INTERNATIONAL
AYURVEDIC MEDICAL
JOURNAL

IAMJ

International Ayurvedic Medical Journal, (*ISSN: 2320 5091)* (September, 2017) 5(9)

MUSIC THERAPY ON PLANTS-A LITERARY REVIEW

Athira S[1], Subhramanya[2]

[1]P.G. Scholar, [2]Professor,
Department of P.G. Studies in Dravyaguna Vijnana, Alva's Ayurveda Medical College, Moodbidri, Karnataka, India

Email:athira.ane@gmail.com

ABSTRACT

Music is long known to produce remarkable results for humans and other animal species, music therapy appears to benefit for plant life as well. Plants are able to feel and respond to vibrations and frequencies. They grow at certain frequencies; whereas certain other frequencies can stunt their growth. The range of these differs for different species. Many scientific researchers have proved that there is a remarkable growth of plants through music therapy. Hence it is a great achievement in the agricultural field.

Keywords: Music, Plant growth, Music therapy

INTRODUCTION

Music is long known to produce remarkable results for humans and other animal species, music therapy appears to benefit for plant life as well. There are different opinions about the effect of music on plants, whether they feel or understand music. It has been noted that human conversation in the vicinity of plants would cause accelerated and strong growth. Studies on the effect of music on plant growth began as early as 1968 with Dorothy Retallack. She compared the effects of different types of music on plant growth. She was the first to deliver this subject through her book: The sound of Music and Plants[1]. Her observations were that plant life flourished when treated to classical music and withered when subjected to rock music. These findings opened a new world to music theory. Hence in this article a sincere effort has been made to know and collect the previous research works and the scientific facts behind this technique and how it helps in agricultural field.

Facts of music on plant growth

Music is sound and sound is a wave. Sound waves are produced by generation of vibrations, which are disturbances in the atmosphere. Sound waves need a medium to travel. They are emitted by a source and their frequency, or volume is determined by the frequency of the vibrating source, from the music of the radio to the guitar being played, all of

these are mechanical pressure waves that are translated into sounds and on a higher level music[2]. Growth is a process which results in the increase of number and size of leaves and stems in a plant. It also results in strengthening of roots and production of blossom. Plant growth is a result of cell division that takes place within the cell. The nucleus, chloroplast, vacuoles and ribosome play an important role in cell division. Genes, Temperature, moisture, soil quality, mineral retention, water retention, and atmospheric changes are various factors that influence plant growth.

Different techniques and Sounds that can influence plant Growth

- Classical music influence-The music played to plants should have a time limit about three hours. It helps to grow healthy and properly. An over dose of music can seriously destroy the plants.
- Protein and Molecular Music[3]-which was developed by Joel Sternheimer. This technique has Special melodies which regulate Biosynthesis. He studied and investigated the vibrational frequencies of amino acids. Ribosomes plays an important role in the creation of proteins from a variety of 20 amino acids depending on the need of the cell and its organisms. While this process takes within the ribosomes, the amino acids turn comparatively slow, making it possible for the researchers to measure their individual frequencies as a note. When the frequencies are recognised, each of these notes can then be recorded into a sequence, or mealody. Sternheiner successfully replicated the recorded melodies for the selected proteins. When these melodies were played, he noticed that it increases the manifestation of the corresponding protein and accelerated the growth of the plant. As a result there are greater yields, plants having higher nutrient levels and their shelf life is more.
- Sonic Bloom Techniques-Developed by Dan Carlson found out that the melody of frequencies originating between 3000 to 5000 kHz helps the stomata of plants to open up quicker. This helps them to absorb nutrients more effectively. This technique helps to assist the organic farm, particularly with low water availability and poor soil condition[4].
- Ultrasonic and Infrasound-When the frequency of sound extends beyond the human hearing limits it is known as ultrasound. With the development of electronic oscillators scientists were able to experiment with ultrasonic plant growth acceleration. Evidence support the theory that sound acts as a catalyst, activiating the production of plant hormones called auxins that can stimulate plant growth[5].

Research updates

- The effect of mantras[6]: The classic texts of Indian origin record the influence of Mantras on plants and animals. Ayurveda also recognize the importance of this realm of medicine. The author during his various experiments on plants found that these from the stage of seedling to the maturity are affected by certain types of sound waves, especially the mantras. In the study ocimum santum (*Tulasi*) were grown in the garden. Seeds of the herb were sown in polythene bags filled with black cotton soil and on germination the saplings were planted in different beds according to lunar phases or Nakshatras. The plants were subjected to sound recordings of Gayatri mantra on tapes with lower frequency and was played in morning, afternoon and evenings. The growth parameters were assessed and recorded accordingly and the fully

grown plants were taken. Phytochemical studies of colloidal gels from extracts of the plants were done. The parts of the plants the leaves, stem, flowers, fruits and roots were taken and medicine were prepared and given to patients thrice a day in a dose of 1 to 2.5gm and progress of his\her condition was recorded. There were outstanding results obtained from patients whom showed favorable response like increase in digestion and their mental agitation subside, blood pressure lowered and sleep increased. This study reveals that the plants have shown a positive response to this type of particular sound waves regarding the growth their efficacy in curing the diseases etc.

- The effect of music on physicochemical parameters[7]: This study was an attempt to understand the effect of music on plant growth and development. Eight medicinal and ornamental plants were selected for the study. Two sets of selected plants were prepared, one of them was subjected to rhythmic soft-melodious music and a control set of plants was not exposed to any particular music. Music was played for fixed period for a month. After the treatment various growth and physiological parameters of treated plants were studied against the control plants. From the results, it was observed that plant growth in treated plants was better than control plants especially showing increased level of various metabolites.
- Effect of different musical elements on plant growth[8]:–In this study effects of strong, complex, rhythmic music with *sekunda* and *kvarta* intervals and frequently reprised and opus with rhythmic dynamically changing lyrics which contain more extensive kvinta septa oktava intervals on mitotic index and growth root were investigated in onion(Allium cepa) root tip cells during germination. For this the music samples of Wagner, Mozart, and Schubert were chosen. They found correlation between root elongation and Mitotic Index. Both kinds of music have positive effects on root growth.
- Measuring effects of music and healing energy using a seed germination bioassay[9]: A series of five experiments were performed utilizing okra and zucchini seeds germinated in acoustically shielded, thermally insulated, dark, humid growth chambers. Conditions compared were an untreated control, musical sound, pink noise and healing energy. Healing energy was administered for 15-20 minutes every 12 hours with the intention that the treated seeds would germinate faster than the untreated seeds. The objective marker was the number of seeds sprouted out of 25 seeds counted at 12-hour intervals over a 72-hour growing period. Temperature and relative humidity were monitored every 15 minutes inside the seed germination containers. A total of 14 trials were run testing a total of 4600 seeds. Musical sound had a highly statistically significant effect on the number of seeds sprouted compared to the untreated control over all five experiments for the main condition ($p<0.002$) and over time ($p< 0.000002$). This effect was independent of temperature, seed type, position in room, specific Petri dish and person doing the scoring. Musical sound had a significant effect compared to noise and an untreated control as a function of time

($p<0.03$) while there was no significant difference between seeds exposed to noise and an untreated control. Healing energy also had a significant effect compared to an untreated control (main condition, $p<0.0006$) and over time ($p<0.0001$) with a magnitude of effect comparable to that of musical sound.

Hence this study suggests that sound vibrations (music and noise) as well as biofields (bioelectromagnetic and healing intention) both directly affect living biologic systems and that a seed germination bioassay has the sensitivity to enable detection caused by various applied energetic conditions.

DISCUSSION

Music has a profound effect on plant growth. External vibrations whether from music, sound or physical disturbance, affect the internal vibrations, either stimulating growth or hampering it. The various research works has given an idea about the different types of sound vibrations that helps a plant to grow and helps to produce good yield. These facts were early mentioned in Ayurveda. As Ayurveda is an *upaveda* of *Atharvaveda* and it is evolved from agama or *Aptopadesha* and is preceptor by *sabda pramana*, the base of which is again the sound. *Surapala Vrikshayurveda* is an ancient Sanskrit text on the science of plant life. The book deals with various subjects such as planting a garden, importance of various trees; collection, examination and treatment of seeds; selection of suitable land, soil characteristics, digging of planting pits, different methods of irrigation, plant nutrition, fertilizers, diseases of trees and their treatment, the wonders of horticulture, plant conservation. *Vrikshayurveda* has references about chanting of mantras to protect crops and grains from *keeta, patanga, piplika, mushaka.* The effect of sound on plants apparently depends on frequency, intensity and exposure time .Low frequency sound does not damage cell structure but instead activates enzymes. Increases cell membrane fluidity and promotes DNA replication and cell cycling. Music notes create inaudible quantum vibrations that happen when amino acids join the protein chain. Hence by overall assessing these modern techniques and by our Ayurvedic facts we can apply in our present cultivation practices.

CONCLUSION

- The sound vibrational techniques help the plant to grow healthy and disease free.
- The research works proves that music therapy grown medicinal plants can give very good health benefits.
- The low frequency sound helps in good growth of plants while high frequency sound declines the growth of plants.
- Only selected plants are till now used for experiments hence more importance research works should be done on medicinal plants.

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Source of Support: Nil
Conflict Of Interest: None Declared

How to cite this URL: Athira S &, Subhramanya: Music Therapy On Plants-A Literary Review. International Ayurvedic Medical Journal {online} 2017 {cited September, 2017} Available from: http://www.iamj.in/posts/images/upload/3505_3509.pdf