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Editorial

T*he Quest* has always striven to report on the most exciting discoveries and trends across the life science spectrum, with the goal of offering researchers in academia an engaging glimpse of what's happening both in and outside their own disciplines. It's clear that crosstalk among scientists in different fields will be an important factor in driving new innovations, and we aim to further that dialogue by offering highly readable articles about new directions and discoveries in the life sciences.

Crosstalk among people in different fields will be an important factor in driving new innovations.

To capture all these affairs aimed at enhancing the reading experience, while remaining true to our mission, this issue offers fortuitous examples of various outbreaks and researches all around the world.

The epidemic of Ebola claimed more than 2000 people around the Africa, widened its periphery and started reaching to neighboring continents. Describing to the symptoms of Ebola include vomiting, fever, diarrhea and often bleeding. The World Health Organization (WHO) met to decide whether or not to recommend a Public Health Emergency of International Concern (PHEIC). If it were deemed so, it would mean there's a possibility it would spread internationally and possibly require a "coordinated international response."

Currently, an experimental drug called ZMapp is being used to treat two U.S. citizens who were infected with Ebola while in Liberia. Before now, the drug had only been used on primates. The patients appear to be improving, but it's still unknown if they will fully recover.

The current Ebola outbreak, which is centered in West Africa, has led to 1,711 suspected and confirmed cases and 932 deaths, according to the WHO.

We invite you to read this month's articles and contribute to these discussions. Also, check us out on Facebook and leave us your opinions.

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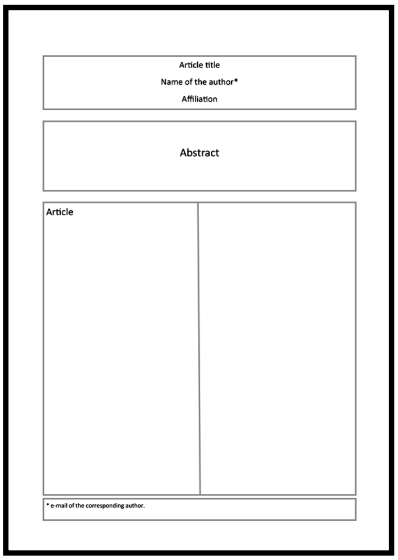
Manuscripts submitted to Quest should adhere to below mentioned criteria.
Research News: About 400 words (1 page)
Research Article: About 2000 words (4 pages)

Common for all: -
Font: Calibri
Font Size: 14
Columns: 2
Line Spacing: 1
Margin: Narrow
References: 1) In text citing, S No, Superscript.
2) Author's name (s), *Journal name*, **Volume No**, Page No**,** (year).



Ebola virus treatment development at The Scripps Research Institute.

Ebola hemorrhagic fever (alternatively Ebola Haemorrhagic Fever, EHF, or just Ebola) is a very rare, but severe, mostly fatal infectious disease occurring in humans and other primates, caused by the Ebola virus, which is possibly carried by fruit bats.

Symptoms typically start two days to three weeks after contracting the virus, with a fever, sore throat, muscle pains, and headaches. Typically nausea, vomiting, and diarrhea follow, along with decreased functioning of the liver and kidneys. At this point, some people begin to have bleeding problems.

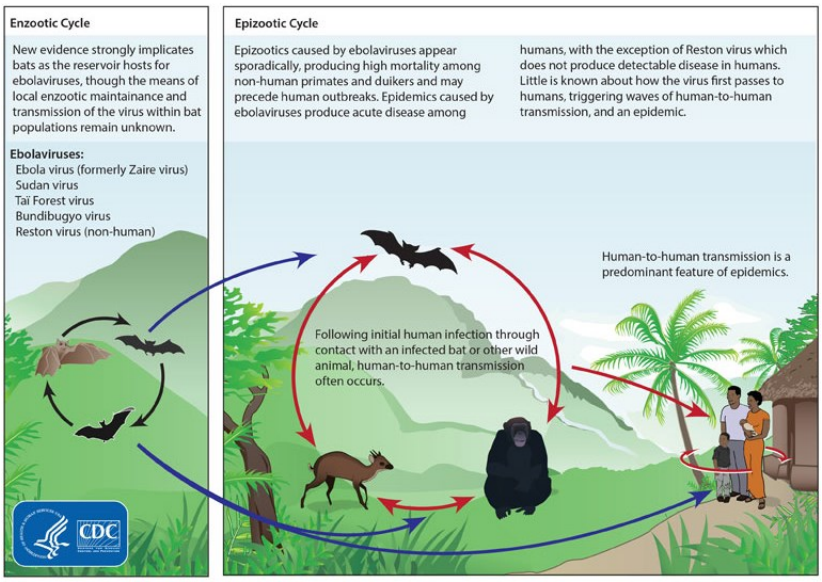


Figure: Life Cycle of ebola virus. From Wikipedia

There is no specific treatment for the disease; efforts to help persons who are infected include giving either oral rehydration therapy (slightly sweet and salty water to drink) or intravenous fluids. The disease has high mortality rate: often killing between 50% and 90% of those infected with the virus. EVD was first identified in Sudan and the Democratic Republic of the Congo. The disease typically occurs in outbreaks in tropical regions of Sub-Saharan Africa. From 1976 (when it was first identified) through 2013, fewer than 1,000 people per year have been infected. The largest outbreak to date is the ongoing 2014 West Africa Ebola outbreak, which is affecting Guinea, Sierra Leone, Liberia and likely Nigeria. **As of July 2014 more than 1320 cases have been identified.** Efforts are ongoing to develop a vaccine; however, none yet exists.

Laboratories at The Scripps Research Institute (TSRI) are investigating antibodies to fight Ebola virus, including the three antibodies recently used to treat two American health care workers infected with the Ebola virus.

The conditions of two Americans have reportedly improved since they received a highly experimental antibody cocktail called ZMapp, supplied by San Diego-based Mapp Biopharmaceutical.

The TSRI laboratories of Professor Erica Ollmann Saphire and Assistant Professor Andrew Ward are studying the structures of these antibodies using techniques called electron microscopy, which creates high-resolution images by hitting samples with electrons, and X-ray crystallography, which determines the atomic structure of crystalline arrays of proteins. Through these images, the team will discover exactly how the immune system molecules bind to the Ebola virus and stop it from functioning, a critical step in drug development. Ebola virus causes an extremely virulent disease that currently leads to death in 25 to 90 percent of cases. The fast-moving virus is spread via the blood or other bodily fluids of an infected person. These are the chinks in the armor of the virus and the places

were you would want your anti-serum to target.

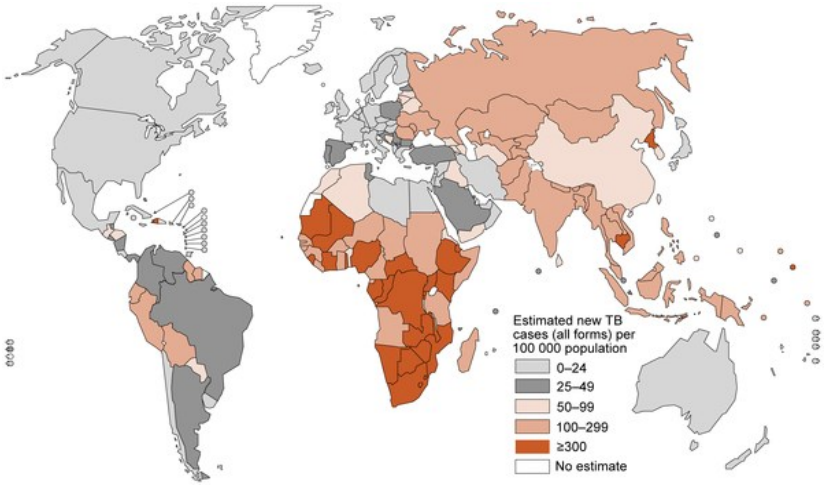
The ZMapp treatment is still in experimental stages and has not yet been approved for use outside the two recent cases. According to Saphire, ZMapp is one of the best antibody cocktails currently known, but there may still be ways to improve it. She is currently leading a $28 million National Institutes of Health-funded consortium to test antibody cocktails from laboratories around the world, with the goal of finding the best for neutralizing Ebola virus and the many other viruses like it. An ideal antibody cocktail would ease symptoms and improve the prognosis of infected individuals -- it could even work as a preventative measure, protecting healthcare workers before they enter an infected area.

The work on the Ebola virus is part of a larger Vaccine and Global Health Initiative at TSRI, which includes research on HIV/AIDS, influenza and tuberculosis.

Contributed By Avni Soni & Disha Patel M.Sc. PCH

The Past and Future of Tuberculosis Research

Tuberculosis (TB) is an oldest public health problem. Approximate 10 million new cases per year, and a pool of two billion latently infected individuals, control efforts are struggling in many parts of the world (Figure 1). The renewed interest in research and improved funding for TB give reasons for optimism. Recently, the Stop TB Partnership, a network of concerned governments, organizations, and donors lead by the WHO (http://www.stoptb.org/stop_tb_initiative/), outlined a global plan to halve TB prevalence and mortality by 2015 and eliminate the disease as a public health problem by 2050. As existing diagnostics, drugs, and vaccines will be insufficient to achieve these objectives, a substantial effort in both basic science and epidemiology will be necessary to develop better tools and strategies to control TB.



The global incidence of TB.

TB is caused by several species of gram-positive bacteria known as tubercle bacilli or Mycobacterium tuberculosis complex (MTBC). MTBC includes obligate human pathogens such as Mycobacterium tuberculosis and Mycobacterium africanum, as well as organisms adapted to various other species of mammal.

When TB started to reemerge in the early 1990s, fuelled by the growing pandemic of HIV/AIDS, scientists and public health officials were caught off-guard; billions of dollars of emergency funds were necessary to control TB outbreaks. TB was mainly a consequence of reactivation of latent infections rather than ongoing disease transmission, and that mixed infections

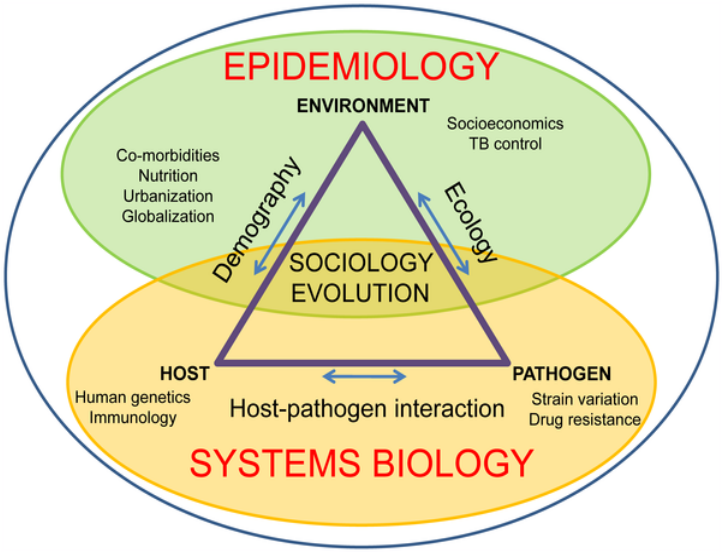
and exogenous re infections with different strains were very unlikely. The development of molecular techniques to differentiate between strains of MTBC made it possible to re-address some of these points. One of these methods, a DNA fingerprinting protocol based on the Mycobacterium insertion sequence IS6110, quickly evolved into the first international gold standard for genotyping of MTBC.

History of the Pathogen

DNA sequence based methods can provide important clues about the evolutionary forces shaping bacterial populations. Multilocus sequence typing (MLST), in which fragments of seven structural genes are sequenced for each strain has been used very successfully to define the genetic population structure of many bacterial species Because of the low degree of sequence polymorphisms in MTBC, however, standard MLST is uninformative. A recent study of MTBC extended the traditional MLST scheme by sequencing 89 complete genes in 108 strains, covering 1.5% of the genome of each strain. The new sequence-based data also revealed that the MTBC strains that are adapted to various animal species represent just a subset of the global genetic diversity of MTBC that affects different human populations. The availability of comprehensive DNA sequence data has also allowed researchers to address questions about the molecular evolution of MTBC. Although these kinds of fundamental evolutionary questions are often underappreciated by clinicians and biomedical researchers, studying the evolution of a pathogen ultimately allows for better epidemiological predictions by contributing to our understanding of basic biology, particularly with respect to antibiotic resistance.

A Vision for the Future

Recent increases in research funding for TB, substantial progress has been made understanding of the basic biology and epidemiology of the disease. Unfortunately, this increased knowledge has not yet had any noticeable impact on the current global trends of TB (Figure 1). While TB incidence appears to have stabilized in many countries, the total number of cases is still increasing as a function of global human population growth. Of particular concern are the ongoing epidemics of multidrug-resistant TB, as well as the synergies between TB and the ongoing epidemics of HIV/AIDS and other comorbidities such as diabetes.



System epidemiology approach to TB research.

TB epidemiology needs to evolve into a more predictive, interdisciplinary endeavour; a discipline we might refer to as ''systems epidemiology'' (Figure 2). Novel biological processes are being discovered through these systems approaches, which might not have been possible using more traditional methods.

Whole-genome sequencing could potentially become the new gold standard for strain typing in routine molecular epidemiology. For host genetics and TB susceptibility, too, de novo DNA sequencing based approaches could have advantages over traditional SNP typing. For example, many of the human populations carrying the largest proportion of the global TB burden have not been sufficiently characterized genetically (Figure 1), and screening for currently limited human SNP collections might have little relevance for these populations.

Challenges for the Future Advances in TB research are hampered by the fact that MTBC is a Biosafety Level 3 pathogen with a long generation time, making it slow and complex to culture. Moreover, TB is a chronic disease that can develop over many years, and is characterized by extended periods of latency during which MTBC cannot be isolated from infected individuals. All of these factors complicate and prolong the development of new interventions and their assessment in clinical trials. The field has been marked by a number of dogmas that, in some cases, might have contributed to the slow progress in TB research. New insights are now questioning some of these views, but at the same time, new opinions could well evolve into new dogmas. One of the problems has been that the macrophage and mouse infection models used in these studies relied on poorly characterized strains, and finding relevant links to human disease has been all but impossible.

Contributed By Krishna Saraiya, IGBT SemI

Effect of types of sound (music and noise) and varying frequency on growth of guar or cluster bean (cyamopsis tetragonoloba) seed germination and growth of plants.

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ABSTRACT

This project is an attempt to show how the rate of growth plant species was affected by sounds of varying frequencies and types of different sound (music). The common guar or cluster bean. Cyamopsis Tetragonoloba plants was selected because of their relatively seasonal and fast growing rates. In 13 plant sets; One of plant was used as a control for the untreated, and the other 12 plants were subjected to sounds of different frequencies and types of sound .(music) 4 sets of silent classical music second 4sets of rhythmic rock music and third 4sets of non-rhythmic traffic noise are being played by normal speakers daily 1hour at roughly the same sound intensity by varying frequencies lower frequency (50-100) and higher frequency (1500-2000) With in 4sets 2 were kept near (25cm)according to lower(50-100) and higher (1500-2000) frequencies and 2 were kept far(550cm) according to lower(50-100) and higher(1500-2000) frequencies. The parameters such as number of seeds germinated in petri-dish plates every day, difference in height of plants and number of leaves are all monitored in every two days for regular basis till 13days because after 13days there is not significant change is seen in plants. The results show that the plants are able to distinguish between silent classical music, rhythmic rock music and non-rhythmic traffic noise and by varying frequencies; and also definitely showing positive effect on exposure to silent classical music and rhythmic rock music and in some case mixed and some case negative effect of non-rhythmic traffic noise compare to control or untreated plants.

INTRODUCTION

Musical sound has a significant effect on the number of seeds sprouted compared to noise and untreated control and sound vibrations directly affect living biologic systems [1]. Sound is known to affect the growth of plants. Seeds are sometimes treated with ultrasound to help start the germination process [2,3]. Neurophysiologic studies have indicated that human physiologic processes are affected by music, but they have concentrated on how our brains process music and where the neural interactions are focused rather than on systemic physiologic effects [4]. Sound vibration can stimulate a seed or plant [5]. Studies in the audible frequency range have examined effects on seed germination [6,7]. They have focused on single frequencies in an attempt to map responses as a function of frequency [8-12]. However, these studies did not look at dynamically organized sound with the complexities of musical sound[13].The author, A.E. Lord, performed random noise experiments on coleus plants in which one group was subjected to random noise and a second group was used as a control. Lord came to the conclusion that botanists had not carried out sufficient experiments to show causes behind the effects that he observed, and he put forward the idea that the rate of water transpired out of the leaves is affected by the

sound. Transpiration, in turn, affects growth. Typical leaf structures and the topic of transpiration can be found in textbooks on botany [14]. Foliage planted along freeways to reduce noise pollution often grows differently than foliage planter in a quiet environment [15]. Sound waves have been used for different types of experiments not only on bacteria but also certain parts of plants that react to the sound waves and optimization of chrysanthemum callus growth can be altered with different sound wave frequencies, strength and loading time[16].The radio sensitivities of different plants has shown considerable variations[17]. Sound wave can accelerate growth of plants and the stimulation of sound wave has an obvious effect on the growth and development of plants [18]. Certain reports indicate that plants enjoy music, and they respond to the different types of music and their wave-length [19]. Optimum plant growth occurs when the plant is exposed to pure tones in which the wavelength coincides with the average of major leaf dimensions [20]. Playing appropriate tunes have been found to stimulate the plant's synthesis of its appropriate protein [21]. The rate of water transpired out of leaves is also reportedly affected by sound waves and this in turn affects the growth [22]. High frequency, sound tones is known increase the rate of sprouting of alyssum seeds while random noise seems to have the opposite effect [23]. The mechanism is not understood, though it has been noted that the exposure of seedlings and mature plants to green music (classical music and natural sounds such as those of birds, insects, water, etc.) elevates the level of polyamines and increases the uptake of oxygen in comparison with the controls [24]. Music or sound can also have detrimental effects on plant growth. Some reports indicate that music contain in hard-core vibrations could be devastating to plants [25]. Certain types of music have positive effect on plants and even played at a low frequency volume to significantly increase plant growth [26].

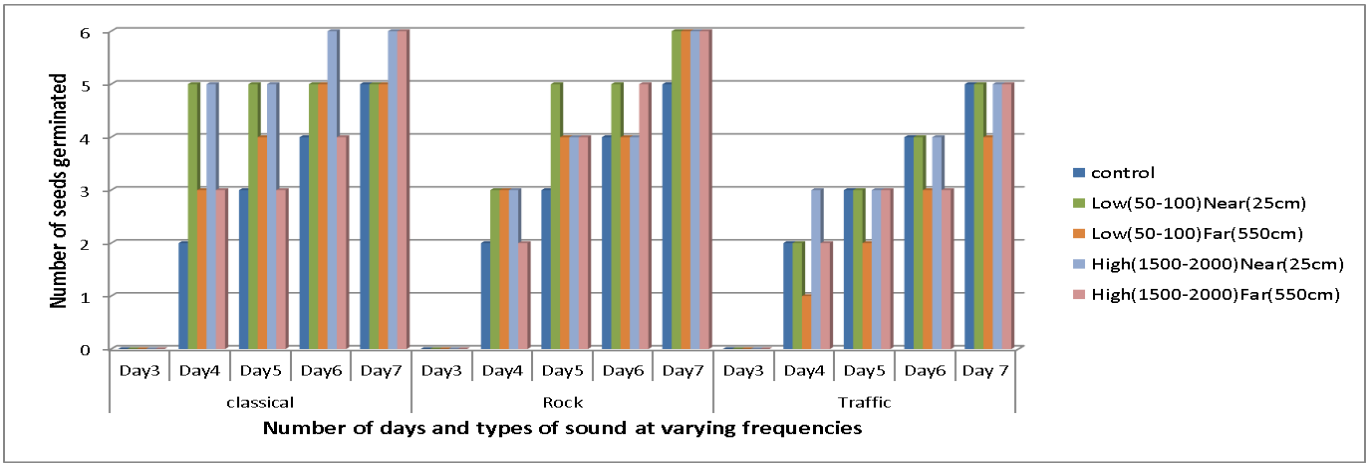

Fig1:- difference in number of seeds germination

MATERIALS AND METHODS

Seeds of guar or cluster bean. (cyamopsis tetragonoloba) plants were collected from Anand Agriculture University(AAU), in Anand; and potted at equal depth of 3/4th inch inside the soil. And this project is held in ARIBAS

New Vallabh Vidhyanagar in physics laboratory. The pots were divided into different sets and labelled as control, classical music, and rock music and traffic noise. Each set was kept in the same environmental conditions and were receiving the same external sound. The

RESULTS AND DISCUSSION

Seed germination recorded everyday till germinated all seeds in petridishplates. The difference in germination of seeds were maximum for the plants exposed to at near (25cm) at

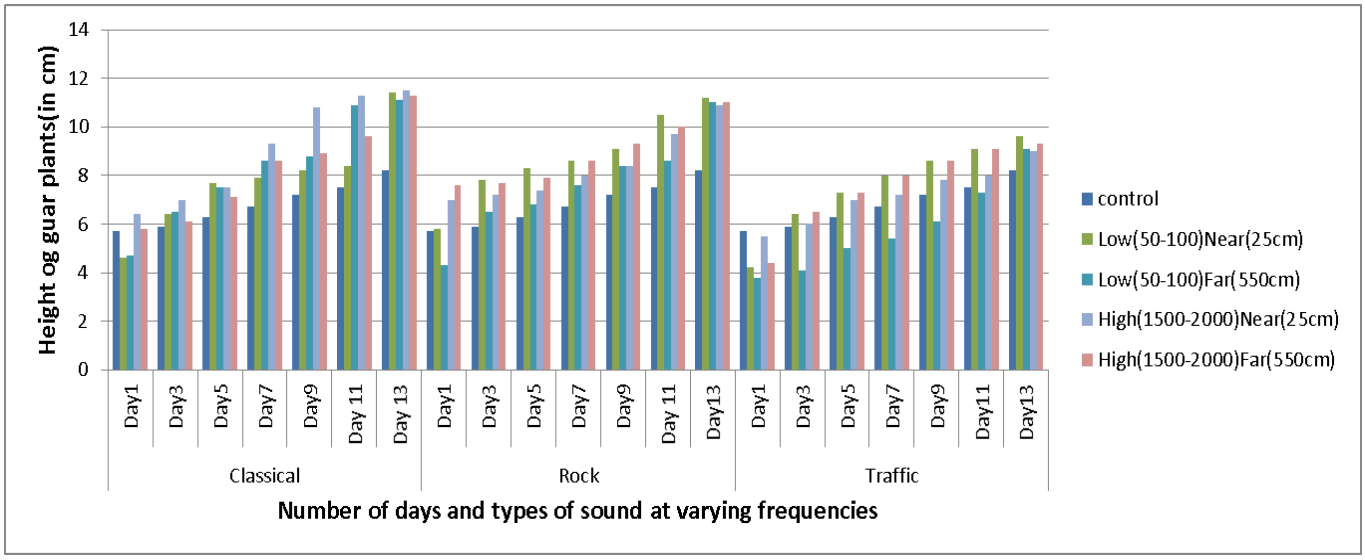

Fig2:- difference in guar plant height.

sound exposure was given for one hours both low frequency (50-100) and high frequency (1500-2000) as soon the seeds germinated in petri-dish plates and pot experiment. The petri-dish plates and pots were kept at a distance of (25cms) near and (550cms)far from the speakers and silent classical music second 4sets of rhythmic rock music and third 4sets of non-rhythmic traffic noise were played to the set labelled music using normal laptop with speakers. The control was given no external sound exposure. The volume of the selected sound pieces and the piece of music played was constant throughout the exposure period (13 days). The height of the plants was recorded every 2 days using a measuring scale which went along with the stem of the plant. Numbers of leaves were counted every 2 days.

low(50-100) and high(1500-2000) frequency in silent classical music in 4th day and also maximum for the plants exposed to at near (25cm) and far(550cm) at high(1500-2000) frequency in silent classical music in 7th day, followed by the plants exposed to rhythmic rock music maximum germination rate observed in near(25cm) ;far(550cm) at low(50-100) frequency; and near(25cm) at high(1500-2000) frequency in 4th day and also maximum for the plants exposed to both near (25cm) and far(550cm) at low(50-100) and high (1500-2000) frequency in rhythmic rock music in 7th day and when non rhythmic traffic noise exposed to plants seed germination rate would be maximum in near(25cm) at high (1500-2000) frequency and same for the plants exposed to at near (25cm) and far (550cm) low (50-100) and high(1500-2000)

frequency in traffic noise in 7th day (Fig1). The control set showed the minimum difference compare to other frequencies and types of sound. That means that musical sound with high(1500-2000) frequency has definitely helped in better growth of the plant and same effect in traffic noise in case of seed germination in petridishplates. Therefore, the plants with no external sound or untreated control being played showed slower growth.

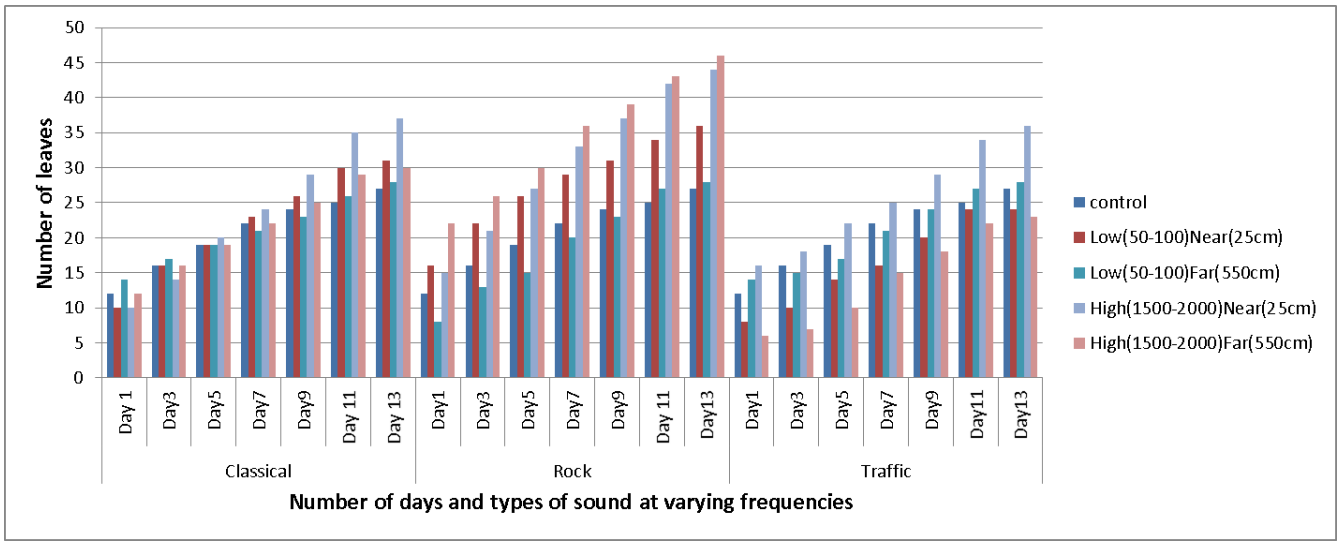

Fig3:- difference in number leaves.

Height recorded every two days for regular basis till 13days in pots of guar plants. The difference in height of guar plants were maximum according to near(25cm) at high(1500-2000); near(25cm) at low (50-100); far (550cm)at high(1500-2000)and then near (25cm) at low(50-100) frequency in silent classical music compare to control in 13days and, followed by the plants exposed to rhythmic rock music maximum growth rate observed according in near(25cm) at low(50-100); far (550cm) at high(1500-2000); near(25cm) at high(1500-2000) and far(550cm) low(50-100) frequency in rhythmic rock music compare to control in 13days and when non rhythmic traffic noise exposed to plants growth rate would be maximum in near(25cm)at low(50-100) ;far(550cm)at high(1500-2000) ; near (25cm) at high frequency(1500-2000) then control and minimum for the plants exposed to far(550cm) low(50-100) frequency in traffic noise in 13days (Fig2). The control set showed the minimum difference compare to other frequencies and types of sound. That means that musical sound has definitely helped in better growth of the plant and mixed effect in traffic noise in case of height of guar plants. Therefore, the plants with no external sound or untreated control being played showed slower growth.

Number of leaves of guar plant recorded for a period of 13 days. The difference in leaves were maximum according to at near (25cm) at high(1500-2000); near(25cm) at low(50-100); far(550cm)at high(1500-2000) and then far(550cm) at low(50-100) frequency in silent classical music compare to control in 13days and, followed by the plants exposed to rhythmic rock music maximum growth rate observed according in far(550cm) at high(1500-

2000); near(25cm) at high(1500-2000); near (25cm) at low(50-100) and far(550cm) at low (50-100) frequency in rhythmic rock music compare to control in 13days and when non rhythmic traffic noise exposed to plants growth rate would be maximum in near (25cm)at high(1500-2000); far(550cm)at low (50-100); then control and minimum for the plants exposed to according near(25cm) at low (50-100); and far(550cm) at high(1500-2000) frequency in traffic noise in 13days (Fig3). The control set showed the minimum difference compare to other frequencies and types of sound. That means that musical sound has definitely helped in better growth of the plant and some negative effect in traffic noise in case of number of leaves. Therefore, the plants with no external sound or untreated control being played showed slower growth.

CONCLUSION

The plots for difference in number of seeds germination; difference in height and difference in number of leaves clearly show that there is positive effect of silent classical musical sound compare to rhythmic rock musical sound on the growth of the plants. Both silent classical music and rhythmic rock music have given better results than the control. And same; mixed and negative effect in traffic noise. another higher(1500-2000) frequency have given better results than lower(50-100) frequency and also near(25cm) plants show positive effect compare to far (550cm) plants on the growth of the plants. So my preliminary studies clearly indicates that the plant is able to differentiate between “some sound” and “no sound”; “music “ and “ noise “and also between low(50-100) frequency and high (1500-2000) frequency; near(25cm) and far (550cm) in particular. For plants, both silent classical music and rhythmic rock music are proving to be beneficial. silent classical musical sound is showing better results at some places but the results are very close. and in case of traffic noise plants feel stressed condition. Hence it can be concluded that the mechanical perturbation produced by sound in the physical environment of the plant, is what matters more than the type of sound and varying frequencies which the plant encounters be it silent classical music ; rhythmic rock music and non rhythmic traffic noise by applying varying frequencies.

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SOLID LIPID NANOPARTICLES

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ABSTRACT

Solid lipid nanoparticles (SLN) are the rapidly developing field of nanotechnology with several potential applications. Due to their unique size dependent properties, lipid nanoparticles offer possibility to develop new therapeutics. This review presents a broad conduct of solid lipid nanoparticles includes production procedures and appropriate analytical techniques for the characterization of SLN.

Key words: Colloidal drug carriers, Homogenization, Bioavailability.

INTRODUCTION

Solid lipid nanoparticles (SLN) introduced in 1991 represent an alternative carrier system to tradition colloidal carriers such as emulsions, liposomes and polymeric micro - and nanoparticles[1]. As an alternative particulate carrier system, nanoparticles made from solid lipids are attributing novel colloidal drug carrier for intravenous applications. SLN's are submicron colloidal carriers ranging from 50 to 1000 nm, which are composed of lipid that is dispersed in water. SLN being smaller in size shows unique properties like large surface area, high drug loading and the interaction of phases at the interface. SLN's have potential to improve performance of pharmaceuticals[1,2].

In order to overcome the disadvantages associated with the liquid state of the oil droplets, the liquid lipid was replaced by a solid lipid, which finally transformed into solid lipid nanoparticles. The SLN's offers enhanced oral bioavailability and reduce plasma profile variability.

Solid lipid nanoparticles are one of the novel potential colloidal carrier systems as alternative materials to polymers which is identical to oil in water emulsion for parenteral nutrition. They have many advantages such as good biocompatibility, low toxicity and lipophilic drugs are better delivered by solid lipid nanoparticles and the system is physically stable[3,4].

Solid lipid nanoparticles (SLNs) are considered to be the most effective lipid based colloidal carriers. This is one of the most popular approaches to improve the oral bioavailability of the poorly water soluble drugs. SLNs are in the submicron size range of 50-1000 nm and are composed of physiologically tolerated lipid components which are in solid state at room temperature[5].

SLNs combine all the advantages of polymeric nanoparticles, fat emulsions and liposomes.

SLN's are Advantages to Control and / or target drug release[1-4]. It has excellent biocompatibility[5] and improve stability of pharmaceuticals[4]. With High and enhanced drug content. This can be easily scale up and sterilized. It is much easier to manufacture than biopolymeric nanoparticles. It does not require special solvent conventional emulsion manufacturing methods are applicable.

Scope of solid lipid nanoparticles[6,9] has possibility of controlled drug release[7]. It has increased drug stability with high drug pay load[5]. It can incorporate lipophilic and hydrophilic drugs.

Preparation of solid lipid nanoparticles[1- 4,6,8]

SLNs are prepared from lipid, emulsifier and water/solvent by using different methods that

are discussed below:

High pressure homogenization (HPH)

High pressure homogenizers push a liquid with high pressure (100-2000 bar) through a narrow gap (in the range of a few microns). The fluid put on a spurt from a very short distance at very high velocity (over 1000 Km/h).

Hot homogenization: Like homogenization of emulsion SLN can be prepared by homogenizing at temperatures above the lipid melting point.

Cold homogenization

The aspect of development of Cold homogenization was to overcome the problems associated with hot homogenization such as: Temperature-induced drug degradation, drug distribution into the aqueous phase during homogenization.

Ultrasonication/high speed homogenization

SLNs are also prepared by ultrasonication or high speed homogenization techniques. For smaller particle size; combination of both ultrasonication and high speed homogenization is required.

Solvent evaporation

In this method, lipophilic material is dissolved in an organic solvent further it is emulsified in an aqueous phase. By evaporating the solvent, nanoparticles get dispersed and dispersion is formed by precipitating the lipid in aqueous medium mean size ranging between 25 nm[10].

Supercritical fluid method

This is an alternative method of preparing SLNs by particles from gas saturated solutions (PGSS). In this method, the use of solvents can be avoided and mild pressure, temperature conditions are required.

Microemulsion based method

This method is based on the dilution of micro-emulsions. As micro-emulsions are two-phase systems composed of an inner and outer phase (e.g. o/w microemulsions). They are made by stirring an optically transparent mixture at 65-70°C, which typically composed of a low melting fatty acid (e.g. stearic acid), an emulsifier (e.g. polysorbate 20), co-emulsifiers (e.g. butanol) and water.

Spray drying method[11]

It is an alternative technique to the lyophilization process. This recommends the use of lipid with melting point more than 70^{o}C. The best results were obtained with SLN concentration of 1% in a solution of trehalose in water or 20% trehalose in ethanol-water mixture.

Double emulsion method

Here the drug is encapsulated with a stabilizer to prevent the partitioning of drug in to external water phase during solvent evaporation in the external water phase of w/o/w double emulsion.

Precipitation method

The glycerides are dissolved in an organic solvent (e.g. chloroform) and the solution will be emulsified in an aqueous phase. After evaporation of the organic solvent the lipid will be precipitated forming nanoparticles.

Film-ultrasound dispersion

The lipid and the drug were put into suitable organic solutions, after decompression, rotation and evaporation of the organic solutions, a lipid film is formed, then the aqueous solution which includes the emulsions was added. Using the ultrasound with the probe to diffuser at last, the SLN with the little and uniform particle size is formed.

Lyophilization[14]**:** this method increases the chemical and physical stability for long lasting stability. Lyophilization had been required to achieve long term stability for a product containing hydrolysable drugs or a suitable product for per-oral administration.

Spray drying

Spray drying is an alternative procedure to lyophilization in order to transform an aqueous SLN dispersion into a dry product. This method has been used less for SLN formulation, albeit spray drying is cheaper than lyophilization. Though spray drying can be done for the lipids with melting points greater than temperature >70°C.

Characterization of SLN

An adequate characterization of the SLN's is necessary for the control of the quality of the product.

Several parameters have to be considered which can affect the stability and release kinetics:

- Particle size and zeta potential.
- Degree of crystallinity and lipid modification.
- Co – existence of additional structures and dynamic phenomena.

Applications of SLN[4,16,17,18]

There are several potential applications of SLNs some of which are given below:

SLN as a carrier for vaccines

Being in the solid state, the lipid components of SLNs will be degraded more slowly providing a longer lasting exposure to the immune system.

Solid lipid nanoparticles in cancer chemotherapy[12,15,20]

Improved stability of drugs, encapsulation of chemotherapeutic agents of diversified physicochemical properties, enhanced drug efficacy, improved pharmacokinetics and less ***in-vitro*** toxicity are the important features of SLN which make them a suitable carrier for delivering chemotherapeutic drugs.

Solid lipid nanoparticles for delivering peptides and proteins[13]

Lipid microparticles (LM) and lipospheres have been sought as alternative carriers for therapeutic peptides, proteins and antigens. Proteins and antigens intended for therapeutic purposes may be incorporated or adsorbed onto SLN, and further administered by parenteral routes or by alternative routes such as oral, nasal and pulmonary.

Solid lipid nanoparticles for targeted brain drug delivery[4]

SLNs can improve the ability of the drug to penetrate through the blood-brain barrier and is a promising drug targeting system for the treatment of central nervous system disorders. The potential advantages of the use of solid lipid nanoparticles over polymeric nanoparticles are accounted on the bases of a lower cytotoxicity, higher drug loading capacity, and best production scalability.

SLN applied to the treatment of malaria[19]

Nanosized carriers have been receiving special attention with the aim of minimizing the side effects of drug therapy, such as poor bioavailability and the selectivity of drugs. Several nanosized delivery systems have already proved their effectiveness in animal models for the treatment and prophylaxis of malaria.

Targeted delivery of solid lipid nanoparticles for the treatment of lung diseases[4]

Nanoparticles with their special characteristics such as small particle size, large surface area and the capability of changing their surface properties have numerous advantages compared with other delivery systems.

SLN for potential agriculture applications[9]

Essential oil extracted from ***Artemesia arboreseens L*** when incorporated into SLN, were able to reduce the rapid evaporation compared with emulsions and the systems have been used in agriculture as suitable carrier of safe pesticides.

CONCLUSION

Solid lipid nanoparticles do not, as proposed, 'combine the advantages of other colloidal drug carriers and avoid the disadvantages of them'. The results cannot simply be regarded as nano emulsions with a solid core. Clear advantages of SLN include the composition (physiological compounds), the rapid and effective production process including the possibility of large scale production, the avoidance of organic solvents and the possibility to produce carriers with higher encapsulation efficiency.

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A Report on WATER BODIES OF VILLAGE ODE : a case study

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ABSTRACT

Water is one of the most important requirements that profoundly influence life. Rapid industrialization and indiscriminate use of chemical fertilizers and pesticides in agriculture are causing heavy and varied pollution in aquatic environment leading to deterioration of water quality. In addition through contaminated water recalcitrant compound concentration also increases in higher tropical level which leads more serious and carcinogenic effects in higher animals. The quality of water usually described according to its physical, chemical and biological characteristics. Therefore, it is necessary to analyze the water quality at regular time interval. The parameters which need to be analyzed include BOD, COD, TSS, TDS, TS, presence of heavy metals, microbial flora characterization etc. The survey was carried out by NSS volunteers in order to check the levels of pollution in the water bodies of Ode village. The BOD values of the different water samples are below the permissive limit of the drinking water standard (as per WHO guidelines 1-3 mg/l for drinking water supply). However, among different water samples COD value of L5 water sample is high. Except water sample P1, TDS and TS values for all other water samples are above the permissive limit of inland surface and drinking water standard (MOEF guidelines for Inland Surface water-permissive Conc. is 2100 mg/l and as per WHO guidelines 2000 mg/l for drinking water supply).

Keywords: Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Solids (TS)

ABOUT NSS

The National Service Scheme (NSS) is an Indian government sponsored public service programme. The scheme launched in 1969. It's aim is development of student's personality through community service. The cardinal principle of the NSS programme involves combined approach of faculty and students to per-

Sample Code	BOD (mg/l)	COD (mg/l)	TSS (mg/L)	TDS (mg/L)	TS (mg/L)
P1	0.3±0.01	360±6	1.6±0.3	600±20	601.6±20
P2	0.6±0.01	280±8	1.4±0.1	4800±10	4801.4±10
L1	0.55±0.02	400±5	1.2±0.15	1700±25	1701.2±25
L2	0.65±0.01	440±5	1.2±0.07	600±20	601.2±20
L3	1.3±0.02	360±7	0.3±0.01	1200±15	1200.3±15
L4	1.4±0.01	400±5	0.00±0.05	1700±25	1700±25
L5	0.2±0.01	2400±10	0.5±0.02	4267±30	4267.5±30

Table 1. Physico-Chemical characterization of various water sample

Sample code	Colony type	Size	Shape	Margin	Elevation	Pigmentation	Texture
P1	A	Medium	Round		Raised	White	Rough
	B	Medium	Round	Entire	Flat	Colorless	Smooth
	C	Small	Round	Entire	Flat	Yellow	Smooth
P2	A	Medium	Irregular	Irregular	Slightly raised	Colorless	Smooth
	B	Large	Round	Entire	Flat	Colorless	Smooth
L1	A	Medium	Round	Entire	Flat	Colorless	Dry
	B	Medium	Round	Undulate	Slightly raised	White	Dry
	C	Small	Round	Entire	Flat	Yellow	Smooth
	D	Small	Irregular	Lobate	Flat	Orange	Dry
L2	A	Medium	Round	Entire	Flat	Colorless	Smooth
	B	Medium	Round	Irregular	Raised	White	Dry
	C	Small	Round	Entire	Flat	Yellow	Smooth
L3	A	Medium	Round	Entire	Slightly raised	Colorless	Dry
	B	Medium	Round	Entire	Flat	Yellow	Smooth
	C	Medium	Spindle	Irregular	Slightly raised	Yellow	Dry
L4	A	Medium	Round	Undulate	Raised	White	Rough
	B	Small	Round	Entire	Flat	Yellow	Smooth
L5	A	Large	Round	Undulate	Slightly raised	White	Dry
	B	Large	Round	Entire	Flat	Yellow	Smooth

Table 2. Cultural characteristics of various bacterial isolates

Sample code	Colony type	CFU/ml
P1	A	$0.8*10^8$
	B	$0.45*10^8$
	C	$0.13*10^8$
P2	A	Uncountable
	B	$0.1*10^7$
L1	A	Uncountable
	B	$0.73*10^8$
	C	$0.26*10^8$
	D	$0.3*10^7$
L2	A	$0.41*10^8$
	B	$0.71*10^8$
	C	$0.21*10^8$
L3	A	Uncountable
	B	$0.2*10^7$
	C	$0.1*10^7$
L4	A	$0.54*10^8$
	B	$0.3*10^7$
L5	A	$0.23*10^8$
	B	$0.6*10^7$

Table 3: QUANTITATIVE ANALYSIS OF VARIOUS BACTERIAL ISOLATES

form various tasks for nation building. On the motto “SOCIETY SERVICE BY SCIENCE”. same path ARIBAS runs NSS club with the

INTRODUCTION and SURVEY STRATERGY

Water is an essential commodity in our life which is used for various purposes viz. domestic, agricultural and Industrial. In the villages in India it has been used for domestic and agricultural purposes since ages. One such village is Ode, Dist. Anand, Gujarat, where the people of the village use the pond water for their domestic purpose. Therefore, it was of utmost importance to study the level of pollution in the pond water of the village which was collected from two different ponds. The basic factors responsible for the pollution of these waters are runoff of chemical fertilizers and pesticides from agricultural fields. This survey was carried out by NSS volunteers in order to check the levels of pollution in the water bodies of Ode village. The focus of this survey was to determine the effect of various water sources like ground water and pond water on the local community. The ground water is also used by local residents for drinking as well as for different household chores. Ground water is pumped to the surface with the help of bore well system. Five such ground water samples were collected from different locality area of the village.

The sample analysis was performed on the basis of standard water quality parameters which included physical, chemical and biological parameters. The parameters analyzed include:

BOD
COD
Total Suspended Solids (TSS)
Total Dissolved Solids (TDS)
Total Solids (TS) Microbial flora characterization

QUALITATIVE ANALYSIS OF VARIOUS WATER SAMPLE

P= POND L= LOCAL AREA

The BOD values of the different water samples are below the permissive limit of the drinking water standard (as per WHO guidelines 1-3 mg/l for drinking water supply). However, among different water samples COD value of L5 water sample is high. Except water sample P1, TDS and TS values for all other water samples are above the permissive limit of inland surface and drinking water standard (MOEF guidelines for Inland Surface water-permissive Conc. is 2100 mg/l and as per WHO guidelines 2000 mg/l for drinking water supply). The Results obtained from the water samples are tabulated in Table 1. All the water samples are in category of hard water which can lead gastrointestinal problems.

MICROBIAL FLORA CHARACTERIZATION:

Viable count of microbial flora from different water samples was performed by Standard Plate Count (SPC) method. Microbial Count of the each water sample was found to be high.

HEAVY METAL ANALYSIS OF VARIOUS WATER SAMPLES

Water samples were analyzed for the presence of different toxic metals viz. copper, chromium, nickel, lead and arsenic. The re-

sults obtained indicate the level of chromium, nickel, lead and arsenic were below the detection levels. However, copper was found to be present in two water samples P2 and L5 at a concentration of 0.4759±0.05 mg/l and 0.0807±0.02 mg/l, respectively. As per ICMR (1963) guidelines 3 mg/l maximum permissive value and as per WHO (1984, 1993) guidelines below 2 mg/l is permissive value. So, the water samples are not hazardous with reference to heavy metals.

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