	16387	21357.66667	9475.29	14.57047239	-0.62855	1.15314	-0.52459
	7A	30633	29705	30578	30305.33333	520.6307	-21.21971707	0.629365	-1.15309	0.523724
	7B	30327	30180	32270	30925.66667	1166.545	-23.70101732	-0.5132	-0.63921	1.152406
	7C	27828	30750	30371	29649.66667	1588.95	-18.59708537	-1.14646	0.692491	0.453969
	7D	29741	16484	17316	21180.33333	7425.417	15.27979627	1.152887	-0.63247	-0.52042
	8D	31065	16523	15448	21012	8722.73	15.95312063	1.152506	-0.51463	-0.63787
	9A	34023	30287	30691	31667	2050.331	-26.66631112	1.149083	-0.67306	-0.47602
	9B	37846	30347	35425	34539.33333	3827.147	-38.15549126	0.864003	-1.09542	0.231417
	9C	33351	30848	29212	31137	2084.579	-24.54633938	1.062085	-0.13864	-0.92345
	9D	30210	31533	28704	30149	1415.486	-20.59439207	0.043095	0.977756	-1.02085

Microorganism:		E. faecalis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.8	Untreated	15094	14529	14756	14793	284.3114	0	1.058698	-0.92856	-0.13014
	10A	13802	14268	14160	14076.66667	243.9208	4.842380405	-1.12605	0.784408	0.341641
	10B	12664	11873	10482	11673	1104.663	21.09105658	0.897106	0.181051	-1.07816
	10C	12376	13622	12066	12688	823.5848	14.22970324	-0.37883	1.134067	-0.75523
	10D	10947	12366	11054	11455.66667	790.185	22.56021992	-0.64373	1.152051	-0.50832
	11A	28542	28271	13476	23429.66667	8621.193	-58.38346966	0.592996	0.561562	-1.15456
	11B	13169	12311	13403	12961	574.947	12.38423579	0.361773	-1.13054	0.768767
	11C	13631	13759	13741	13710.33333	69.29165	7.318776899	-1.14492	0.702345	0.442574
	11D	12938	14453	13689	13693.33333	757.5093	7.433696118	-0.99713	1.002848	-0.00572
	12A	13419	15950	15695	15021.33333	1393.506	-1.543522837	-1.14986	0.666424	0.483433
	12B	11366	12750	12455	12190.33333	728.9721	17.59390703	-1.13082	0.767748	0.363068
	12C	11650	13530	13242	12807.33333	1012.572	13.42301539	-1.14296	0.713694	0.42927
	13A	13318	14004	14747	14023	714.6894	5.205164605	-0.98644	-0.02658	1.013027
	13C	11628	12229	12134	11997	323.0743	18.90083147	-1.14215	0.718101	0.424051
	13D	12507	13183	12457	12715.66667	405.4939	14.04267784	-0.5146	1.152504	-0.63791
	14A	18932	17961	20273	19055.33333	1160.924	-28.8131774	-0.10624	-0.94264	1.048877
	14C	10944	12185	11457	11528.66667	623.5963	22.06674328	-0.93757	1.052497	-0.11492
	15A	15484	15403	15344	15410.33333	70.2875	-4.173144956	1.048076	-0.10433	-0.94374
	15D	13314	13825	13740	13626.33333	273.8071	7.886613038	-1.14071	0.725572	0.415134
	16C	12574	12223	13782	12859.66667	817.8168	13.06924446	-0.3493	-0.7785	1.127799
	16D	10881	12420	12029	11776.66667	799.9277	20.39027468	-1.11968	0.804239	0.315445
	17A	13557	14615	14253	14141.66667	537.7149	4.402983393	-1.08732	0.880268	0.207049
	17B	13750	13832	15206	14262.66667	817.9788	3.585028955	-0.62675	-0.5265	1.153249
	17C	13585	13982	15762	14443	1159.406	2.365983911	-0.74003	-0.39762	1.137651
	17D	13496	13701	15165	14120.66667	910.209	4.544942428	-0.68629	-0.46107	1.147356
	18A	12583	11265	14818	12888.66667	1796.114	12.8732058	-0.17018	-0.90399	1.074171
	18C	12013	12513	13721	12749	878.1162	13.81734604	-0.83816	-0.26876	1.106915
	18D	12359	13427	12800	12862	536.6926	13.05347124	-0.93722	1.052744	-0.11552
	19A	15574	15052	19289	16638.33333	2310.335	-12.47436851	-0.46068	-0.68662	1.147309

Microorganism:		E. faecalis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.9	Untreated	13029	13229	13223	13160.333	113.778	-	-1.1543	0.603517	0.550782
	19C	12897	7500	7939	9445.333	2997.279	28.229	1.1516	-0.64903	-0.50257
	19D	11956	7948	10544	10149.333	2032.938	22.879	0.888697	-1.08283	0.194136
	20C	11284	8182	8060	9175.333	1827.177	30.280	1.154057	-0.54364	-0.61041
	20D	10635	11395	11761	11263.667	574.374	14.412	-1.09453	0.228655	0.86587
	21A	7912	10972	11621	10168.333	1980.803	22.735	-1.1391	0.405728	0.733373
	21C	6334	8093	7448	7291.667	889.860	44.594	-1.0762	0.900516	0.175683
	SB1	6827	7394	8021	7414.000	597.251	43.664	-0.98284	-0.03349	1.016323
	SB2	8128	8432	11783	9447.667	2028.162	28.211	-0.65067	-0.50078	1.151453
	SB3	10661	8420	11032	10037.667	1413.168	23.728	0.441089	-1.14471	0.70362
	SB5	8012	6975	12074	9020.333	2694.903	31.458	-0.37416	-0.75896	1.133127
	SB6	11779	11121	12526	11808.667	702.970	10.271	-0.0422	-0.97823	1.020433
	CP1	10280	10238	11367	10628.333	640.049	19.240	-0.54423	-0.60985	1.154079
	CP2	11376	11961	12122	11819.667	392.569	10.187	-1.13016	0.360022	0.770141
	CP3	10729	10754	7864	9782.333	1661.372	25.668	0.56981	0.584858	-1.15467
	CP4	8632	10824	11205	10220.333	1388.666	22.340	-1.14378	0.43471	0.709074
	CP5	10432	10649	10731	10604.000	154.496	19.425	-1.1133	0.29127	0.822028
	CP6	11708	12960	13273	12647.000	828.120	3.901	-1.13389	0.377964	0.755929
	CT1	10827	11601	11970	11466.000	583.336	12.875	-1.09542	0.231427	0.863996
	CT2	10779	11183	11552	11171.333	386.632	15.114	-1.01475	0.030175	0.984571
	CT3	8525	11064	10518	10035.667	1336.456	23.743	-1.13035	0.769448	0.360905
	CT4	11518	11510	11750	11592.667	136.313	11.912	-0.54776	-0.60645	1.154203
	CT5	12448	13573	14910	13643.667	1232.520	-3.673	-0.9701	-0.05734	1.027434
	CT6	13007	13319	14441	13589.000	754.164	-3.257	-0.77171	-0.35801	1.129727
	MDZ1	1170	1206	1128	1168.000	39.038	91.125	0.051232	0.973399	-1.02463
	MDZ2	11023	12526	12401	11983.333	834.018	8.944	-1.15145	0.650665	0.500788
	MDZ3	13039	14717	16566	14774.000	1764.191	-12.262	-0.98345	-0.03231	1.015763
	MDZ4	1218	1288	1211	1239.000	42.579	90.585	-0.4932	1.150793	-0.6576
	MDZ5	1161	1162	1116	1146.333	26.274	91.289	0.558216	0.596276	-1.15449

Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
2.15	Untreated	13925	15075	11733	13577.66667	1697.858	0	0.204572	0.881896	-1.08647
	LP1	18989	38553	20735	26092.33333	10826.51	-92.17096703	-0.65611	1.15094	-0.49483
	LP1	17697	22371	21578	20548.66667	2501.243	-51.34166401	-1.1401	0.728571	0.411529
	LP3	8357	13894	15850	12700.33333	3886.501	6.461591339	-1.11754	0.307131	0.810412
	LP3	10360	13965	15922	13415.66667	2821.398	1.193135787	-1.08303	0.194703	0.88833
	LP4	13067	12307	12403	12592.33333	413.8663	7.257015197	1.146908	-0.68943	-0.45747
	LP4	13024	12506	13219	12916.33333	368.492	4.870743623	0.292182	-1.11355	0.821366
	LP5	27191	26216	24189	25865.33333	1531.413	-90.49910392	0.865649	0.228982	-1.09463
	LP5	24638	27579	22940	25052.33333	2347.091	-84.51132988	-0.17653	1.07651	-0.89998
	LP6	39971	38025	40362	39452.66667	1251.756	-190.5702993	0.414085	-1.14053	0.726446
	LP6	11097	12001	40252	21116.66667	16577.85	-55.5250043	-0.6044	-0.54987	1.154271
	DEA	35675	12684	43184	30514.33333	15891.41	-124.739155	0.324746	-1.12201	0.797265
	DEA	19504	31311	17670	22828.33333	7403.216	-68.13149044	-0.44904	1.145808	-0.69677
	FLA	16672	11992	12542	13735.33333	2558.053	-1.161220632	1.148009	-0.68151	-0.4665
	FLA	17272	11800	11823	13631.66667	3152.642	-0.397711929	1.154693	-0.58099	-0.5737
	PAA	11887	12291	35000	19726	13229.21	-45.28269462	-0.59255	-0.56201	1.154566
	PAA	12389	8180	7968	9512.333333	2493.52	29.94132522	1.153657	-0.53432	-0.61934
	RIB	10539	11039	10763	10780.33333	250.4503	20.60245992	-0.9636	1.032807	-0.06921
	RIB	13668	13321	11558	12849	1131.421	5.366656028	0.723869	0.417175	-1.14104
	ANB	24271	41252	44043	36522	10701.06	-168.9858346	-1.14484	0.442012	0.702828
	ANB	26741	21858	42070	30223	10546.3	-122.5934746	-0.33016	-0.79317	1.123332
	DED	13255	12846	13454	13185	309.9855	2.892004026	0.225817	-1.0936	0.867783
	DED	13378	12418	12343	12713	577.1265	6.368300886	1.15226	-0.51115	-0.64111
	PAB	12459	14946	13738	13714.33333	1243.669	-1.006554882	-1.00938	0.990349	0.01903
	PAB	8354	7882	7783	8006.333333	305.13	41.03306901	1.139405	-0.40748	-0.73193
	PAC	8175	8372	7896	8147.666667	239.1743	39.99214396	0.114282	0.937949	-1.05223
	PAC	12051	13143	10598	11930.66667	1276.76	12.13021383	0.094249	0.949539	-1.04379
	RIA	21894	24817	11249	19320	7140.852	-42.29249012	0.360461	0.769796	-1.13026
	RIA	17262	20151	25567	20993.33333	4216.088	-54.61664989	-0.88502	-0.19979	1.084813

Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.25A	Untreated	12282	11631	8265	10726	2156.001	0	0.721706	0.419759	-1.14147
	1A	33001	24770	25081	27617.33333	4664.984	-157.480266	1.154059	-0.61036	-0.5437
	1B	18997	10264	15946	15069	4432.061	-40.49039717	0.886269	-1.08415	0.197876
	1C	13071	12728	13859	13219.33333	579.9072	-23.24569582	-0.25579	-0.84726	1.10305
	1D	11654	12739	12065	12152.66667	547.7868	-13.30101311	-0.91033	1.070368	-0.16004
	2A	8436	11595	14003	11344.66667	2791.93	-5.767915967	-1.04181	0.089663	0.952149
	2B	11426	12362	14208	12665.33333	1415.588	-18.08067624	-0.87549	-0.21428	1.089771
	2C	12298	12583	11841	12240.66667	374.3078	-14.12144944	0.153172	0.914577	-1.06775
	2D	8258	11172	10868	10099.33333	1601.869	5.842501088	-1.14949	0.669634	0.479856
	3C	11204	13830	10860	11964.66667	1624.557	-11.54826279	-0.46823	1.14821	-0.67998
	3D	10975	12608	10581	11388	1074.76	-6.171918702	-0.38427	1.135137	-0.75087
	4A	7055	12422	13448	10975	3433.361	-2.321461868	-1.14174	0.421453	0.720285
	4D	12613	10910	14075	12532.66667	1584.029	-16.84380633	0.050715	-1.02439	0.973678
	5A	13871	13932	12208	13337	978.2183	-24.34271863	0.54589	0.608249	-1.15414
	5B	15273	12757	12357	13462.33333	1580.786	-25.51121885	1.145422	-0.44619	-0.69923
	5D	7799	10727	7884	8803.333333	1666.486	17.92529057	-0.60267	1.154325	-0.55166
	6A	8472	7245	12930	9549	2991.614	10.97333582	-0.36001	-0.77015	1.130159
	6B	10494	11929	8029	10150.66667	1972.539	5.363913233	0.174057	0.901546	-1.0756
	6C	12337	11148	11919	11801.33333	603.1702	-10.02548325	0.888085	-1.08317	0.19508
	6D	13196	11174	13498	12622.66667	1263.637	-17.68288893	0.453717	-1.14643	0.69271
	7A	11474	8059	14123	11218.66667	3040.053	-4.593200323	0.08399	-1.03935	0.955356
	7B	14321	8353	13683	12119	3277.015	-12.98713407	0.671953	-1.14922	0.477264
	7C	7587	7812	8503	7967.333333	477.3472	25.71943564	-0.79676	-0.32541	1.122174
	7D	12620	16359	11625	13534.66667	2496.027	-26.18559264	-0.36645	1.131532	-0.76508
	8D	14226	11218	8164	11202.66667	3031.029	-4.444030083	0.997461	0.005059	-1.00252
	9A	13625	14210	14257	14030.66667	352.1027	-30.8098701	-1.15213	0.509321	0.642805
	9B	14409	13360	8155	11974.66667	3349.252	-11.64149419	0.726829	0.413625	-1.14045
	9C	14655	17086	11407	14382.66667	2849.278	-34.09161539	0.09558	0.948778	-1.04436
	9D	14106	12673	10773	12517.33333	1671.944	-16.70085151	0.950191	0.093105	-1.0433

Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.25B	Untreated	11356	10711	11478	11181.66667	412.1484	0	0.422987	-1.14198	0.718997
	19C	10393	11408	10468	10756.33333	565.6044	3.803845581	-0.64238	1.15216	-0.50978
	19D	12166	14986	14041	13731	1435.331	-22.79922492	-1.09034	0.874363	0.215978
	20C	10580	13238	12368	12062	1355.163	-7.873006409	-1.0936	0.867792	0.225803
	20D	10753	14206	14164	13041	1981.577	-16.6284096	-1.15464	0.587915	0.56672
	21A	10947	12625	13033	12201.66667	1105.557	-9.122074825	-1.13487	0.382914	0.751958
	21C	8418	10765	10687	9956.666667	1333.095	10.955433	-1.15421	0.606358	0.547848
	SB1	12016	13441	12779	12745.33333	713.0963	-13.98420033	-1.02277	0.975558	0.047212
	SB2	19735	20710	8391	16278.66667	6848.293	-45.58354449	0.5047	0.647071	-1.15177
	SB3	17595			17595		-57.35579073			
	SB5	15287	13730	11600	13539	1850.906	-21.08212848	0.944402	0.103193	-1.0476
	SB6	13809	13008	13060	13292.33333	448.2012	-18.87613653	1.152756	-0.63439	-0.51837
	CP1	13785	13949	12324	13352.66667	894.6174	-19.41571024	0.483261	0.666579	-1.14984
	CP2	11475	11867	12112	11818	321.3145	-5.69086302	-1.06749	0.152499	0.914991
	CP3	11486	11550	11100	11378.66667	243.4447	-1.761812491	0.440894	0.703787	-1.14468
	CP4	7456	10373	11987	9938.666667	2296.514	11.11641079	-1.08106	0.189127	0.891932
	CP5	14749	13368	13430	13849	780.0391	-23.85452377	1.153788	-0.61664	-0.53715
	CP6	14295	11970	11226	12497	1600.933	-11.76330303	1.123095	-0.32918	-0.79391
	CT2	13058	14479	13683	13740	712.2127	-22.87971382	-0.95758	1.037611	-0.08003
	CT3	12184	11330	13165	12226.33333	918.2322	-9.34267402	-0.0461	-0.97615	1.022254
	CT4	13384	12585	13413	13127.33333	469.8982	-17.40050678	0.546218	-1.15415	0.607933
	CT5	13718	11918	15313	13649.66667	1698.531	-22.07184379	0.040231	-1.01951	0.979277
	CT6	13071	12729	11495	12431.66667	829.005	-11.17901327	0.771206	0.358663	-1.12987
	MDZ1	1174	1163	1097	1144.666667	41.64533	89.76300492	0.704361	0.440225	-1.14459
	MDZ2	16146	19157	13730	16344.33333	2718.931	-46.17081532	-0.07295	1.034475	-0.96153
	MDZ3	8389	13925	7351	9888.333333	3534.172	11.56655239	-0.42424	1.142182	-0.71794
	MDZ4	11093	8192	14932	11405.66667	3380.861	-2.003279177	-0.09248	-0.95055	1.043028
	MDZ5	1292	1140	980	1137.333333	156.0171	89.82858846	0.991344	0.017092	-1.00844
	MDZ6	15689	17189	10768	14548.66667	3358.955	-30.11179013	0.33949	0.786058	-1.12555

Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.13	Untreated	18604	18182	17741	18175.66667	431.5349	0	0.992581	0.014676	-1.00726
	10A	19631	19203	18747	19193.66667	442.0739	-5.600894969	0.989277	0.021113	-1.01039
	10B	16909	21265	21327	19833.66667	2533.025	-9.122086306	-1.15461	0.565069	0.589545
	10C	15389	18295	18110	17264.66667	1627.007	5.012195793	-1.15283	0.633269	0.519564
	10D	15873	17312	17426	16870.33333	865.5948	7.181763163	-1.15219	0.510246	0.641948
	11A	13127	19333	15988	16149.33333	3106.144	11.14860528	-0.97302	1.024958	-0.05194
	11B	14966	17867	20009	17614	2531.002	3.090212188	-1.04623	0.09996	0.946266
	11C	17248	19267	19792	18769	1343.126	-3.264437801	-1.13243	0.370777	0.761656
	11D	15055	14968	16095	15372.66667	627.0696	15.42171768	-0.50659	-0.64533	1.151919
	12A	17438	17863	19261	18187.33333	953.7958	-0.064188384	-0.78563	-0.34004	1.125678
	12B	18782	16756	18359	17965.66667	1068.739	1.155390907	0.763829	-1.13186	0.368035
	12C	18601	19036	18384	18673.66667	332.0186	-2.739927009	-0.21886	1.091304	-0.87244
	13C	16263	18556	17794	17537.66667	1167.794	3.510187613	-1.09152	0.872015	0.219502
	13D	17133	17152	17543	17276	231.4239	4.949841363	-0.61791	-0.53581	1.153727
	14A	16231	16395	16188	16271.33333	109.2352	10.47737818	-0.36923	1.132113	-0.76288
	14C	15526	16073	15900	15833	279.5872	12.88902745	-1.09805	0.858408	0.239639
	15A	19762	20453	17227	19147.33333	1698.567	-5.345975388	0.361874	0.768687	-1.13056
	15D	16683	17142	18043	17289.33333	691.8673	4.87648321	-0.87637	-0.21295	1.089323
	16C	16300	18495	18604	17799.66667	1299.892	2.06869991	-1.15369	0.534916	0.618769
	16D	18317	19481	18452	18750	636.653	-3.159902434	-0.68012	1.148192	-0.46807
	17A	17341	18093	20411	18615	1600.184	-2.417151136	-0.79616	-0.32621	1.122371
	17B	15728	16272	14521	15507	896.1758	14.68263429	0.246603	0.853627	-1.10023
	17C	16866	17239	15848	16651	719.9924	8.388504777	0.298614	0.816675	-1.11529
	17D	17238	18038	16597	17291	721.9605	4.867313441	-0.07341	1.034683	-0.96127
	18A	17426	18224	17031	17560.33333	607.7387	3.385478754	-0.22104	1.092026	-0.87099
	18C	18164	19170	18755	18696.33333	505.5594	-2.864635868	-1.05296	0.936916	0.116043
	18D	18864	20809	19169	19614	1046.076	-7.913510738	-0.71697	1.142364	-0.4254
	19A	26445	28605	33565	29538.33333	3650.607	-62.51581785	-0.84735	-0.25567	1.103013
	19C	19380	18244	15724	17782.66667	1871.151	2.162231555	0.853664	0.246551	-1.10021

Microorganism:		K. pneumoniae								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
2.15	Untreated	50673	43078	43752	45834.33333	4203.937	0	1.150984	-0.65566	-0.49533
	LP1	45328	40192	42024	42514.66667	2602.919	7.242751067	1.080838	-0.89233	-0.18851
	LP1	41961	42269	42389	42206.33333	220.7744	7.915463663	-1.11124	0.283849	0.827391
	LP3	49337	42590	43527	45151.33333	3655.044	1.490149306	1.145175	-0.70077	-0.44441
	LP3	43741	39411	41492	41548	2165.543	9.351795961	1.012679	-0.98682	-0.02586
	LP4	41819	40673	41770	41420.66667	647.9617	9.629608081	0.614748	-1.15387	0.539127
	LP4	38260	39106	39429	38931.66667	603.684	15.06003505	-1.11261	0.288782	0.823831
	LP5	47212	42999	43323	44511.33333	2344.45	2.886482477	1.151941	-0.64507	-0.50687
	LP5	41463	37279	41148	39963.33333	2330.03	12.80917507	0.643625	-1.15206	0.508434
	LP6	43058	43051	43681	43263.33333	361.7269	5.60933216	-0.56765	-0.587	1.154646
	LP6	43462	42907	42986	43118.33333	300.2338	5.925688894	1.144663	-0.7039	-0.44077
	DEA	43975	42225	44900	43700	1358.538	4.656625674	0.202424	-1.08573	0.883303
	DEA	44846	43459	42179	43494.66667	1333.858	5.104615899	1.013102	-0.02674	-0.98636
	FLA	43394	42753	39830	41992.33333	1899.864	8.382362567	0.737772	0.400379	-1.13815
	FLA	37054	39026	40296	38792	1633.618	15.36475568	-1.0639	0.14324	0.920656
	PAA	46262	47951	48092	47435	1018.291	-3.492287441	-1.15193	0.506731	0.645199
	PAA	42986	43416	42677	43026.33333	371.1473	6.126411787	-0.10867	1.049898	-0.94123
	RIB	45422	43622	44027	44357	944.2854	3.223202403	1.127837	-0.77837	-0.34947
	RIB	40669	38325	38643	39212.33333	1271.491	14.44768478	1.145637	-0.69787	-0.44777
	ANB	47777	45235	51117	48043	2950.008	-4.818803953	-0.09017	-0.95186	1.042031
	ANB	47462	48660	48619	48247	680.139	-5.263885152	-1.15418	0.607229	0.546947
	DED	43329	45628	43187	44048	1370.161	3.897369512	-0.52476	1.153149	-0.62839
	DED	44260	45317	47194	45590.33333	1485.975	0.532352021	-0.89526	-0.18394	1.079201
	PAB	45775	45616	45706	45699	79.7308	0.295266285	0.953208	-1.041	0.087795
	PAB	44993	47202	44159	45451.33333	1572.423	0.835618132	-0.29148	1.113356	-0.82187
	PAC	43923	45826	41208	43652.33333	2320.868	4.760623405	0.116623	0.936575	-1.0532
	PAC	43234	44129	41682	43015	1238.113	6.151138521	0.176882	0.899757	-1.07664
	RIA	43063	41807	40616	41828.66667	1223.644	8.739445685	1.008736	-0.01771	-0.99103
	RIA	40384	42867	41709	41653.33333	1242.436	9.121982793	-1.02165	0.976845	0.044804

Microorganism:		K. pneumoniae								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.5	Untreated	36441	31292	34719	34150.66667	2621.126	0	0.873797	-1.09063	0.216828
	10A	32625	41710	39236	37857	4696.865	-10.85288721	-1.11393	0.820334	0.2936
	10B	37581	33221	31749	34183.66667	3032.837	-0.096630617	1.120183	-0.31741	-0.80277
	10C	35150	32541	33860	33850.33333	1304.527	0.879436224	0.996274	-1.00368	0.00741
	10D	37367	37053	34841	36420.33333	1376.724	-6.646039121	0.687623	0.459545	-1.14717
	11A	33220	31852	29858	31643.33333	1690.685	7.341974778	0.932561	0.123421	-1.05598
	11B	38938	31169	35342	35149.66667	3888.069	-2.925272323	0.974348	-1.02382	0.049468
	11C	35532	35023	36376	35643.66667	683.3772	-4.371803381	-0.1634	-0.90823	1.071639
	11D	36691	42452	38319	39154	2969.882	-14.65076328	-0.82933	1.110482	-0.28116
	12A	41522	36356	38248	38708.66667	2613.628	-13.34673798	1.076409	-0.90015	-0.17626
	12B	32191	33050	32357	32532.66667	455.6472	4.737828446	-0.74985	1.135381	-0.38553
	12C	32901	33127	30483	32170.33333	1465.636	5.798813103	0.498532	0.652731	-1.15126
	13A	31850	32783	30972	31868.33333	905.6392	6.683129661	-0.02024	1.009968	-0.98972
	13C	30620	32177	31790	31529	810.6497	7.676765705	-1.12132	0.799359	0.321964
	13D	35257	34643	34229	34709.66667	517.2324	-1.636864092	1.058196	-0.12889	-0.92931
	14A	36952	38473	37978	37801	775.7944	-10.68890798	-1.09436	0.866209	0.228153
	14C	35771	33031	36343	35048.33333	1770.317	-2.628548003	0.408213	-1.13953	0.731319
	15A	37685	35647	36012	36448	1086.707	-6.727052669	1.138301	-0.73709	-0.40121
	15D	32229	27705	29011	29648.33333	2328.366	13.18373482	1.108359	-0.83463	-0.27373
	16C	31057	30220	31548	30941.66667	671.4703	9.396595479	0.171762	-1.07476	0.902994
	16D	33513	32587	29996	32032	1823.003	6.203880842	0.812396	0.304443	-1.11684
	17A	30657	36327	37311	34765	3591.492	-1.798891188	-1.14381	0.434917	0.708898
	17B	37222	39646	36627	37831.66667	1599.175	-10.77870613	-0.38124	1.134543	-0.75331
	17C	34180	34415	39145	35913.33333	2801.171	-5.161441456	-0.61879	-0.5349	1.153684
	17D	34915	33356	36815	35028.66667	1732.299	-2.570960059	-0.06562	-0.96558	1.031192
	18A	31697	23472	36073	30414	6397.724	10.94170929	0.20054	-1.08507	0.884533
	18C	25453	28249	34806	29502.66667	4800.876	13.61027603	-0.84353	-0.26113	1.104659
	18D	34106	34528	34745	34459.66667	324.9344	-0.904813962	-1.08842	0.210299	0.878126
	19A	35474	36000	37607	36360.33333	1111.217	-6.470347089	-0.79762	-0.32427	1.121893

Microorganism:		K. pneumoniae								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.11A	Untreated	31668	30506	31556	31243.33333	641.0003	0	0.662506	-1.15029	0.487779
	1A	33225	33316	34907	33816	945.9286	-8.234289982	-0.62478	-0.52858	1.153364
	1B	33574	29975	29874	31141	2107.645	0.327536541	1.154369	-0.55322	-0.60114
	1C	35719	32557	29019	32431.66667	3351.758	-3.803478075	0.980779	0.037393	-1.01817
	1D	33327	27721	32344	31130.66667	2993.483	0.360610264	0.733705	-1.13903	0.405325
	2A	34767	33154	34666	34195.66667	903.5222	-9.449482556	0.63234	-1.1529	0.520555
	2B	26374	31172	33675	30407	3710.131	2.676837725	-1.08702	0.206192	0.880832
	2C	32034	29682	31594	31103.33333	1250.416	0.448095594	0.744285	-1.13669	0.392403
	2D	34644	35047	32355	34015.33333	1451.941	-8.872292756	0.432984	0.710543	-1.14353
	3C	32976	31276	31141	31797.66667	1022.697	-1.774245172	1.152183	-0.51009	-0.64209
	3D	30548	32544	30644	31245.33333	1125.702	-0.006401366	-0.61947	1.15365	-0.53419
	4A	34166	34845	35164	34725	509.7068	-11.14371066	-1.09671	0.235429	0.86128
	4D	28968	32183	29929	30360	1650.266	2.827269818	-0.8435	1.104671	-0.26117
	5A	30148	31953	32113	31404.66667	1091.242	-0.516376827	-1.15159	0.502486	0.649108
	5B	30644	31062	29985	30563.66667	542.9754	2.175397418	0.14795	0.917782	-1.06573
	5D	32476	33818	35948	34080.66667	1750.84	-9.081404033	-0.91651	-0.15002	1.066536
	6A	31737	31337	42827	35300.33333	6521.352	-12.98517017	-0.54641	-0.60775	1.154157
	6B	33615	33214	32306	33045	670.6646	-5.766563534	0.849903	0.251989	-1.10189
	6C	32758	33853	32884	33165	599.1469	-6.150645471	-0.6793	1.148299	-0.469
	6D	30712	33040	33961	32571	1674.506	-4.249439881	-1.11018	0.280083	0.830095
	7A	32466	31671	33997	32711.33333	1182.248	-4.698602369	-0.20751	-0.87996	1.087476
	7B	29360	30475	34651	31495.33333	2789.172	-0.806572069	-0.76558	-0.36582	1.131399
	7C	33910	33650	29228	32262.66667	2631.312	-3.26256268	0.62605	0.52724	-1.15329
	7D	32444	33730	26986	31053.33333	3580.621	0.608129734	0.388387	0.747543	-1.13593
	8D	32988	31300	33000	32429.33333	978.0498	-3.796009815	0.571205	-1.15468	0.583474
	9A	33764	34912	34441	34372.33333	577.0722	-10.01493652	-1.05417	0.93518	0.118991
	9B	33063	36105	32761	33976.33333	1849.653	-8.747466126	-0.49379	1.150846	-0.65706
	9C	31349	31772	31432	31517.66667	224.1346	-0.878053985	-0.75252	1.134735	-0.38221
	9D	33657	32990	28521	31722.66667	2792.709	-1.534193961	0.692637	0.453801	-1.14644

Microorganism:		K. pneumoniae								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.11B	Untreated	32375	42752	31990	35705.66667	6105.339	0	-0.54553	1.154126	-0.60859
	19C	24083	34566	34121	30923.33333	5928.079	13.3937657	-1.15389	0.614477	0.53941
	19D	34882	30974	29957	31937.66667	2600.076	10.55294678	1.132403	-0.37063	-0.76177
	20C	34131	30934	34422	33162.33333	1935.271	7.123052363	0.500533	-1.15143	0.650899
	20D	27363	31042	31645	30016.66667	2317.836	15.93304517	-1.14489	0.442367	0.702523
	21A	34355	34249	34093	34232.33333	131.7928	4.126329154	0.930754	0.126461	-1.05722
	21C	34195	30549	30489	31744.33333	2122.552	11.09441078	1.154585	-0.56316	-0.59143
	SB1	23613	28682	28611	26968.66667	2906.309	24.46950531	-1.15461	0.589522	0.565092
	SB2	34352	35111	32415	33959.33333	1390.232	4.890913674	0.282447	0.828399	-1.11085
	SB3	35905	33579	31240	33574.66667	2332.503	5.968240335	0.99907	0.001858	-1.00093
	SB5	33034	34373	32145	33184	1121.548	7.062371052	-0.13374	1.060141	-0.9264
	SB6	30387	32517	32641	31848.33333	1267.07	10.80314049	-1.15332	0.527727	0.62559
	CP1	32802	35278	36446	34842	1860.714	2.418850416	-1.09635	0.234319	0.862035
	CP2	31369	34283	35650	33767.33333	2186.59	5.428643446	-1.09684	0.235831	0.861006
	CP3	28125	33778	32464	31455.66667	2958.32	11.90287256	-1.12586	0.785018	0.340847
	CP4	33356	31741	34052	33049.66667	1185.563	7.438595181	0.258386	-1.10384	0.845449
	CP5	32481	32943	34112	33178.66667	840.6511	7.07730799	-0.82991	-0.28034	1.11025
	CP6	31846	33263	32997	32702	753.154	8.412296834	-1.13655	0.744868	0.391686
	CT1	33118	33633	33149	33300	288.8027	6.737492648	-0.63019	1.153036	-0.52285
	CT2	28800	28752	29369	28973.66667	343.2089	18.85415013	-0.50601	-0.64587	1.151874
	CT3	31849	30132	29413	30464.66667	1251.609	14.67834237	1.106043	-0.26579	-0.84025
	CT4	31202	32393	28764	30786.33333	1849.863	13.77745829	0.224701	0.868533	-1.09323
	CT5	35478	31680	32247	33135	2048.807	7.199604171	1.143592	-0.71017	-0.43342
	CT6	34490	34477	33680	34215.66667	463.9465	4.173007086	0.591304	0.563283	-1.15459
	MDZ1	34019	32874	31899	32930.66667	1061.135	7.771875613	1.025631	-0.0534	-0.97223
	MDZ2	35474	34939	33006	34473	1298.315	3.452299822	0.770999	0.358927	-1.12993
	MDZ3	33597	32883	29701	32060.33333	2074.196	10.2093972	0.740849	0.39662	-1.13747
	MDZ4	36612	33003	33996	34537	1864.331	3.273056564	1.113	-0.82282	-0.29018
	MDZ5	31874	31497	32127	31832.66667	317.0273	10.84701775	0.130378	-1.05879	0.928416

Microorganism:		P. aeruginosa								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
2.17	Untreated	50791	48365	49028	49394.66667	1253.875	0	1.113615	-0.82119	-0.29243
	LP1	52459	43782	49102	48447.66667	4375.351	1.917211035	0.916803	-1.06635	0.14955
	LP1	51611	48227	58257	52698.33333	5102.641	-6.68830643	-0.21309	-0.87628	1.089371
	LP3	51514	53953	49150	51539	2401.598	-4.341224424	-0.01041	1.005164	-0.99475
	LP3	55476	48428	48486	50796.66667	4052.525	-2.838363116	1.154671	-0.58449	-0.57018
	LP4	47790	48521	49326	48545.66667	768.297	1.718809048	-0.98356	-0.03211	1.015666
	LP4	46968	44933	46857	46252.66667	1144.212	6.361010635	0.625176	-1.15334	0.528166
	LP5	47809	46150	47253	47070.66667	844.3958	4.704961399	0.874392	-1.09033	0.215933
	LP5	48320	48075	47652	48015.66667	337.9295	2.791799385	0.900582	0.175579	-1.07616
	LP6	46741	47543	48235	47506.33333	747.6746	3.822949846	-1.02362	0.049041	0.974577
	LP6	46796	52426	45745	48322.33333	3592.521	2.17094963	-0.42486	1.14228	-0.71742
	DEA	51986	51723	51899	51869.33333	133.9863	-5.009987583	0.870736	-1.09215	0.221416
	DEA	55298	51377	50626	52433.66667	2508.845	-6.152486098	1.141694	-0.42118	-0.72052
	FLA	41473	48905	53777	48051.66667	6196.228	2.718917022	-1.06172	0.137718	0.924003
	FLA	49688	44702	41476	45288.66667	4137.314	8.312638342	1.063331	-0.1418	-0.92153
	PAA	44856	46398	49268	46840.66667	2239.063	5.170598715	-0.88638	-0.1977	1.084085
	PAA	54296	49401	54029	52575.33333	2752.293	-6.439291691	0.625176	-1.15334	0.528166
	RIB	48837	48941	49778	49185.33333	515.8918	0.423797441	-0.67521	-0.47361	1.14882
	RIB	49415	58146	50736	52765.66667	4706.087	-6.824623441	-0.71199	1.143271	-0.43129
	ANB	48791	50383	49265	49479.66667	817.4211	-0.172083356	-0.84249	1.105101	-0.26261
	ANB	47951	50797	46109	48285.66667	2361.85	2.245181666	-0.1417	1.063291	-0.92159
	DED	47067	47119	52432	48872.66667	3082.583	1.056794256	-0.58576	-0.5689	1.154659
	DED	45788	48756	47292	47278.66667	1484.045	4.283863305	-1.00446	0.995478	0.008984
	PAB	45919	45562	49173	46884.66667	1989.777	5.081520272	-0.48531	-0.66473	1.150045
	PAB	48571	47701	47174	47815.33333	705.483	3.197376235	1.071134	-0.16206	-0.90907
	PAC	49076	51716	49012	49934.66667	1543.012	-1.093235437	-0.55649	1.154452	-0.59796
	PAC	44780	49823	46659	47087.33333	2548.64	4.671219565	-0.90532	1.073383	-0.16806
	RIA	48282	50745	46324	48450.33333	2215.302	1.911812341	-0.07599	1.035826	-0.95984
	RIA	47749	47776	52095	49206.66667	2501.406	0.380607893	-0.58274	-0.57194	1.154684

Microorganism:		P. aeruginosa								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.13	Untreated	31650	33846	35410	33635.33333	1888.832	0	-1.05109	0.111533	0.939558
	CP4	29921	28097	27949	28655.66667	1098.307	14.8048679	1.152077	-0.50866	-0.64341
	CP5	30851	28193	23286	27443.33333	3837.813	18.40921253	0.887919	0.195337	-1.08326
	CP6	30753	25272	23617	26547.33333	3735.034	21.07307791	1.126005	-0.34145	-0.78455
	CT1	30056	25920	24729	26901.66667	2795.887	20.01962222	1.128205	-0.35111	-0.77709
	CT2	29678	26633	26150	27487	1912.768	18.27938874	1.14546	-0.44647	-0.69899
	CT3	23768	24497	21471	23245.33333	1579.258	30.89013537	0.330957	0.792567	-1.12352
	CT4	29355	29168	24980	27834.33333	2473.693	17.24674449	0.614735	0.53914	-1.15388
	CT5	25478	24645	26456	25526.33333	906.467	24.1085763	-0.05332	-0.97227	1.025594
	CT6	24482	25090	23455	24342.33333	826.3996	27.62868412	0.169006	0.904728	-1.07373
	MDZ1	20411	23056	20210	21225.66667	1588.298	36.89473371	-0.51292	1.152387	-0.63947
	MDZ2	24266	24907	24222	24465	383.4149	27.26398827	-0.51902	1.152798	-0.63378
	MDZ3	23373	22976	24688	23679	896.082	29.6008166	-0.34149	-0.78453	1.126013
	MDZ4	28377	27025	27136	27512.66667	750.5893	18.20308009	1.15154	-0.64971	-0.50183
	MDZ5	25568	23366	23049	23994.33333	1372.021	28.66331041	1.14697	-0.45796	-0.68901
	MDZ6	25046	26316	25731	25697.66667	635.6558	23.59919133	-1.02519	0.972749	0.052439
	LP1	23957	24797	24739	24497.66667	469.1283	27.16686817	-1.15249	0.638063	0.514429
	LP3	23840	23929	25471	24413.33333	917.0465	27.41759658	-0.6252	-0.52814	1.15334
	LP4	23133	23059	22502	22898	344.9362	31.92277962	0.681285	0.466753	-1.14804
	LP5	23380	23385	24418	23727.66667	597.8514	29.45612748	-0.58153	-0.57316	1.15469
	LP6	21870	25419	27399	24896	2801.358	25.98259767	-1.08019	0.186695	0.893495
	ANA	28039	26371	25813	26741	1158.207	20.49729451	1.120698	-0.31946	-0.80124
	BEA	29657	27312	34971	30646.66667	3924.239	8.885497394	-0.25219	-0.84976	1.101955
	DEA	25748	27376	31798	28307.33333	3130.681	15.8404852	-0.8175	-0.29749	1.114987
	EUA	25693	25309	32031	27677.66667	3774.983	17.71252453	-0.52574	-0.62746	1.153206
	FLA	24329	24174	32698	27067	4877.205	19.52807563	-0.56139	-0.59317	1.154555
	PAA	27604	28060	35080	30248	4190.841	10.07075892	-0.6309	-0.52209	1.15299
	MAA	25208	29209	33328	29248.33333	4060.143	13.04283194	-0.99512	-0.00969	1.004809
	RZA	26886	26796	33527	29069.66667	3860.426	13.57401938	-0.56565	-0.58897	1.154622

Microorganism:		P. aeruginosa								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.17	Untreated	45084	43970	44645	44566.33333	561.1509	0	0.922509	-1.0627	0.140188
	10A	42936	47091	47481	45836	2519.033	-2.848936791	-1.15124	0.498207	0.653028
	10B	44307	41550	40290	42049	2054.464	5.648508964	1.09907	-0.24289	-0.85618
	10C	46069	43845	41369	43761	2351.126	1.807044181	0.981657	0.035728	-1.01738
	10D	46192	45240	43311	44914.33333	1467.85	-0.780858496	0.870434	0.221866	-1.0923
	11A	47090	43234	40892	43738.66667	3129.667	1.857156748	1.070827	-0.16125	-0.90957
	11B	45210	42877	41131	43072.66667	2046.527	3.351558351	1.044371	-0.09561	-0.94876
	11C	46937	43498	41709	44048	2657.042	1.163060307	1.087299	-0.207	-0.8803
	11D	44414	44553	45825	44930.66667	777.6274	-0.817507984	-0.66441	-0.48567	1.15008
	12A	45554	44236	45208	44999.33333	683.3281	-0.971585427	0.811713	-1.11708	0.305368
	12B	40871	39900	38539	39770	1171.423	10.76223457	0.939883	0.110976	-1.05086
	12C	41211	40229	40021	40487	635.569	9.153396809	1.139137	-0.40594	-0.7332
	13C	40223	39812	40228	40087.66667	238.7474	10.04943941	0.566847	-1.15464	0.58779
	13D	41726	41068	40784	41192.66667	483.2156	7.569989304	1.103717	-0.25799	-0.84572
	14A	42168	41567	42315	42016.66667	396.2983	5.721059993	0.381867	-1.13467	0.7528
	14C	45751	47053	46448	46417.33333	651.5415	-4.153359412	-1.0227	0.975635	0.047068
	15A	41495	41671	43496	42220.66667	1107.971	5.263315358	-0.65495	-0.4961	1.151053
	15D	43882	42587	41806	42758.33333	1048.552	4.056874023	1.071637	-0.1634	-0.90824
	16C	38148	38147	38876	38390.33333	420.6	13.85799445	-0.57616	-0.57854	1.1547
	16D	37264	37706	38959	37976.33333	879.2419	14.7869468	-0.81017	-0.30746	1.117629
	17A	41605	41532	42417	41851.33333	491.2396	6.092042573	-0.50145	-0.65006	1.151509
	17B	39342	40537	41433	40437.33333	1049.057	9.264841173	-1.04411	0.095006	0.949106
	17C	46248	47252	47021	46840.33333	525.8178	-5.102506376	-1.1265	0.782907	0.343592
	17D	43422	45820	46302	45181.33333	1542.57	-1.379965445	-1.14052	0.414028	0.726493
	18A	40438	40952	43570	41653.33333	1679.66	6.536324131	-0.72356	-0.41754	1.141104
	18C	35478	33688	40117	36427.66667	3318.043	18.26191669	-0.28621	-0.82569	1.1119
	18D	39097	39597	43205	40633	2241.403	8.825795257	-0.68529	-0.46221	1.147495
	19A	41344	42567	45562	43157.66667	2170.149	3.16083142	-0.83573	-0.27218	1.107912
	19C	44618	45205	47000	45607.66667	1241.002	-2.336591897	-0.79747	-0.32447	1.121943

Microorganism:		P. aeruginosa								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
5.8	Untreated	39253	37018	40528	38933	1776.746	0	0.180105	-1.07781	0.897709
	17A	38966	37965	40944	39291.66667	1515.966	-0.921240764	-0.21482	-0.87513	1.089954
	17B	38876	38466	37569	38303.66667	668.4507	1.616452196	0.856209	0.24285	-1.09906
	17C	39115	37781	39321	38739	836.0215	0.498291937	0.449749	-1.1459	0.696154
	17D	37856	38643	37865	38121.33333	451.799	2.084778123	-0.58728	1.154643	-0.56736
	18A	41270	37144	40822	39745.33333	2263.93	-2.086490467	0.67346	-1.14903	0.475574
	18B	39332	37241	37957	38176.66667	1062.667	1.942653619	1.087202	-0.88049	-0.20671
	18C	38533	35939	35980	36817.33333	1485.952	5.434121867	1.154591	-0.59109	-0.5635
	18D	37895	39930	39583	39136	1088.652	-0.521408574	-1.13994	0.729342	0.4106
	19A	41422	39013	41218	40551	1335.847	-4.155857499	0.652021	-1.15133	0.499309
	19B	37681	38691	38686	38352.66667	581.6858	1.490594954	-1.15469	0.581643	0.573047
	19C	38387	38823	38425	38545	241.5036	0.996583875	-0.65423	1.151121	-0.49689
	19D	40210	38344	40825	39793	1291.997	-2.208923022	0.322756	-1.12152	0.798763
	20A	39552	39237	39202	39330.33333	192.765	-1.020556683	1.149932	-0.48418	-0.66575
	20B	39527	39386	41058	39990.33333	927.3103	-2.715776676	-0.49965	-0.65171	1.151359
	20C	40361	39436	40131	39976	481.5859	-2.678961292	0.799442	-1.1213	0.321853
	20D	39634	39943	39092	39556.33333	430.7834	-1.601041105	0.180292	0.89759	-1.07788
	21A	40158	38748	39912	39606	753.1613	-1.72861069	0.732911	-1.1392	0.406287
	21B	37154	33646	39975	36925	3170.708	5.157578404	0.072224	-1.03415	0.96193
	21C	36995	37650	41340	38661.66667	2342.511	0.696923775	-0.71149	-0.43187	1.14336
	21D	38618	41111	40314	40014.33333	1273.229	-2.77742104	-1.09669	0.861327	0.23536
	SB1	37462	38993	38850	38435	845.6707	1.27912054	-1.15057	0.659831	0.490735
	SB2	38812	40517	40375	39901.33333	946.0583	-2.487178829	-1.15144	0.65077	0.500674
	SB3	40195	38735	40331	39753.66667	884.8081	-2.107894759	0.49879	-1.15129	0.652496
	SB5	38645	38915	40206	39255.33333	834.2963	-0.827918047	-0.73155	-0.40793	1.139483
	SB6	37284	38113	39176	38191	948.4087	1.905838235	-0.95634	-0.08224	1.038582
	CP1	36886	39851	39923	38886.66667	1733.002	0.119007868	-1.15445	0.556452	0.597999
	CP2	41327	39677	39438	40147.33333	1028.587	-3.119033553	1.146881	-0.45726	-0.68962
	CP3	38598	37239	37788	37875	683.6644	2.71748902	1.057536	-0.93028	-0.12726

Microorganism:		S. aureus								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
2.15	Untreated	42036	44163	38015	41404.66667	3122.245	0	0.202205	0.883446	-1.08565
	LP1	44197	40211	40555	41654.33333	2208.721	-0.602991611	1.151194	-0.65347	-0.49772
	LP1	45190	44131	40236	43185.66667	2608.787	-4.301447502	0.768301	0.362365	-1.13067
	LP3	41766	44401	42320	42829	1389.287	-3.440030914	-0.76514	1.131516	-0.36638
	LP3	40063	41627	41937	41209	1004.496	0.47257153	-1.14087	0.416129	0.724742
	LP4	36973	39065	40311	38783	1686.773	6.331814449	-1.07305	0.167183	0.905872
	LP4	37077	40357	43150	40194.66667	3039.753	2.9223759	-1.02563	0.053403	0.972228
	LP5	34276	39628	41781	38561.66667	3864.461	6.866375771	-1.10899	0.275933	0.833061
	LP5	39560	37300	39244	38701.33333	1223.832	6.529054696	0.701621	-1.14504	0.443416
	LP6	41007	42024	40229	41086.66667	900.148	0.768029369	-0.0885	1.04131	-0.95281
	LP6	44817	44788	44255	44620	316.4317	-7.765630283	0.622567	0.53092	-1.15349
	DEA	43836	45625	41432	43631	2104.004	-5.377010643	0.097433	0.947717	-1.04515
	DEA	41930	42995	41973	42299.33333	602.8485	-2.160787029	-0.61265	1.153966	-0.54132
	FLA	40893	42440	41820	41717.66667	778.5604	-0.755953435	-1.05922	0.927781	0.131439
	FLA	39966	42604	42086	41552	1397.722	-0.355837506	-1.1347	0.752653	0.38205
	PAA	41405	41362	41748	41505	211.5396	-0.242323732	-0.47272	-0.676	1.148721
	PAA	39724	38447	42860	40343.66667	2270.822	2.562513082	-0.27288	-0.83523	1.108116
	RIB	42207	42977	43192	42792	517.9044	-3.350669007	-1.12955	0.357209	0.772343
	RIB	44050	44820	41456	43442	1762.49	-4.920540358	0.344966	0.781848	-1.12681
	ANB	33902	42563	42924	39796.33333	5107.833	3.884425266	-1.15398	0.541652	0.612328
	ANB	41847	43371	43855	43024.33333	1047.926	-3.911797382	-1.12349	0.330812	0.792677
	DED	42138	43645	43458	43080.33333	821.4234	-4.047047837	-1.1472	0.687425	0.459771
	DED	41391	43738	45278	43469	1957.412	-4.985750399	-1.06161	0.137426	0.924179
	PAB	41168	45407	42003	42859.33333	2245.498	-3.513291577	-0.75321	1.134567	-0.38136
	PAB	39942	42168	42015	41375	1243.37	0.071650539	-1.15251	0.637783	0.51473
	PAC	41429	43067	42688	42394.66667	857.4931	-2.391034827	-1.12615	0.784069	0.342082
	PAC	44842	46828	44163	45277.66667	1384.886	-9.354018066	-0.31459	1.119466	-0.80488
	RIA	42114	43330	41819	42421	800.9164	-2.454634743	-0.38331	1.13495	-0.75164
	RIA	44122	40863	42686	42557	1633.325	-2.783100134	0.958168	-1.03715	0.07898

Microorganism:		S. aureus								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.7	Untreated	30416	32312	28019	30249	2151.367	0	0.077625	0.958925	-1.03655
	1A	1105	31828	33510	22147.66667	18242.88	26.78215258	-1.15347	0.530636	0.622837
	1B	1434	36129	25050	20871	17721	31.00267777	-1.09683	0.861012	0.235822
	1C	31279	28198	28033	29170	1828.31	3.567060068	1.153524	-0.53164	-0.62189
	1D	33041	30163	30847	31350.33333	1503.572	-3.64089171	1.124433	-0.78967	-0.33476
	2A	32771	30736	33951	32486	1626.338	-7.395285795	0.17524	-1.07604	0.900797
	2B	30597	30356	36012	32321.66667	3198.193	-6.852017147	-0.53926	-0.61462	1.153881
	2C	34074	33264	30464	32600.66667	1894.21	-7.774361687	0.777809	0.35019	-1.128
	2D	35131	32799	34013	33981	1166.329	-12.33759794	0.985999	-1.01344	0.027437
	3C	25093	24644	26668	25468.33333	1062.921	15.80437921	-0.35312	-0.77554	1.128651
	3D	29621	34811	35647	33359.66667	3264.651	-10.28353554	-1.1452	0.44456	0.700636
	4A	34145	32054	33147	33115.33333	1045.86	-9.475795343	0.984517	-1.0148	0.030278
	4D	31454	34054	34056	33188	1501.688	-9.71602367	-1.1547	0.576684	0.578016
	5A	31223	30807	33767	31932.33333	1602.425	-5.564922256	-0.44266	-0.70227	1.144932
	5B	31310	37958	32438	33902	3557.59	-12.07643228	-0.72858	1.140098	-0.41151
	5D	31351	34971	40650	35657.33333	4687.338	-17.87937893	-0.91872	-0.14642	1.065139
	6A	32862	34051	33527	33480	595.8918	-10.68134484	-1.0371	0.958228	0.078873
	6B	31550	30770	31219	31179.66667	391.4848	-3.076685731	0.945971	-1.04644	0.100472
	6C	29534	29359	29749	29547.33333	195.3416	2.319635911	-0.06826	-0.96412	1.03238
	6D	31948	31974	33126	32349.33333	672.7387	-6.943480225	-0.59657	-0.55792	1.154485
	7A	37086	34225	37148	36153	1669.985	-19.5180006	0.558688	-1.1545	0.595814
	7B	32089	34336	34362	33595.66667	1304.876	-11.06372662	-1.15464	0.567359	0.587284
	7C	31059	32842	32727	32209.33333	997.8759	-6.480655008	-1.15278	0.634013	0.518769
	7D	30206	37032	28780	32006	4410.655	-5.808456478	-0.4081	1.139513	-0.73141
	8D	31802	30460	30616	30959.33333	733.9273	-2.348286996	1.148161	-0.68036	-0.4678
	9A	29509	29538	35786	31611	3615.685	-4.502628186	-0.58136	-0.57334	1.154691
	9B	33072	33650	33189	33303.66667	305.5852	-10.09840546	-0.75811	1.133344	-0.37524
	9C	37330	36361	31989	35226.66667	2845.453	-16.45564041	0.739191	0.398648	-1.13784
	9D	35273	32714	28956	32314.33333	3177.408	-6.827773921	0.931157	0.125784	-1.05694

Microorganism:		S. aureus								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.8	Untreated	38099	19214	29415	28909.33333	9452.649	0	0.972179	-1.02567	0.053495
	10A	26268	29756	29329	28451	1902.551	1.585416474	-1.14741	0.685921	0.461486
	10B	31280	28310	28552	29380.66667	1649.315	-1.630384651	1.151589	-0.64916	-0.50243
	10C	29167	22625	18430	23407.33333	5411.084	19.03191587	1.06442	-0.14458	-0.91984
	10D	30297	22584	21418	24766.33333	4825.049	14.3310119	1.146241	-0.45229	-0.69395
	11A	33327	29383	22828	28512.66667	5303.335	1.372105894	0.907794	0.164111	-1.0719
	11B	28514	28668	27096	28092.66667	866.5664	2.8249239	0.48621	0.663923	-1.15013
	11C	29664	26109	23800	26524.33333	2953.98	8.249930818	1.06286	-0.1406	-0.92226
	11D	25819	28961	26629	27136.33333	1631.282	6.132967438	-0.80754	1.118548	-0.311
	12A	30396	32497	30299	31064	1241.962	-7.453186975	-0.53786	1.15382	-0.61596
	12B	28409	30980	26803	28730.66667	2106.997	0.618024168	-0.15267	1.067554	-0.91489
	12C	26131	28575	28510	27738.66667	1392.659	4.049441933	-1.15439	0.60053	0.553856
	13A	22011	22174	24523	22902.66667	1405.615	20.77760354	-0.63436	-0.5184	1.152758
	13C	27991	24761	25389	26047	1712.585	9.901070012	1.135126	-0.75091	-0.38421
	13D	22810	21318	22087	22071.66667	746.1182	23.65210774	0.989566	-1.01012	0.020551
	14A	30603	28620	28751	29324.66667	1109.005	-1.436675583	1.152685	-0.6354	-0.51728
	14C	24541	28445	31823	28269.66667	3644.165	2.212664883	-1.02319	0.048113	0.975075
	15A	32141	32628	31121	31963.33333	769.049	-10.56406236	0.231021	0.864271	-1.09529
	15D	25359	23371	26389	25039.66667	1534.132	13.38552717	0.208152	-1.08769	0.879542
	16C	27783	30007	28301	28697	1163.682	0.734480214	-0.78544	1.125737	-0.3403
	16D	25132	25207	23721	24686.66667	837.1322	14.60658611	0.531975	0.621566	-1.15354
	17A	25795	25303	27808	26302	1327.231	9.019001937	-0.382	-0.75269	1.134693
	17B	31133	28706	29754	29864.33333	1217.256	-3.303431418	1.042235	-0.95159	-0.09064
	17C	31117	32232	28096	30481.66667	2139.944	-5.43884328	0.296893	0.817934	-1.11483
	17D	27525	25837	25200	26187.33333	1201.439	9.415644313	1.113387	-0.29159	-0.82179
	18A	28837	25253	26408	26832.66667	1829.35	7.183377917	1.095653	-0.86351	-0.23214
	18C	24424	23288	22281	23331	1072.147	19.29595978	1.01945	-0.04011	-0.97934
	18D	27459	24002	20119	23860	3672.06	17.46610091	0.980104	0.03867	-1.01877
	19A	28979	29731	28790	29166.66667	497.7794	-0.890139286	-0.37701	1.133702	-0.75669

Microorganism:		S. aureus								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.9	Untreated	38721	28311	30299	32443.66667	5526.456	0	1.135869	-0.7478	-0.38807
	19C	30021	29096	33540	30885.66667	2344.786	4.802169915	-0.36876	-0.76325	1.132015
	19D	32766	27302	23458	27842	4677.437	14.18355919	1.052713	-0.11545	-0.93727
	20C	28762	28088	29324	28724.66667	618.8452	11.46294603	0.060327	-1.0288	0.968471
	20D	31116	27974	25727	28272.33333	2706.858	12.85715753	1.050541	-0.11021	-0.94033
	21A	30176	30926	29355	30152.33333	785.7674	7.062498074	0.030119	0.9846	-1.01472
	21C	30878	28292	27225	28798.33333	1878.399	11.23588579	1.107149	-0.26956	-0.83759
	SB1	30596	25322	24461	26793	3321.511	17.41685588	1.144961	-0.44287	-0.70209
	SB2	30658	30558	33425	31547	1627.164	2.763764885	-0.54635	-0.60781	1.154155
	SB3	30770	32537	28833	30713.33333	1852.65	5.333347032	0.030587	0.984356	-1.01494
	SB5	24075	31726	22692	26164.33333	4865.93	19.35457357	-0.42938	1.142981	-0.7136
	SB6	28686	23619	28578	26961	2894.761	16.89903525	0.595904	-1.1545	0.558595
	CP1	28448	28237	28726	28470.33333	245.2638	12.24686893	-0.09106	-0.95136	1.042415
	CP2	30710	28469	28902	29360.33333	1188.727	9.503652485	1.135388	-0.74982	-0.38557
	CP3	28645	25962	25076	26561	1858.371	18.13194152	1.121413	-0.32233	-0.79909
	CP4	30119	33126	31019	31421.33333	1543.346	3.151102937	-0.84384	1.104527	-0.26069
	CP5	31120	30820	30355	30765	385.4543	5.174096639	0.920991	0.142689	-1.06368
	CP6	26776	25029	27435	26413.33333	1243.324	18.58708942	0.291691	-1.11341	0.821722
	CT1	30936	31708	26812	29818.66667	2632.305	8.090947386	0.42447	0.717749	-1.14222
	CT2	35068	33027	26764	31619.66667	4327.187	2.539786913	0.7969	0.325231	-1.12213
	CT3	25860	22470	21721	23350.33333	2205.464	28.02806917	1.137931	-0.39916	-0.73877
	CT4	30649	30426	31066	30713.66667	324.8636	5.33231961	-0.19906	-0.8855	1.084558
	CT5	29818	27092	30407	29105.66667	1768.579	10.28860281	0.402772	-1.13858	0.735807
	CT6	30331	30640	30513	30494.66667	155.3137	6.007335792	-1.05378	0.935741	0.118041
	MDZ1	1192	1202	1240	1211.333333	25.32456	96.26634885	-0.76342	-0.36855	1.131971
	MDZ2	25754	30782	29524	28686.66667	2616.494	11.58007213	-1.12084	0.800817	0.320021
	MDZ3	31940	30794	28274	30336	1875.423	6.496388612	0.855274	0.244212	-1.09949
	MDZ4	1342	1303	1310	1318.333333	20.79263	95.93654642	1.138224	-0.73744	-0.40078
	MDZ5	1200	1206	1162	1189.333333	23.86071	96.3341587	0.447039	0.698498	-1.14554

Microorganism:		S. enterica								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
2.17	Untreated	43787	46632	52583	47667.33333	4488.467	0	-0.86451	-0.23067	1.095177
	LP1	50830	46270	47622	48240.66667	2342.106	-1.202780381	1.105558	-0.84141	-0.26415
	LP1	48521	51554	48900	49658.33333	1652.596	-4.176864659	-0.68821	1.147084	-0.45887
	LP3	47114	49118	47778	48003.33333	1020.826	-0.704885246	-0.87119	1.091926	-0.22074
	LP3	50236	47405	44821	47487.33333	2708.439	0.377617096	1.014853	-0.0304	-0.98445
	LP4	45767	45974	47887	46542.66667	1168.818	2.359407561	-0.66363	-0.48653	1.150164
	LP4	53731	47469	42266	47822	5740.646	-0.324470986	1.029327	-0.06149	-0.96784
	LP5	46480	46309	46938	46575.66667	325.2297	2.29017776	-0.29415	-0.81993	1.114085
	LP5	44591	46187	45730	45502.66667	821.9272	4.541195228	-1.10918	0.832596	0.276586
	LP6	44815	43972	42643	43810	1095.025	8.092194515	0.917788	0.147942	-1.06573
	LP6	47896	47584	44970	46816.66667	1606.851	1.784590425	0.671707	0.477539	-1.14925
	DEA	38960	46151	38036	41049	4442.55	13.8844212	-0.47023	1.14844	-0.67821
	DEA	41787	43425	40345	41852.33333	1541.039	12.19913008	-0.0424	1.020524	-0.97813
	FLA	47224	38352	45790	43788.66667	4762.573	8.136949134	0.721319	-1.14154	0.420221
	FLA	33535	30398	41041	34991.33333	5468.916	26.59263507	-0.26629	-0.8399	1.106191
	PAA	39150	37159	41650	39319.66667	2250.302	17.51234248	-0.0754	-0.96017	1.035565
	PAA	42923	46150	45919	44997.33333	1800.135	5.601320261	-1.15232	0.640323	0.511999
	RIB	44929	42984	48416	45443	2752.236	4.666368303	-0.18676	-0.89346	1.080213
	RIB	43415	52715	44958	47029.33333	4984.006	1.338442819	-0.72519	1.140782	-0.4156
	ANB	40586	46210	43851	43549	2824.137	8.639739304	-1.04917	0.942235	0.106935
	ANB	44510	43648	47265	45141	1889.257	5.299925875	-0.33399	-0.79026	1.124251
	DED	49627	49467	47348	48814	1272.111	-2.405560761	0.639095	0.51332	-1.15241
	DED	46268	46999	43020	45429	2118.03	4.695738521	0.396123	0.741255	-1.13738
	PAB	43637	43637	43276	43516.66667	208.4234	8.707570523	0.57735	0.57735	-1.1547
	PAB	44995	52052	47388	48145	3588.885	-1.002083887	-0.87771	1.088639	-0.21093
	PAC	37819	48800	45624	44081	5650.772	7.523670998	-1.10817	0.835107	0.27306
	PAC	36823	48608	55022	46817.66667	9230.648	1.782492553	-1.08277	0.193955	0.888814
	RIA	40976	35472	46297	40915	5412.758	14.16553615	0.01127	-1.00559	0.994318
	RIA	44472	44653	47127	45417.33333	1483.378	4.720213703	-0.63728	-0.51527	1.15255

Microorganism:		S. enterica								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
6.6	Untreated	27659	22899	13714	21424	7088.545	0	0.879588	0.208082	-1.08767
	17B	26122	20460	21749	22777	2967.684	-6.315347274	1.127142	-0.78074	-0.3464
	17C	25413	20077	19058	21516	3413.143	-0.429424944	1.141763	-0.42161	-0.72016
	17D	22610	20051	21667	21442.66667	1294.165	-0.087129699	0.901997	-1.07534	0.173342
	18A	24212	19258	17460	20310	3496.771	5.199775952	1.115887	-0.30085	-0.81504
	18B	18353	15451	17195	16999.66667	1460.828	20.6512945	0.926415	-1.06013	0.133714
	18C	19305	13960	13378	15547.66667	3266.932	27.42874035	1.150111	-0.48598	-0.66413
	18D	25836	21708	20244	22596	2899.832	-5.470500373	1.117306	-0.30622	-0.81108
	19A	24751	22218	28984	25317.66667	3418.409	-18.17432163	-0.16577	-0.90676	1.072526
	19B	15940	17478	16497	16638.33333	778.6799	22.33787652	-0.89682	1.078321	-0.1815
	19C	18625	17904	17099	17876	763.3852	16.56086632	0.981156	0.036679	-1.01783
	19D	15840	14397	17279	15838.66667	1441	26.07045059	0.000925	-1.00046	0.999537
	20A	17797	13663	16650	16036.66667	2134.156	25.14625342	0.824838	-1.11223	0.287389
	20B	21250	19762	21379	20797	898.654	2.926624347	0.504087	-1.15172	0.647635
	20C	18238	16092	19836	18055.33333	1878.672	15.72379885	0.097232	-1.04506	0.947833
	20D	23594	22635	27116	24448.33333	2359.503	-14.11656709	-0.36208	-0.76852	1.130605
	21A	23004	21653	22578	22411.66667	690.6883	-4.610094598	0.857599	-1.09842	0.240823
	21B	15354	16115	19453	16974	2180.335	20.77109783	-0.74301	-0.39398	1.136981
	21C	18165	15642	17398	17068.33333	1293.403	20.33078168	0.847892	-1.10278	0.254883
	21D	17899	16362	20557	18272.66667	2122.316	14.70936022	-0.17607	-0.90027	1.07634
	SB1	19267	13862	17999	17042.66667	2826.559	20.45058501	0.78694	-1.12528	0.338338
	SB2	16271	22459	18635	19121.66667	3122.574	10.74651481	-0.91292	1.068776	-0.15585
	SB3	28552	25368	28426	27448.66667	1803.011	-28.12111028	0.611939	-1.154	0.542056
	SB5	19706	20699	23829	21411.33333	2151.824	0.059123724	-0.79251	-0.33104	1.123543
	SB6	22362	18839	22163	21121.33333	1979.061	1.41274583	0.626896	-1.15324	0.526344
	CP1	13726	12890	14340	13652	727.8269	36.27707244	0.101673	-1.04695	0.94528
	CP2	18878	21000	20807	20228.33333	1173.398	5.580968384	-1.15079	0.657634	0.493155
	CP3	14412	16929	16715	16018.66667	1395.522	25.23027135	-1.1513	0.652324	0.498977
	CP4	18458	19059	18978	18831.66667	326.1293	12.10013692	-1.14576	0.697065	0.448697

Microorganism:		S. enterica								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
7.21	Untreated	32908	31119	19930	27985.66667	7033.524	0	0.699839	0.445486	-1.14532
	1A	19461	29562	28053	25692	5448.696	8.195862168	-1.14358	0.710262	0.433315
	1B	32121	31941	30218	31426.66667	1050.598	-12.29557988	0.660893	0.489562	-1.15046
	1C	36156	28405	29423	31328	4212.039	-11.94301845	1.146238	-0.69396	-0.45228
	1D	35530	31629	33772	33643.66667	1953.664	-20.21749229	0.965536	-1.03122	0.065689
	2A	33661	35980	30191	33277.33333	2913.508	-18.90848887	0.131685	0.927633	-1.05932
	2B	35460	36638	32729	34942.33333	2005.257	-24.857963	0.258155	0.845611	-1.10377
	2C	32833	31510	32139	32160.66667	661.7661	-14.91835106	1.015968	-0.98323	-0.03274
	2D	34141	36167	33808	34705.33333	1276.744	-24.01110092	-0.44201	1.14484	-0.70283
	3C	26775	20990	21550	23105	3190.623	17.43987994	1.150246	-0.66288	-0.48737
	3D	25098	23333	21981	23470.66667	1563.054	16.13325869	1.041125	-0.08808	-0.95305
	4A	32094	33647	32732	32824.33333	780.6064	-17.28980311	-0.9356	1.053882	-0.11828
	4D	32939	32607	32689	32745	172.9393	-17.00632467	1.121781	-0.79797	-0.32381
	5A	36716	33031	35936	35227.66667	1941.934	-25.87753255	0.766418	-1.13117	0.364757
	5B	31455	33413	29432	31433.33333	1990.588	-12.3194016	0.010885	0.994513	-1.0054
	5D	33873	34245	35229	34449	700.6397	-23.09515585	-0.82211	-0.29116	1.113268
	6A	36804	32756	38357	35972.33333	2891.635	-28.53841848	0.287611	-1.11229	0.824678
	6B	34204	34321	36088	34871	1055.575	-24.60307062	-0.63188	-0.52104	1.152926
	6C	29417	34499	32504	32140	2560.479	-14.84450373	-1.06347	0.921312	0.142161
	6D	31738	29420	28523	29893.66667	1659.014	-6.817775766	1.111705	-0.28551	-0.82619
	7A	33236	33950	32932	33372.66667	522.5795	-19.24913944	-0.26152	1.104776	-0.84325
	7B	29697	32404	31591	31230.66667	1389.008	-11.59522136	-1.10415	0.844728	0.259418
	7C	28398	29146	33146	30230	2552.874	-8.019581452	-0.71762	-0.42462	1.142242
	7D	27443	29494	32592	29843	2592.181	-6.636730707	-0.92586	-0.13464	1.060497
	8D	35129	32572	34249	33983.33333	1299.037	-21.43120883	0.881936	-1.08645	0.204511
	9A	33026	25449	34457	30977.33333	4840.846	-10.68999607	0.423204	-1.14202	0.718814
	9B	30280	28676	32527	30494.33333	1934.426	-8.964112581	-0.1108	-0.93999	1.050785
	9C	33402	32339	33731	33157.33333	727.5385	-18.47969794	0.336294	-1.1248	0.788503
	9D	34799	34689	32732	34073.33333	1162.93	-21.75280203	0.623999	0.52941	-1.15341

Microorganism:		S. enterica								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.5	Untreated	27517	32920	33052	31163	3158.218	0	-1.15445	0.556326	0.598122
	10A	35603	34728	33651	34660.66667	977.7404	-11.22378034	0.963787	0.068866	-1.03265
	10B	35373	25089	22582	27681.33333	6778.094	11.1724374	1.134783	-0.38246	-0.75233
	10C	35225	32022	4429	23892	16931.36	23.33215672	0.66935	0.480174	-1.14952
	10D	31205	25060	29148	28471	3127.939	8.638449443	0.874058	-1.09049	0.216436
	11A	24071	23166	30606	25947.66667	4059.533	16.73565874	-0.46229	-0.68522	1.147505
	11B	39857	31268	29252	33459	5631.773	-7.367711709	1.136054	-0.38904	-0.74701
	11C	38081	30904	29105	32696.66667	4748.935	-4.921434607	1.133798	-0.37749	-0.75631
	11D	29991	29375	31154	30173.33333	903.4071	3.17577469	-0.20183	-0.88369	1.08552
	12A	27192	32985	34035	31404	3685.286	-0.773353015	-1.14292	0.429003	0.71392
	12B	28575	24899	25685	26386.33333	1935.754	15.3280065	1.130653	-0.76835	-0.3623
	12C	26223	24895	26040	25719.33333	719.7335	17.46836526	0.699796	-1.14533	0.445535
	13A	19607	27684	25764	24351.66667	4219.656	21.85711688	-1.12442	0.789717	0.334703
	13C	22129	22822	27129	24026.66667	2708.951	22.90002032	-0.70052	-0.4447	1.145216
	13D	31056	31538	30287	30960.33333	630.963	0.650343891	0.15162	0.915532	-1.06715
	14A	32744	35053	35820	34539	1601.122	-10.83336007	-1.12109	0.321025	0.800064
	14C	21903	18177	19908	19996	1864.558	35.83416231	1.022762	-0.97557	-0.0472
	15A	28732	28768	29594	29031.33333	487.616	6.840376943	-0.61387	-0.54004	1.153914
	15D	21220	22158	24749	22709	1827.884	27.12832526	-0.8146	-0.30144	1.116044
	16C	16183	20648	23895	20242	3871.997	35.04476462	-1.0483	0.104855	0.943441
	16D	28760	30570	31329	30219.66667	1319.845	3.027094097	-1.10594	0.265435	0.840503
	17A	28690	29672	28418	28926.66667	659.6494	7.176245334	-0.35878	1.129893	-0.77112
	17B	31314	31323	32513	31716.66667	689.6596	-1.776679609	-0.58386	-0.57081	1.154676
	17C	27714	28775	34959	30482.66667	3912.748	2.183144541	-0.7076	-0.43644	1.144038
	17D	31361	34448	33524	33111	1584.399	-6.251002792	-1.10452	0.843853	0.260667
	18A	21082	24115	33911	26369.33333	6705.022	15.38255838	-0.78856	-0.33622	1.124779
	18C	18987	25963	26497	23815.66667	4190.263	23.57710533	-1.15235	0.512458	0.639896
	18D	21223	29809	33714	28248.66667	6390.012	9.351902363	-1.09948	0.244183	0.855293
	19A	23450	32857	32587	29631.33333	5354.894	4.91501674	-1.15433	0.602377	0.551956

Microorganism:		S. pyogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.31	Untreated	19506	14569	12246	15440.33333	3707.603	0	1.096576	-0.23501	-0.86156
	10A	14251	20413	21104	18589.33333	3772.959	-20.39463742	-1.14985	0.483352	0.666497
	10B	20142	19771	19711	19874.66667	233.4531	-28.71915546	1.145127	-0.44406	-0.70107
	10C	21920	16088	19324	19110.66667	2921.847	-23.77107575	0.961492	-1.03451	0.073013
	10D	15913	15923	17067	16301	663.3943	-5.574145636	-0.58487	-0.5698	1.154668
	11A	30185	37837	29655	32559	4578.557	-110.8697999	-0.5185	1.152765	-0.63426
	11B	30747	30294	27238	29426.33333	1908.639	-90.58094601	0.691941	0.4546	-1.14654
	11C	27228	22920	23777	24641.66667	2280.45	-59.59284126	1.134133	-0.75497	-0.37916
	11D	16541	16111	11022	14558	3069.804	5.714470758	0.64597	0.505895	-1.15187
	12A	30774	26638	26200	27870.66667	2523.88	-80.50560221	1.150345	-0.4884	-0.66194
	12B	20876	18857	21245	20326	1285.5	-31.6422357	0.427849	-1.14275	0.714897
	12C	21527	23421	19849	21599	1787.088	-39.88687636	-0.04029	1.019536	-0.97925
	13A	12312	6119	4510	7647	4119.331	50.47386714	1.132465	-0.37093	-0.76153
	13C	17633	15591	19528	17584	1968.957	-13.88355174	0.024886	-1.01221	0.987325
	13D	13152	6237	7630	9006.333333	3657.188	41.67008484	1.133567	-0.75723	-0.37634
	14A	21011	22221	22996	22076	1000.412	-42.97618791	-1.06456	0.14494	0.919621
	14C	14420	12977	15753	14383.33333	1388.363	6.845707131	0.02641	-1.01294	0.986533
	15A	1314	1259	1295	1289.333333	27.93445	91.64957579	0.88302	-1.08588	0.202856
	15D	4644	3805	3805	4084.666667	484.3969	73.54547613	1.154701	-0.57735	-0.57735
	16C	13346	11347	10542	11745	1443.748	23.93298936	1.10892	-0.27567	-0.83325
	16D	6138	7207	3526	5623.666667	1893.633	63.57807474	0.271612	0.836135	-1.10775
	17A	27350	27760	26689	27266.33333	540.3798	-76.59161072	0.154829	0.913555	-1.06838
	17B	26036	25519	25421	25658.66667	330.4336	-66.17948663	1.141934	-0.42268	-0.71926
	17C	18629	16848	19411	18296	1313.548	-18.49485115	0.253512	-1.10236	0.848846
	17D	7158	6909	7946	7337.666667	541.3431	52.47727812	-0.33189	-0.79186	1.123748
	18A	7342	10622	15766	11243.33333	4246.232	27.18205566	-0.91878	-0.14633	1.065101
	18C	16393	17963	16869	17075	805.0168	-10.58699078	-0.84719	1.103083	-0.2559
	18D	19933	18130	11804	16622.33333	4269.069	-7.655275145	0.775501	0.35316	-1.12866
	19A	1300	1270	1198	1256	52.42137	91.86546059	0.839352	0.267067	-1.10642

Microorganism:		S. pyogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.3(1)	Untreated	12068	20680	20427	17725	4900.739	0	-1.15432	0.60297	0.551345
	10A	18903	22786	22464	21384.33333	2154.92	-20.64503996	-1.15147	0.650449	0.501024
	10B	23036	21337	20561	21644.66667	1265.86	-22.11377527	1.099121	-0.24305	-0.85607
	10C	22597	27278	21771	23882	2969.879	-34.73624824	-0.43268	1.143481	-0.7108
	10D	26938	19372	21236	22515.33333	3941.904	-27.02585802	1.121962	-0.79741	-0.32455
	11A	24804	30748	25930	27160.66667	3157.323	-53.23366244	-0.74641	1.136195	-0.38978
	11B	28984	26710	25046	26913.33333	1976.858	-51.83826986	1.047453	-0.10286	-0.9446
	11C	26182	25287	22496	24655	1922.555	-39.09732017	0.794256	0.328729	-1.12298
	11D	22286	27252	26982	25506.66667	2792.444	-43.90220969	-1.15335	0.62502	0.52833
	12A	30382	30270	31456	30702.66667	654.8048	-73.21673719	-0.48971	-0.66076	1.15047
	12B	29320	31168	30664	30384	955.2884	-71.41889986	-1.1138	0.820695	0.293105
	12C	22539	25455	23919	23971	1458.695	-35.23836389	-0.9817	1.017347	-0.03565
	13A	23604	25229	22384	23739	1427.296	-33.92947814	-0.09458	1.043932	-0.94935
	13C	20738	21728	20191	20885.66667	779.0676	-17.83168782	-0.18954	1.081207	-0.89166
	13D	20979	14332	15570	16960.33333	3534.886	4.314057358	1.136859	-0.74354	-0.39332
	14A	20461	20543	20489	20497.66667	41.68133	-15.64268923	-0.87969	1.087617	-0.20793
	14C	26846	21127	27447	25140	3488.327	-41.83356841	0.48906	-1.15041	0.661349
	15A	1272	1316	1214	1267.333333	51.15988	92.85002351	0.091217	0.951266	-1.04248
	15D	20157	10980	12063	14400	5015.028	18.75881523	1.14795	-0.68195	-0.466
	16C	22238	19432	14161	18610.33333	4100.711	-4.994828397	0.884643	0.200372	-1.08501
	16D	17704	13133	8338	13058.33333	4683.446	26.32816173	0.991933	0.015943	-1.00788
	17A	26603	25446	27019	26356	815.0699	-48.69393512	0.303041	-1.11647	0.813427
	17B	31772	28843	30757	30457.33333	1487.316	-71.83262811	0.883919	-1.0854	0.201481
	17C	27439	25296	27220	26651.66667	1179.137	-50.36201222	0.66772	-1.14971	0.481991
	17D	20309	21677	16016	19334	2953.76	-9.077574048	0.330088	0.793226	-1.12331
	18A	22639	17156	23702	21165.66667	3512.914	-19.41137753	0.419405	-1.14141	0.722003
	18C	15187	24348	22684	20739.66667	4880.195	-17.00799248	-1.1378	0.739383	0.398413
	18D	21845	23797	19524	21722	2139.154	-22.55007052	0.057499	0.97001	-1.02751
	19A	1280	1254	1207	1247	37	92.96473907	0.891892	0.189189	-1.08108

Microorganism:		S. pyogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.3(2)	Untreated	17416	23857	27289	22854	5012.339	0	-1.08492	0.200106	0.884817
	CP4	19345	19836	20287	19822.66667	471.1415	13.26390712	-1.01385	0.0283	0.98555
	CP5	29160	23801	25256	26072.33333	2771.195	-14.08214463	1.114201	-0.81962	-0.29458
	CP6	30775	24999	32187	29320.33333	3808.396	-28.29409877	0.381963	-1.13469	0.752723
	CT1	24238	22495	20244	22325.66667	2002.377	2.311776203	0.955032	0.084566	-1.0396
	CT2	28704	28186	22426	26438.66667	3484.71	-15.68507336	0.650078	0.501429	-1.15151
	CT3	27033	26764	28115	27304	715.1091	-19.47142732	-0.37896	-0.75513	1.134093
	CT4	24479	25367	21555	23800.33333	1994.562	-4.14077769	0.340259	0.785469	-1.12573
	CT5	24269	25983	27046	25766	1401.16	-12.74175199	-1.0684	0.154872	0.913529
	CT6	27400	33491	25840	28910.33333	4042.93	-26.5001021	-0.37357	1.133007	-0.75943
	MDZ1	1341	1276	916	1177.666667	228.9287	94.8469998	0.713468	0.429537	-1.14301
	MDZ2	5507	6370	7560	6479	1030.831	71.65047694	-0.94293	-0.10574	1.048668
	MDZ3	22360	25955	27424	25246.33333	2605.318	-10.46789767	-1.10786	0.272008	0.835855
	MDZ4	1404	1388	1353	1381.666667	26.0832	93.95437706	0.856234	0.242813	-1.09905
	MDZ5	1434	1443	1336	1404.333333	59.34925	93.85519676	0.499866	0.651511	-1.15138
	MDZ6	27760	27753	35535	30349.33333	4490.92	-32.79659286	-0.57657	-0.57813	1.1547
	LP1	6897	7121	7367	7128.333333	235.0858	68.80925294	-0.98404	-0.03119	1.015232
	LP3	15178	16030	15384	15530.66667	444.5327	32.04398938	-0.79334	1.123277	-0.32993
	LP4	10948	8433	8254	9211.666667	1506.37	59.69341618	1.152661	-0.51692	-0.63574
	LP5	21385	20730	14341	18818.66667	3891.578	17.65701117	0.659458	0.491146	-1.1506
	LP6	23917	29148	25431	26165.33333	2691.705	-14.48907558	-0.83528	1.108096	-0.27281
	DEA	23464	28644	27612	26573.33333	2741.755	-16.27432105	-1.13407	0.755234	0.378833
	FLA	29880	32905	28291	30358.66667	2343.948	-32.83743181	-0.20421	1.086344	-0.88213
	PAA	36347	35497	24895	32246.33333	6380.611	-41.09710919	0.642676	0.50946	-1.15214
	RIB	31476	31540	27812	30276	2134.127	-32.47571541	0.562291	0.59228	-1.15457
	ANB	1226	1333	1263	1274	54.34151	94.4254835	-0.8833	1.085726	-0.20242
	DED	26245	27102	25163	26170	971.6733	-14.50949506	0.077186	0.95917	-1.03636
	PAB	26936	25297	23950	25394.33333	1495.378	-11.11548671	1.030955	-0.06509	-0.96587
	PAC	26846	24698	26064	25869.33333	1087.151	-13.19389749	0.898373	-1.07743	0.179061

Microorganism:		S. pyogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.17 (1)	Untreated	16768	16895	17919	17194	631.0713	0	-0.67504	-0.4738	1.14884
	1A	1843	2072	2073	1996	132.5028	88.39129929	-1.15469	0.573573	0.58112
	1B	2400	2518	2494	2470.666667	62.36452	85.63064635	-1.13312	0.758979	0.374144
	1C	33671	32441	30919	32343.66667	1378.579	-88.11019348	0.962827	0.070604	-1.03343
	1D	12797	12492	12056	12448.33333	372.4249	27.60071343	0.936207	0.11725	-1.05346
	2A	24545	25972	27150	25889	1304.482	-50.56996627	-1.03029	0.063627	0.966667
	2B	27942	27050	28177	27723	594.5612	-61.23647784	0.368339	-1.13193	0.763588
	2C	34768	32583	35446	34265.66667	1496.144	-99.2885115	0.335752	-1.12467	0.788917
	2D	13335	11812	11831	12326	873.8713	28.31220193	1.154632	-0.58819	-0.56644
	3C	7359	7327	7455	7380.333333	66.61331	57.07611182	-0.32026	-0.80064	1.120897
	3D	11972	11728	13449	12383	931.2094	27.98069094	-0.44136	-0.70339	1.144748
	4A	10965	10425	8404	9931.333333	1349.985	42.23954093	0.765687	0.365683	-1.13137
	4D	18631	21108	22408	20715.66667	1918.822	-20.48195107	-1.08643	0.204466	0.881965
	5A	32544	32274	34493	33103.66667	1210.748	-92.53034004	-0.46225	-0.68525	1.1475
	5B	20380	19952	21098	20476.66667	579.0832	-19.09193129	-0.16693	-0.90603	1.07296
	5D	11562	10640	11951	11384.33333	673.3159	33.78891862	0.263868	-1.10547	0.841606
	6A	13257	14255	17013	14841.66667	1945.512	13.68112908	-0.81452	-0.30155	1.116073
	6B	30691	28930	27436	29019	1629.324	-68.77399093	1.026192	-0.05462	-0.97157
	6C	16807	21290	16710	18269	2616.712	-6.252180993	-0.55872	1.154502	-0.59579
	6D	13034	14148	16295	14492.33333	1657.545	15.71284557	-0.87982	-0.20774	1.087552
	7A	29649	28255	25662	27855.33333	2023.325	-62.00612617	0.886495	0.19753	-1.08402
	7B	34323	33004	34609	33978.66667	856.1135	-97.61932457	0.402205	-1.13848	0.736273
	7C	11710	12212	13612	12511.33333	985.6984	27.23430654	-0.81296	-0.30368	1.116636
	7D	14322	11187	13243	12917.33333	1592.671	24.87301772	0.881957	-1.08644	0.204478
	8D	10895	8309	10854	10019.33333	1481.334	41.72773448	0.591134	-1.15459	0.563456
	9A	17119	16848	13468	15811.66667	2034.193	8.039626226	0.642679	0.509457	-1.15214
	9B	22781	17821	15094	18565.33333	3897.181	-7.975650421	1.081722	-0.19099	-0.89073
	9C	36795	30718	34031	33848	3042.63	-96.85936955	0.96857	-1.02872	0.060145
	9D	2271	4805	22093	9723	10787.4	43.45120391	-0.69081	-0.4559	1.146708

Microorganism:		S. pyogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.17 (2)	Untreated	16320	19166	21514	19000	2600.976	0	-1.03038	0.063822	0.96656
	19A	1883	2078	2299	2086.666667	208.1354	89.01754386	-0.97853	-0.04164	1.020169
	19C	18564	15819	16649	17010.66667	1407.785	10.47017544	1.103388	-0.84648	-0.2569
	19D	12466	13086	14256	13269.33333	908.9738	30.16140351	-0.88378	-0.20169	1.085473
	20C	13964	13262	13056	13427.33333	476.0434	29.32982456	1.127348	-0.34731	-0.78004
	20D	16519	20010	23579	20036	3530.072	-5.452631579	-0.9963	-0.00737	1.003662
	21A	25433	23928	22044	23801.66667	1698.028	-25.27192982	0.960722	0.0744	-1.03512
	21C	20074	17165	19729	18989.33333	1589.308	0.056140351	0.682477	-1.14788	0.465402
	SB1	13390	13346	14025	13587	379.9566	28.48947368	-0.51848	-0.63428	1.152763
	SB2	16918	17529	18626	17691	865.4473	6.889473684	-0.89318	-0.18719	1.080366
	SB3	27376	24755	26878	26336.33333	1391.928	-38.6122807	0.746926	-1.13607	0.389149
	SB5	13718	14311	14462	14163.66667	393.2739	25.45438596	-1.13322	0.374633	0.758589
	SB6	17652	18572	14447	16890.33333	2165.412	11.10350877	0.351742	0.776604	-1.12835
	CP1	12	21	27	20	7.549834	99.89473684	-1.05963	0.132453	0.927173
	CP2	2092	2053	2098	2081	24.43358	89.04736842	0.4502	-1.14596	0.695764
	CP3	2072	2155	2088	2105	44.03408	88.92105263	-0.74942	1.135484	-0.38606
	15A	2122	2518	2110	2250	232.1723	88.15789474	-0.55131	1.154315	-0.603
	15D	13226	13646	12498	13123.33333	580.8454	30.92982456	0.176754	0.899838	-1.07659
	16C	20687	22862	15752	19767	3643.189	-4.036842105	0.252526	0.84953	-1.10206
	16D	17204	16441	21873	18506	2940.758	2.6	-0.44274	-0.7022	1.144943
	17A	27901	28662	32131	29564.66667	2254.846	-55.60350877	-0.73782	-0.40032	1.138141
	17B	26895	25388	27295	26526	1005.626	-39.61052632	0.366936	-1.13163	0.764698
	17C	33850	35007	34364	34407	579.6973	-81.08947368	-0.96085	1.035023	-0.07418
	17D	13776	13307	15978	14353.66667	1426.126	24.45438596	-0.40506	-0.73392	1.138983
	LP1	6173	6275	6695	6381	276.6731	66.41578947	-0.75179	-0.38312	1.134913
	LP3	13645	14466	15263	14458	809.0297	23.90526316	-1.00491	0.009888	0.995019
	LP4	7789	10607	10539	9645	1607.703	49.23684211	-1.15444	0.598369	0.556073
	LP5	21520	26784	24948	24417.33333	2671.821	-28.5122807	-1.0844	0.885788	0.198616
	LP6	36558	26680	16436	26558	10061.55	-39.77894737	0.993882	0.012125	-1.00601

APPENDIX B

Raw Data for Purified Compounds

Microorganism:		A. baumanii								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.19	Untreated	16215	15258	24202	18558.33333	4910.926	0	-0.47717	-0.67204	1.149206
	DSK1	20798	21268	16398	19488	2686.317	-5.009429726	0.487656	0.662617	-1.15027
	DSK2	19564	18719	20140	19474.33333	714.731	-4.935788056	0.125455	-1.05681	0.931353
	DSK3	22227	19134	15897	19086	3165.273	-2.843286933	0.992331	0.015165	-1.0075
	DSK4	20802	22472	9314	17529.33333	7163.519	5.54467894	0.456852	0.689977	-1.14683
	DSK5	16899	17501	16753	17051	396.4896	8.122137405	-0.38336	1.13496	-0.7516
	Y15	12282	11048	10321	11217	991.3632	39.55814998	1.074278	-0.17047	-0.90381
	Y8	15599	13206	9832	12879	2897.373	30.6026044	0.938782	0.112861	-1.05164
	Y16	13628	13277	12621	13175.33333	511.1402	29.00583745	0.885602	0.198902	-1.0845
	CPB1A	24798	26699	11769	21088.66667	8126.844	-13.63448586	0.45643	0.690346	-1.14678
	CPB1B	17393	23909	24065	21789	3807.847	-17.40817243	-1.15446	0.556745	0.597713
Microorganism:		A. baumanii								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.6	Untreated	25480	24122	21978	23860	1765.64	0	0.917514	0.148388	-1.0659
	Y19	25482	21987	25779	24416	2108.811	-2.330259849	0.505498	-1.15183	0.646336
	Y14	25491	24882	25779	25384	457.9727	-6.387259011	0.233638	-1.09614	0.862497
	Y13	24876	25048	25232	25052	178.0337	-4.995808885	-0.98858	-0.02247	1.011045
	Y8'	25690	25122	25976	25596	434.6907	-7.275775356	0.216246	-1.09043	0.874185
	Y8	24217	25191	24815	24741	491.1985	-3.692372171	-1.06678	0.916127	0.150652
	Y3	24110	24444	23107	23887	695.8369	-0.113160101	0.320477	0.800475	-1.12095

Microorganism:		B. anthracis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.19	Untreated	20697	22586	23164	22149	1290.252	0	-1.12536	0.338694	0.786668
	DSK1	21675	23518	23499	22897.33333	1058.614	-3.378632594	-1.15465	0.586301	0.568353
	DSK2	23918	23648	24254	23940	303.5984	-8.086143844	-0.07246	-0.9618	1.034261
	DSK3	20602	22366	22912	21960	1207.333	0.853311662	-1.12479	0.336279	0.788515
	DSK4	1180	1093	1214	1162.333333	62.40459	94.75220853	0.283099	-1.11103	0.827931
	DSK5	21780	21353	22150	21761	398.8396	1.751772089	0.047638	-1.02297	0.97533
	Y15	1418	1361	1364	1381	32.07803	93.76495553	1.153437	-0.62348	-0.52996
	Y8	1373	1322	1292	1329	40.95119	93.99972911	1.07445	-0.17094	-0.90351
	Y16	1438	1412	1390	1413.333333	24.02776	93.61897452	1.02659	-0.05549	-0.9711
	CPB1A	1021	981	1952	1318	549.4242	94.04939275	-0.54057	-0.61337	1.153935
	CPB1B	21524	51877	24200	32533.66667	16805.17	-46.88548768	-0.65514	1.151035	-0.4959
Microorganism:		**B. anthracis**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.6	Untreated	22153	24122	21978	22751	1190.541	0	-0.50229	1.151578	-0.64928
	y19	24047	23167	23356	23523.33333	463.2498	-3.394722576	1.13042	-0.7692	-0.36122
	y14	20135	580	569	7094.666667	11293.26	68.81602274	1.1547	-0.57686	-0.57784
	y13	19109	540	532	6727	10723.13	70.43206892	1.1547	-0.57698	-0.57772
	y8'	586	570	17372	6176	9696.024	72.85394049	-0.57652	-0.57818	1.1547
	y8	19577	18492	15335	17801.33333	2203.726	21.75582026	0.805757	0.313409	-1.11917
	y3	23241	23820	22794	23285	514.4133	-2.347149576	-0.08553	1.04002	-0.95449

Microorganism:		C. sakazakii								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.27	Untreated	23957	24559	26009	24841.66667	1054.799	0	-0.83871	-0.26798	1.106688
	DSK1	18052	17328	17822	17734	369.9351	28.61187521	0.85961	-1.09749	0.23788
	DSK2	21306	21308	21884	21499.33333	333.1326	13.45454545	-0.58035	-0.57435	1.154695
	DSK3	21898	20269	20197	20788	961.9621	16.31801409	1.153892	-0.53952	-0.61437
	DSK4	9858	8367	7761	8662	1079.176	65.13116404	1.108253	-0.27336	-0.8349
	DSK5	20174	19713	19504	19797	342.8075	20.30727944	1.099742	-0.24504	-0.85471
	CPB1A	22542	22130	22966	22546	418.0144	9.24119423	-0.00957	-0.99518	1.00475
	CPB1B	24670	24593	24559	24607.33333	56.8712	0.943307615	1.101905	-0.25203	-0.84987
	Y8	554	566	573	564.3333333	9.609024	97.7282791	-1.07538	0.173448	0.90193
Microorganism:		**C. sakazakii**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	15795	15555	15935	15761.66667	192.1805	0	0.173448	-1.07538	0.90193
	Y19	16185	16010	16442	16212.33333	217.2932	-2.859257693	-0.12579	-0.93115	1.056944
	Y14	16519	16348	16373	16413.33333	92.3598	-4.134503542	1.144076	-0.70738	-0.4367
	Y13	16096	15590	15977	15887.66667	264.5644	-0.799407846	0.787458	-1.12512	0.337662
	Y8'	17037	13886	16034	15652.33333	1609.799	0.693666067	0.860149	-1.09724	0.23709
	Y8	16613	17131	16995	16913	268.5591	-7.304642064	-1.11707	0.811739	0.305333
	Y3	17719	16248	17103	17023.33333	738.7289	-8.004652638	0.941708	-1.04955	0.107843

Microorganism:		E. aerogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.27	Untreated	23830	25699	27085	25538	1633.462	0	-1.04563	0.098564	0.947068
	DSK1	18052	17328	17822	17734	369.9351	30.55838359	0.85961	-1.09749	0.23788
	DSK2	21306	21308	21884	21499.33333	333.1326	15.81434203	-0.58035	-0.57435	1.154695
	DSK3	21898	20269	20197	20788	961.9621	18.59973373	1.153892	-0.53952	-0.61437
	DSK4	9858	8367	7761	8662	1079.176	66.08191714	1.108253	-0.27336	-0.8349
	DSK5	20174	19713	19504	19797	342.8075	22.48022555	1.099742	-0.24504	-0.85471
	CPB1A	22542	22130	22966	22546	418.0144	11.71587438	-0.00957	-0.99518	1.00475
	CPB1B	24670	24593	24559	24607.33333	56.8712	3.644242567	1.101905	-0.25203	-0.84987
Microorganism:		**E. aerogenes**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	17130	17078	16571	16926.333	308.824	-	0.659492	0.491111	-1.1506
	Y19	15487	16572	15747	15935.333	566.488	5.855	-0.79143	1.123884	-0.33246
	Y14	16357	16468	16144	16323	164.654	3.564	0.206494	0.880635	-1.08713
	Y13	15742	16216	15665	15874.333	298.386	6.215	-0.4435	1.14505	-0.70155
	Y8'	16282	16135	16827	16414.667	364.577	3.023	-0.36389	-0.7671	1.13099
	Y8	16948	15472	15622	16014	812.337	5.39	1.149769	-0.66721	-0.48256
	Y3	15621	17760	15935	16438.667	1155.028	2.881	-0.70792	1.143984	-0.43606

Microorganism:		E. coli								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.27	Untreated	21898	20269	20197	20788	961.9621	-	1.153892	-0.53952	-0.61437
	DSK1	24265	26535	25881	25560.33333	1168.48	-22.95715477	-1.10856	0.834132	0.274431
	DSK2	26577	26484	26961	26674	252.8616	-28.31441216	-0.38361	-0.7514	1.135008
	DSK3	26486	25653	27007	26382	682.9649	-26.90975563	0.152277	-1.0674	0.915128
	DSK4	11270	8443	9570	9761	1423.145	53.04502598	1.060327	-0.92612	-0.13421
	DSK5	25515	24568	26371	25484.66667	901.8827	-22.59316272	0.033633	-1.01639	0.982759
	CPB1A	26338	26720	24243	25767	1333.572	-23.95131807	0.428174	0.714622	-1.1428
	CPB1B	27637	27275	27899	27603.66667	313.3326	-32.78654352	0.106383	-1.04894	0.942555
	Y8	26954	26018	26815	26595.66667	505.0785	-27.9375922	0.709461	-1.14372	0.434256
	Y16	18052	17328	17822	17734	369.9351	14.69116798	0.85961	-1.09749	0.23788
Microorganism:		**E. coli**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	15363	17468	16062	16297.66667	1072.106	-	-0.8718	1.091621	-0.21982
	Y19	16696	22554	19565	19605	2929.205	-20.29329352	-0.9931	1.006758	-0.01366
	Y14	18885	16960	21674	19173	2370.16	-17.64260733	-0.12151	-0.93369	1.055203
	Y13	18203	17206	17934	17781	515.8091	-9.101507373	0.818132	-1.11475	0.296621
	Y8'	15670	15552	15369	15530.33333	151.6652	4.708240443	0.920888	0.142859	-1.06375
	Y8	15651	16288	15862	15933.66667	324.4909	2.233448551	-0.87111	1.091967	-0.22086
	Y3	16033	15594	16855	16160.66667	640.1206	0.84061113	-0.19944	-0.88525	1.084692

Microorganism:		E. faecalis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.23	Untreated	2524	3083	3063	2890	317.123	-	-1.15413	0.608597	0.54553
	DSK1	3070	3353	2966	3129.666667	200.2806	-8.292964245	-0.29792	1.115102	-0.81719
	DSK2	3921	4058	3937	3972	74.90661	-37.43944637	-0.68085	1.148096	-0.46725
	DSK3	2395	2529	2650	2524.666667	127.5552	12.64129181	-1.01655	0.033972	0.982581
	DSK4	2435	1703	4056	2731.333333	1204.165	5.490196078	-0.24609	-0.85398	1.100071
	DSK5	3173	3822	3650	3548.333333	336.2326	-22.77970012	-1.11629	0.813921	0.30237
	CPB1A	3889	3576	3546	3670.333333	189.964	-27.0011534	1.151095	-0.49659	-0.65451
	CPB1B	3506	3735	3975	3738.666667	234.5215	-29.3656286	-0.99209	-0.01563	1.007726
	Y8	460	467	454	460.3333333	6.506407	84.07151096	-0.05123	1.024631	-0.9734
	Y16	483	474	445	467.3333333	19.85783	83.82929642	0.788942	0.33572	-1.12466
Microorganism:		E. faecalis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	5163	4882	4039	4694.666667	584.9481	-	0.800641	0.320256	-1.1209
	Y19	23337	21312	23694	22781	1284.653	-385.2527691	0.432802	-1.1435	0.710698
	Y14	20709	17940	22417	20355.33333	2259.357	-333.584209	0.156534	-1.06904	0.912502
	Y13	586	604	1532	907.3333333	541.0521	80.67310423	-0.5939	-0.56064	1.154541
	Y8'	722	21442	20722	14295.33333	11760.36	-204.5015621	-1.15416	0.607691	0.546468
	Y8	510	500	492	500.6666667	9.0185	89.33541607	1.03491	-0.07392	-0.96099
	Y3	3935	22463	22414	16270.66667	10683.03	-246.5776768	-1.1547	0.579642	0.575055
Microorganism:		E. faecalis								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.2	Untreated	2249	2177	1975	2133.666667	142.0469	-	0.811938	0.305063	-1.117
	DSK1	1727	2004	3768	2499.666667	1107.106	-17.15356975	-0.69792	-0.44771	1.145629
	DSK2	3629	3126	3983	3579.333333	430.6534	-67.75503828	0.115329	-1.05266	0.937335
	DSK3	2091	2830	2678	2533	390.255	-18.71582565	-1.13259	0.761041	0.371552
	DSK4	4625	6617	2440	4560.666667	2089.243	-113.7478519	0.030793	0.984248	-1.01504
	DSK5	2691	2658	2190	2513	280.2124	-17.77847211	0.635232	0.517465	-1.1527
	CPB1A	15130	15516	13157	14601	1265.346	-584.3149508	0.418067	0.723122	-1.14119
	CPB1B	2330	2222	1815	2122.333333	271.5812	0.531167005	0.764658	0.366987	-1.13164
	Y8	499	517	503	506.3333333	9.451631	76.26933292	-0.77588	1.128553	-0.35267

Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.19	Untreated	4618	3933	3606	4052.333333	516.4459	-	1.095307	-0.23107	-0.86424
	DSK1	25181	4158	25887	18408.66667	12346.49	-354.2732582	0.548523	-1.15423	0.605705
	DSK2	5366	5257	8119	6247.333333	1621.827	-54.16632393	-0.54342	-0.61063	1.154048
	DSK3	19692	14177	10068	14645.66667	4829.087	-261.4131776	1.044987	-0.09705	-0.94794
	DSK4	1445	1412	1442	1433	18.24829	64.63765732	0.657596	-1.15079	0.493197
	DSK5	24424	13383	4053	13953.33333	10197.47	-244.3283705	1.026791	-0.05593	-0.97086
	Y15	15968	2906	5164	8012.666667	6981.414	-97.72970305	1.139502	-0.73147	-0.40804
	Y8	1315	1309	1373	1332.333333	35.34591	67.12182282	-0.49039	-0.66014	1.150534
	Y16	1427	1392	1414	1411	17.69181	65.18055441	0.904373	-1.07394	0.16957
	CPB1A	882	993	949	941.3333333	55.89574	76.77058485	-1.0615	0.92434	0.13716
	CPB1B	3264	3620	3293	3392.333333	197.6976	16.28691289	-0.64914	1.151591	-0.50245
Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
11.23	Untreated	3594	3568	4845	4002.333333	729.8865	-	-0.55945	-0.59507	1.154517
	DSK1	5802	5115	4167	5028	820.9647	-25.62671775	0.942793	0.105973	-1.04877
	DSK2	5701	4031	5791	5174.333333	991.1778	-29.2829183	0.531354	-1.15351	0.622155
	DSK3	6921	5752	5614	6095.666667	718.0824	-52.30282335	1.149357	-0.47859	-0.67077
	DSK4	815	807	845	822.3333333	20.03331	79.45365204	-0.36606	-0.76539	1.131449
	DSK5	5490	5403	5618	5503.666667	108.1496	-37.51145165	-0.12637	-0.93081	1.057178
	CPB1A	3112	3569	3466	3382.333333	239.713	15.4909636	-1.12774	0.778709	0.349028
	CPB1B	9700	9183	8417	9100	645.5145	-127.367369	0.929491	0.12858	-1.05807
	Y8	481	461	469	470.3333333	10.06645	88.2485217	1.059626	-0.92717	-0.13245
	Y16	447	458	464	456.3333333	8.621678	88.59831765	-1.08254	0.193311	0.889231
Microorganism:		E. faecium								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	8263	8207	6874	7781.333333	786.2724	-	0.612595	0.541373	-1.15397
	Y19	13776	9635	6748	10053	3532.597	-29.19379712	1.053899	-0.11833	-0.93557
	Y14	8756	12861	14632	12083	3014.267	-55.28187114	-1.10375	0.258106	0.845645
	Y13	11194	6814	8343	8783.666667	2223.003	-12.88125428	1.084269	-0.88604	-0.19823
	Y8'	12409	11186	10486	11360.33333	973.2812	-45.99468814	1.077455	-0.17912	-0.89834
	Y8	354	368	368	363.3333333	8.082904	95.33070596	-1.1547	0.57735	0.57735
	Y3	14973	15444	14906	15107.66667	293.1933	-94.15267306	-0.45931	1.147138	-0.68783

Microorganism:		K. pneumoniae								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.27	Untreated	27038	27131	26576	26915	297.2423	-	0.413804	0.72668	-1.14048
	DSK1	24265	26535	25881	25560.33333	1168.48	5.033128986	-1.10856	0.834132	0.274431
	DSK2	26577	26484	26961	26674	252.8616	0.895411481	-0.38361	-0.7514	1.135008
	DSK3	26486	25653	27007	26382	682.9649	1.980308378	0.152277	-1.0674	0.915128
	DSK4	11270	8443	9570	9761	1423.145	63.73397734	1.060327	-0.92612	-0.13421
	DSK5	25515	24568	26371	25484.66667	901.8827	5.314260945	0.033633	-1.01639	0.982759
	CPB1A	26338	26720	24243	25767	1333.572	4.265279584	0.428174	0.714622	-1.1428
	CPB1B	27637	27275	27899	27603.66667	313.3326	-2.558672364	0.106383	-1.04894	0.942555
	Y8	26954	26018	26815	26595.66667	505.0785	1.186451173	0.709461	-1.14372	0.434256
	Y16	23662	21939	23230	22943.66667	896.4777	14.75509319	0.801284	-1.12068	0.319398
Microorganism:		**K. pneumoniae**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	15702	14506	16915	15707.66667	1204.51	-	-0.0047	-0.99764	1.002344
	Y19	14447	14294	14925	14555.33333	329.154	7.336120366	-0.32913	-0.79395	1.123081
	Y14	13960	14194	13390	13848	413.536	11.83922925	0.270835	0.836687	-1.10752
	Y13	15865	14084	13236	14395	1341.809	8.356853341	1.095536	-0.23178	-0.86376
	Y8'	16099	14808	13719	14875.33333	1191.428	5.298898627	1.027059	-0.05651	-0.97054
	Y8	16666	15126	14860	15550.66667	975.0207	0.999511916	1.143907	-0.43555	-0.70836
	Y3	13830	14050	12161	13347	1032.98	15.02875454	0.467579	0.680556	-1.14813

Microorganism:		P. aeruginosa								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.2	Untreated	12351	19164	18119	16544.66667	3669.215	-	-1.14293	0.713868	0.429065
	DSK1	17386	13471	8396	13084.33333	4507.456	20.91509852	0.954345	0.085784	-1.04013
	DSK2	16563	11059	6145	11255.66667	5211.784	31.9680058	1.018333	-0.03774	-0.9806
	DSK3	16120	8243	10713	11692	4028.723	29.33070073	1.099107	-0.8561	-0.24301
	DSK4	1795	1965	1733	1831	120.1166	88.93298948	-0.29971	1.115583	-0.81587
	DSK5	8671	6945	5580	7065.333333	1549.009	57.29540235	1.036576	-0.07768	-0.95889
	CPB1A	6243	5632	5062	5645.666667	590.6186	65.87621389	1.011369	-0.02314	-0.98823
	CPB1B	8050	7648	5796	7164.666667	1202.222	56.69500745	0.736414	0.402033	-1.13845
	Y8	2732	2799	1674	2401.666667	631.0676	85.48374098	0.523452	0.629621	-1.15307
	Y15	5468	5694	4990	5384	359.4385	67.45779103	0.233698	0.862456	-1.09615
Microorganism:		**P. aeruginosa**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.6	Untreated	23806	24303	24130	24079.66667	252.2941	-	-1.08471	0.88521	0.199503
	Y19	9340	8437	12779	10185.33333	2291.109	57.70151857	-0.36896	-0.76309	1.132057
	Y14	17925	15123	20166	17738	2526.695	26.33618959	0.07401	-1.03495	0.960939
	Y13	16511	14845	15959	15771.66667	848.6515	34.50213873	0.871186	-1.09193	0.220742
	Y8'	13930	12746	12591	13089	732.4391	45.64293526	1.148218	-0.4683	-0.67992
	Y8	10978	11284	10692	10984.66667	296.0563	54.38198203	-0.02252	1.011069	-0.98855
	Y3	6237	5944	3181	5120.666667	1686.177	78.73447861	0.66205	0.488284	-1.15033

Microorganism:		S. aureus								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.19	Untreated	25230	25287	26085	25534	478.0303	-	-0.63594	-0.5167	1.152647
	DSK1	24477	25786	26234	25499	912.9836	0.137072139	-1.11941	0.314354	0.805053
	DSK2	25900	26013	26489	26134	312.5876	-2.349808099	-0.74859	-0.38709	1.135682
	DSK3	26514	24838	25897	25749.66667	847.6581	-0.844625467	0.9017	-1.07551	0.173812
	DSK4	1264	1237	1227	1242.666667	19.13984	95.13328634	1.114604	-0.29607	-0.81854
	DSK5	24020	23466	24032	23839.33333	323.3718	6.636902431	0.558696	-1.1545	0.595805
	Y15	1433	1394	1392	1406.333333	23.11565	94.49231091	1.15362	-0.53355	-0.62007
	Y8	1367	1354	1362	1361	6.557439	94.66985196	0.914991	-1.06749	0.152499
	Y16	1417	1402	1416	1411.666667	8.386497	94.47142372	0.635943	-1.15265	0.516704
	CPB1A	27992	27771	28917	28226.66667	607.9723	-10.54541657	-0.38598	-0.74949	1.135468
	CPB1B	27516	25145	27873	26844.66667	1482.738	-5.133025247	0.452766	-1.1463	0.693537
Microorganism:		S. aureus								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.7	Untreated	9167	9478	11422	10022.33333	1222.08	-	-0.6999	-0.44542	1.145315
	Y19	6621	6313	5930	6288	346.1777	37.26011907	0.961934	0.072217	-1.03415
	Y14	17413	4601	4854	8956	7325.069	10.63957162	1.154528	-0.59453	-0.55999
	Y13	16135	16758	15845	16246	466.5115	-62.09798118	-0.23794	1.097508	-0.85957
	Y8'	811	967	1245	1007.666667	219.8393	89.94578774	-0.89459	-0.18498	1.079576
	Y8	371	410	367	382.6666667	23.7557	96.18186051	-0.49111	1.150601	-0.65949
	Y3	6241	8435	6504	7060	1198.024	29.55732198	-0.68363	1.147723	-0.4641

Microorganism:		S. enterica								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
9.19	Untreated	14729	15991	20266	16995.33333	2901.914	-	-0.78098	-0.34609	1.127072
	DSK1	23503	14390	19569	19154	4570.652	-12.70152591	0.951505	-1.0423	0.090797
	DSK2	19288	14056	14701	16015	2852.789	5.768250108	1.147298	-0.6867	-0.4606
	DSK3	20244	15142	14880	16755.33333	3024.113	1.412152356	1.153617	-0.53349	-0.62013
	DSK4	11672	10461	6833	9655.333333	2518.095	43.18832621	0.80087	0.319951	-1.12082
	DSK5	16324	12995	14932	14750.33333	1671.919	13.20950849	0.941234	-1.04989	0.108658
	CPB1A	23349	24444	27554	25115.66667	2181.481	-47.77978269	-0.80985	-0.30789	1.117742
	CPB1B	16834	19100	24827	20253.66667	4119.493	-19.17192955	-0.83012	-0.28005	1.110169
	Y8	8743	10862	12513	10706	1889.835	37.00623701	-1.03871	0.082547	0.956168
	Y16	22867	21623	22416	22302	629.7865	-31.22425764	0.897129	-1.07814	0.181014
	Y15	11057	12203	10065	11108.33333	1069.924	34.63892049	-0.04798	1.023126	-0.97515
Microorganism:		**S. enterica**								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
12.6	Untreated	23607	23210	23775	23530.66667	290.1316	-	0.263099	-1.10525	0.842147
	Y19	22603	22556	22706	22621.66667	76.72244	3.863043971	-0.2433	-0.8559	1.0992
	Y14	22223	18561	18209	19664.33333	2222.849	16.43104034	1.151075	-0.49636	-0.65472
	Y13	21578	17936	19794	19769.33333	1821.125	15.98481414	0.993159	-1.0067	0.013545
	Y8'	21943	16852	17558	18784.33333	2758.168	20.17084089	1.145205	-0.70059	-0.44462
	Y8	23216	18146	18723	20028.33333	2775.634	14.88412285	1.148446	-0.67816	-0.47028
	Y3	21381	16859	16882	18374	2604.164	21.91466455	1.154689	-0.58176	-0.57293

Microorganism:		S. pyogenes								
Plate ID	**Extract ID**	**RFU 1**	**RFU 2**	**RFU 3**	**Sample Mean**	**stdev**	**% inhibition**	**ZRFU 1**	**ZRFU 2**	**ZRFU 3**
10.2	Untreated	3064	2752	3325	3047	286.878	-	0.059259	-1.02831	0.969053
	DSK1	1005	1249	1151	1135	122.7844	62.75024614	-1.05877	0.928457	0.13031
	DSK2	2939	4668	3295	3634	912.9901	-19.26485067	-0.76123	1.132542	-0.37131
	DSK3	9328	10314	9779	9807	493.596	-221.8575648	-0.97043	1.027156	-0.05673
	DSK4	554	543	607	568	34.21988	81.35871349	-0.40912	-0.73057	1.139688
	DSK5	8663	10457	8635	9251.666667	1043.943	-203.6319877	-0.56389	1.154597	-0.59071
	CPB1A	515	527	530	524	7.937254	82.80275681	-1.13389	0.377964	0.755929
	CPB1B	629	24839	613	8693.666667	13982.27	-185.3188929	-0.57678	1.1547	-0.57792
	Y8	483	475	471	476.3333333	6.110101	84.36713707	1.091089	-0.21822	-0.87287
	Y15	503	504	454	487	28.58321	84.01706597	0.559769	0.594755	-1.15452