ROLE OF QUANTUM BIOPHYSICS IN EXPLORATION OF FUNDAMENTAL PRINCIPLES OF RASAPANCHAKA IN DRAVYAGUNA: A REVIEW

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ABSTRACT

Over last decade, phyto-chemistry has taken a lead in exploration and understanding concepts of Dravyaguna including Pharmacokinetic and Pharmacodynamic activity of herbal drugs, finding its way in drug discovery and new drug development systems. But in spite of these advancements, science behind production of phytochemistry, which also runs rationale for exploration of fundamental principles of Dravyaguna, is the science of Quantum Biophysics. Hence, a conceptual study was done encompassing literature review from Ancient Ayurvedic texts and Quantum Biophysics and impact of the latter via study of Earth’s electromagnetic signaling on plant growth followed by further exploration of concept of Rasapanchaka through the language of Quantum Biophysics. The effort of this study is to commemorate, the biophysical approach of electromagnetic signals towards plants which is rightly explicated in Ayurveda as Praspantha (Vibrations). Moreover, it helps one to attain knowledge of plant growth with a purview of biophysical phenomenon of Schumann Resonance and Plant Bioacoustics which has been very well documented in Ayurveda as Lokananchay Vayu and attributes of Vayu as Udhvan respectively. In a nutshell, this study attempts to propose a hypothetical systematic elucidation of growth of plants right from germination till its complete development as explained in Classical texts of Ayurveda through the Bio-physical lens. This theory will have a pivotal role in understanding role of Quantum biophysics in plant growth same being documented in Ayurveda texts, thereby, expounding the concepts of Rasapanchaka in Dravyaguna, which in turn will be helpful in improving drug development systems and in providing better therapeutic effects.

Keywords: Dravyaguna, Rasapanchaka, Quantum Biophysics, Schumann Resonance, Plant Bioacoustics.

INTRODUCTION

Ayurveda is a science which deals with the treatment of Shaddhatvatamak Purush which consists of Panchamahabhoot (five basic elements and soul) and Atma (consciousness). It is still a matter of mystery in how matter and consciousness interact with each other to give birth to life. In Quantum physics, these answers are to a certain extent given in the terminologies of energy, frequency and vibrations. When we go into the details of Theory of Vibrations, we come across to the state that entire universe is in a state of certain vibrations. In Ayurveda, similar terminology to describe these vibrations is “Praspantha”. Praspantha literally means that which is pulsating, and this is the attribute of Vayu. So precisely, Vayu is the responsible entity for all the vibrations of the universe.

As we discuss about treatment options of Shaddhatvatamak Purush, in Ayurveda, herbs form the integral part of the treatment. As already aware, plants are antascheta (non locomotory living beings with inner consciousness) and human beings are bahirantaschetan (locomotory living beings with inner consciousness), plants are rather incomplete human beings or in other words if we see the evolution of living beings, humans have borrowed consciousness from plants. As everything in this universe is formed out of Panchamahabhoot, so are plants and hence, in order to have effective treatment options via plants source, it is mandatory for us to have healthy species of plants.

In today’s era, with recent advancements, treatment options via plant source are done by studying the phytochemistry of plants. The leading compounds with the plants are fractionated via different analytical methods and are tested for their clinical efficacy through various research trials. Pharmacokinetics and pharmacodynamics of these compounds are studied via in vitro, in vivo studies and thereafter followed by clinical trials of drug research. These studies have enriched the area of Dravyaguna vigyan (branch of Ayurveda which deals with study of materia medica of medicinal plants used for health benefits along with study of its Fundamental principles of actions) with the enhanced knowledge of pharmacological activities of the herbs. Hence, along with all the allied sciences like Botany, Plant Anatomy, Plant Physiology, Plant Toxicology etc. drug research in view of its phytochemistry in order to study its pharmacological activities has found its own way in the studies of Dravyaguna vigyan. Moreover, studies of drug interactions have paved its way to study the synergistic as well as antagonistic activity with allopathic medicines for example, Piperine isolated from Pippali (Piper longum) acts as a Bio enhancer giving rise to increased drug bioavailability of Rifampicin given as anti-Koch’s Treatment. But while looking for the pros of the phytochemical analysis, we also come across the limitations of the study like as the established example of Reserpine isolated from Sarpagandha (Rauwolfia serpentina) causing extra pyramidal side effects when this fractionated compound is given alone; on the contrary, no side effects are observed when Sarpagandha is given as an entire herb. Hence, it is known that despite advancement of sciences and incorporation of phytochemical studies in the subject of Dravyagunavigyan, Ayurveda believes in holistic approach of usage of herbs.
Furthermore, when we come across the details of reasons of production of various phytochemicals, plant prepares this chemistry within themselves only in response to environmental signals. In other words, it can be put forward that phytochemistry is the offshoot of the science of biophysics. So, in order to study the dravya (an entity encompassing the attributes of quality and action), right from its germination, production of phytochemicals and to its karmakuta (action of drugs) through its Rasapanchaka (Rasapanchaka consists of Rasa meaning taste, Guṇa meaning attributes, Vīpaka meaning bio-transformed taste, Veerya meaning its Potency, Prabhava meaning which is an exceptional activity or inconceivable potency), we need to peep into the basic science of Biophysics which forms the rationale behind the entire study. Therefore, this conceptual study is an attempt to provide a systematic elucidation of the importance of Biophysics in the study of subject of Dravyaguna viyagan.

**Literature review**

**Concept of Lokasanchari Vayu (Geomagnetic Field - Schumann Resonance) on Plant Growth**

The Geomagnetic field is the magnetic force field that surrounds the Earth. These are Earth based frequencies which protects the planet from solar flares. Every life on this earth is immersed throughout its lifetime in Earth’s electro-magnetic field. These global electromagnetic resonances are called as the Schumann resonances (SR) which are a set of spectrum peaks in the extremely low frequency (ELF) portion of the Earth’s electromagnetic field spectrum7. Thus, plant kingdom cannot escape the effect of Geomagnetic effects upon them. Plants respond to this magnetic field which is well documented in various research papers8. These researches reveal the perception of plants to these signals and respond quickly to varying magnetic fields which alter their gene expression and phenotype. The magnetic field acts on the cryptochrome of the plants which is responsible for various aspects of growth and development9. Moreover, inflorescence is also governed by electromagnetic fields9. This science of Physics is well noted in Ayurveda contemporary text of Charak Samhita which states that Lokasanchari Vayu is responsible for Beeṣābhiksanskar (germination of seeds) and the same Lokasanchariyav is responsible for Udbhedananchaūdhādīnam (growth of the plant beyond the earth surface) and Pusphaflalanamahbhavārantam (responsible for production of flowers and fruits)10. With these explorations of concepts, it can be documented that the Lokasanchari Vayu is nothing but the Geomagnetic Field or the Schumann Resonance which governs the germination, growth and development of the plants.

**Concept of Udvahan and Plant Bioacoustics and Plant Perception**

Plant Consciousness was first noted by the great Biophysicist Sir J. C. Bose who documented his various experiments about Plants. The action of microwaves in plant tissues and the equivalent changes in plant cell membrane potential were first documented by him12. He also has documented of plant responding to sound waves which is also demonstrated by series of experiments carried out thereafter after His discovery. The terminology of Plant Bioacoustics deals with variance in germination and growth rates and behavioral modifications of Plants in response to sound. The theory proposed in Plant Bioacoustics states that environmental signals cause mechanical vibrations within the cells due to charged membranes. The overall nanomechanical oscillations of cytoskeletal components within the plant cells; which probably generates both low and high frequency vibrations13. These concepts of perception that is Udvahan (perception and transmission of signals) is again the attribute of Vayu as referred in classical texts14.

**Concept of Sharirgata Vayu (Vibrations in Human Body)**

Latest discovery of Quantum Vibrations states that there is presence of “microtubules” inside the brain neurons and it is these vibrations within the microtubules which are recorded by EEG15. This instance just illustrates that matter is just a projection of these vibrations. In Ayurveda, the concept of vibrations within human body is well acquainted with the concept of Vata dosha / Sharirgata Vayu (principle described in Ayurveda which controls movements within the body) as it is the only Dosha which possesses the ability to move “Gati”16. Moreover, it is also known to be responsible for all “cheshtha” (actions) as it possesses the attribute of producing vibrations within the body in combination of other substances17. Hence, also rightly attributed as Pravartakchesanaamuchuchananam (the one who is responsible for causing of all action). Niyanta prena e ch mana (the one who controls mind), Sarvindriyanamuduhjoksa, Sarvindriyarthanaamahbivodha (the one responsible for perception of all sensory actions to the brain)18.

**Concept of Vibrations in Dravya**

Ayurveda recognizes Dravyakarmukta (pharmacological action of Drugs) through Rasapanchaka. The basis of Rasapanchaka in terms of Vibrations can be understood by the instance of Katuveera (Capsicum annum) which produces various effects on the body and mouth with its ingestion of as Kutu Rasa vibrations are perceived via tongue. Moreover, the ushna (hot) and tikshna (penetrating) guṇas of Katuveera are also perceived despite dravya only being in contact with the tongue. Moreover, the Ushnaveerya of this dravya is also perceived via the guṇas. These vibrations arising post digestion effect of Katuveera (pachan) is perceived via its Vīpaka. In a nutshell, if we look deeply into Rasa, Veerya, Vīpaka entire concept revolves around Aṇginahabhoot (in this example of Katuveera) and on its attributes that is the Guṇas of the Mahabhoot. The guṇas (attributes) of all dravyas (matter) with their specific composition of that Mahabhoot (Basic five elements – Earth, Water, Fire, Air, Ether) as per the law of Vypadesha Bhuyasa (predominance of one element in amalgamation with other elements)19 have the potency of generating the respective vibrations which are present in the dravya and the same action in generated in the human body on ingestion. The concept of Prabhav again can be understood by the production of specific vibrations from the Dravya and within the human body and accordingly, the therapeutic action of the Dravya is seen as for illustration, Virēchan activity of Chetaki Haritaki even by standing below the tree20. All these vibrations within the Dravya exert their actions through Rasapanchaka which are nothing, but vibrations and same signals of vibrations are again perceived through Vata Dosha as it is known as Prasapanda. After cited examples of understanding the concepts of Rasapanchaka, concisely, it can be stated that Rasa, Veerya, Vīpaka and Prabhav are all Guṇas lying within the Dravya.

**DISCUSSION**

The phytochemistry developed as secondary metabolite in plants is in response to environmental signals which the plants receive. But the effort of this study is to commemorate, the Biophysical approach of electromagnetic signals towards plants, phytochemistry only being the offshoot, which is rightly explicated in Ayurveda. Right from Germination of seeds, till plant growth and development including the inflorescence, Geomagnetic field or the Schumann Resonance is responsible
which is narrated as Lokagata Vayu in development of Rasapanchaka of dravya. Moreover, it helps attain knowledge of plant growth with a purview of Biophysical phenomenon of Schumann Resonance and Plant Bioacoustics including the production of phytochemicals in response to environmental signals. The science of Plant Bioacoustics helps us to understand the udvahan that is perception of signals via sound emissions by the plant cells is also an attribute of Vayu. Moreover, the concept of all the Dravyas in the universe being Panchbhaatuk in nature, the vibrations of the specific Mahabhoot. Rasa, Veerya, Vipaka and Prabhav are all Gunas (attributes) lying within the Dravya. Material things are modifications of Panchmahabhuta (5 basic elements) and the aspects perceived are the Gunas. Accordingly, as all dravya are Panchbhaatuk, Vayu Mahabhuta is attributed with Chalatva and Praspanda (vibrations), which are Praspanda within the dravya. This attribute of Praspanda of Vayu is in the environment as Lokasanchari Vayu and in human body perceived as Sharirgata Vayu (Vata Dosha). This Lokasanchari Vayu (Earth’s Geomagnetic Vibrations (SR)) acts on the plants thereby regulating their growth and preparation of phytochemistry due to Udvahan (Plant Bioacoustics). These same vibrations are perceived by human body which is the attribute of Sharirgata Vayu which is rightly narrated as Pravartakchestham (the one who performs all actions of Body), Sarveindriyanam Udyojakaha (the one who carries sensory signals), Sarveindriyanamahibhojoda (the one who perceives affective stimulation). Microtubules Vibrations in the Neurons, throbbing of Heart, Pineal Gland and its Photo neuroendocrine activity are just examples of this attributes of Sharirgatavayu.

The lokasanchari Vayu and Sharirgata Vayu works with principles of Quantum Entanglement of Particles. With the lens of Quantum Physics, it is stated that entangled particles remain connected so that actions performed on one affect the other, even when separated by great distances which was referred as “Spooky action at a distance” by the Physicist Albert Einstein when separated by great distances which was referred as “Spooky action at a distance” by the Physicist Albert Einstein. This theory explains the mode of action of Prabhav of Dravyas. Whereas, when we come to narration of Rasa, Veerya, Vipaka and Gunas of the Dravya the particles are initially un-entangled before encounters the body. The energy transfer or the perception of vibrations can happen in between two un-entangled particles only if there exist a causal relationship (SamayuSambandh) in between the two particles. Rasa, Veerya and Vipaka work via the attributes of the Gunas, as the latter are being the source of generating vibrations. As Dravya and human body are both composed of Panchmahabhoot, there exists a causal relationship between them and with the principle of Vyapadeshasthubhyasa of Panchamahabhuta it is best understood that entanglement of particles occur followed by perception and transfer of the attributes or energy patterns (Gunas which includes Rasa, Veerya and Vipaka), and thus, through Virtual Photons the pharmacological actions of the Dravya to human body that is Dravyakarnikuta is exhibited.

CONCLUSION

In a nutshell, this study attempts to propose a hypothetical systematic elucidation of growth of plants right from germination till its complete development as explained in Charak Samhita through the Bio-physical lens. The concepts of Quantum Physics and entanglement of particles helps us to understand the mechanism of Prabhav. The concepts of vibrations and actions of Dravya with Rasa, Veerya, Vipaka owing to the attributes of the Gunas can be explained via the existence of causal relationship of un-entangled particles of the Quantum Physics. Right from Geomagnetic force / Schumann Resonance, Plant Bioacoustics and the Laws of Quantum Physics which is rightly attributed to Lokasanchari Vayu and Sharirgata Vayu and hence, the importance of Praspanda (Theory of Vibrations) narrated in Ayurveda can be precisely understood. Thus, understanding the role of Quantum Biophysics have a pivotal role thereby, expounding the concepts of Dravyaguna, which in turn will be helpful in improving drug development systems and in providing better therapeutic effects.

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