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THE BIO-PSYCHOLOGICAL BASIS OF ‘YAJNA’

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Abstract

Yajna originates from the root word ‘Yaja’ in Sanskrit language. It means worship of divinity, congregation and charity. Yajna’s spiritual activity involves worship of divine powers of Almighty, associating with God, devotion/meditation, chanting and for the sake of Ishtartha siddhi. There are two basic energy systems involved in Yajna i.e, Heat and Sound. Yajna’s fire is the source of heat. The different woods used for Yajna’s fire add the biological basis of life. The wood from *Santalum album* i.e, Chandana and *Ficus religiosa* i.e., Pipal among the others emit great medicinal value to the body & environment on firing. The fumigation of specific substances like saffron, chandan, camphor used to inflate the Yajna fire is a scientific method of subtilisation of matter into energy and expanding its potential and positive effects in the surrounding atmosphere and to the human & animal body. Also, the Yajna fire proves toxic to insects and pests and several disease causing micro-organisms. The sound of the Mantras is soothing to human & animal ears and they achieve the desired physical, psychological and spiritual benefits. The electromagnetic waves generated during chanting Mantras help in transmitting the desired sonic signals at cosmic level. Chanting mantras is a part of Nāda yoga, yoga of sound; vibrations and resonances have effects on psychological and spiritual conditions,

which raise the level of awareness in the energy centers called Chakra. Chanting involves higher but controlled secretions of the neurotransmitters for healthy living. The most secreted and controlled secretions of neurotransmitters studied in chanting are serotonin and dopamine.

Keywords: Yajna, biopsychology, medicinal plant, chanting, cosmic, sonic, Nāda yoga, Chakra, electromagnetic waves, neurotransmitters.

Objective: To study the different biological & psychological benefits of ‘*Yajna*’.

Introduction

Yajna is the ritual of sacrifice (vedic ritual) which gives the meaning to a prayer, praise or worship. The performance of yajna aims at three goals: 1) worshipping Divine Powers 2) sacred congregational programs and 3) charity/donation. The essential element in the yajna is the sacrificial fire, “Agni”, into which oblations are poured along with mantra recital, everything that is offered into the holy “Agni” is believed to reach God instantly. Generally, there is fire in the ‘kund’ which is kept in the centre of ground and different items are offered into the fire as oblations in the yajna which may include ghee, milk, and grains. The duration of a typical yajna depends on the type. Some yajnas are performed publically; others are done privately with only a few people (Sharma, 2007). Yajna is also considered auspicious from the social point of view since it has congregational goals and endeavors and it helps to clean the environment (Narayana Rao NM *et.al.*, 2012). The process of yajna not only purifies the air but also remove the impurities of our mind and body. This process also helps in maintaining the unity and harmony in the family and the community (Ahluwalia K, 2009). Yajna aims to eradicate hatred, communal tension, terrorism and induce noticeable unity, selfless love, friendship, cooperation and congregations in society (Sharma, 2007).

Today it is used in a lone manner because people are not attracted to it much. In Bhagavad Gita this has been discussed very deeply and has been correctly conjoined to spiritual leanings. Bhagavad Gita says one's whole energy or engagement of one's full energy is required for the performance of Yajnas (sacrificial spirit) for the gratification of the Supreme Lord. Also, Bhagavad Gita says, all living bodies subsist on food grains, which are produced from rains. Rains are produced by performance of yajna (sacrifice), and yajna is born of prescribed duties (Bhagavat Gita, 3:14). Yajna shows reverence to the Cosmic Powers and Holy Energies thru' Invocations, Prayers, Vedic rites and rituals including Fire ceremony called '*Homa*', Mantra recitation, and Special offerings (Yajna God Promise Society, 2009). It aims at Cosmic blessing for leading a happy, peaceful and prosperous life, or any other Material or Spiritual benefits as Beneficiary or Devotee desires (Sharma, 2001).

The most relevant part of the yajna is for the Worshipper to make the Spiritual connection with the Almighty. It is most essential that the yajna be performed strictly as per laid down Vedic rites and rituals, after following all the prescribed rules and routines, and with observance of all necessary instructions and precautions. In the World of Spirituality, there is no place for ignorance and mistakes, only perfection yields results (Yajna God Promise Society, 2009).

No rituals are complete without Dāna (Charity, the practice of giving). The person who gives has to choose the best gift to give and also a suitable person (*paatra-appatra*) to receive, while giving the person has to think whatever am giving is not mine, its yours, am just a media. The worthier the receiver, the greater the benefits that will come to the donor; hence it is good to give to the holiest people available. Through Dāna the distribution of wealth and sharing the best, is caused which pleases the deity and also facilitates for *punya sampadane*. There are so

many stories to value the importance of Dāna; King Shibi, Karna, Nachiketa, Vamana etc. There are many types of Dāna, mainly *Vidya* (Education), *Anna* (Food), *Vastra* (Cloth), *Jala* (Water), *Suvarna* (Gold) and *Bhudaana* (Land). It is believed that the charity given by a person will give all the comfort here (*Eha*) and also in heaven (*Para*). The purpose of Yajna will be fulfilled only by giving the Dāna. Here the receiving person is not an inferior and also the giver is not superior. Both have their own significance. Greed is wrapped up with egoism and selfishness, since we hold our personalities and our possessions as “I” and “mine”. Giving helps make egoism thaw; it is the antidote to cure the illness of egoism and greed (Bhagavad Gita).

Thus yajna leads to cosmic consciousness. All this needs discipline and unison. This philosophy makes man’s character truly great and leads to the universal level where it inspires one to contribute towards cosmic welfare. This supreme royal path enhances all round progress of individuals and leads the world towards peace and prosperity.

The main instrument of the harmony in yajna is Mantra, a sacred incantation. Synchronization of mind, speech of action that comes about in yajna, especially through the articulation of mantra creates a complete harmony within the person making the sacrifice. Simultaneously, the universe is charged with a harmonious spirit.

Field Study

Co-author of the paper, Preenon Bagchi, attended the holy “Sri Sri 108 Vishwashanti Kalyanaarth Sahastrachandi Mahayajna” held from 26th April to 4th May, 2013 held at Kalyanpur, Deoghar, Jharkhand, to study practically the various aspects of the yajna mentioned in the paper. He had very intimately and cordially encountered with the head priest Vaidic Sri Satish Chandra Pathak, who was kind enough to explain the different aspects of yajna included in

the paper. The head priest along with his followers from Kashi (Banaras) was found having special knowledge on Yajur Veda dealing with principal aspects of “karma kanda” (yajna). Besides, the author also noted that no anti-social activity was found during the yajna. Social gathering from different communities was seen. Also, no intoxication, disease or even a single death was reported. Reduced temperature and comfortable weather was felt in the last 2 days of yajna. Gentle cool breeze was felt on the following day of yajna and it seemed that the surrounding places are experiencing showers.



Picture. 1: The yajna banner which says Sri Sri 108 Vishwashanti Kalyanaarth Sahastrachandi Mahayajna”, dated, 26th April to 4th May, 2013, place, Kalyanpur Radha Krishna Dham, Deoghar, (Jharkhand)



Picture 2: Priests surrounding the yajna-kunda performing yajna.

Ingredients used in Yajna

The wood used in yajna is cut into small sticks of varying lengths called *Samidhas* according to the size of the altar or *Agnikunda*. The principal types of wood used are the following:

- I. Sandalwood (*Santalum album*)
- II. Agar and Tagar wood (*Aquilana malaccensis* and *Valeriana wallchii*)
- III. Cedar (*Cedrys libani*)
- IV. Mango (*Mangifera indica*)
- V. Dhak or Palash (*Butea frondosa*)
- VI. Bilva or Bael (*Aegle marmelos*)
- VII. Pipal (*Ficus religiosa*)
- VIII. Banyan (*Ficus bengalensis*)
- IX. Cikura pod (*Proposis spicigera*)
- X. Gular (*Ficus glomerata*)
- XI White Fig (*Ficus virens*)

In addition to wood, various Havishya or Havan samagri are offered in Yajna. They can be divided into the following four groups:

(1) Odoriferous Substances:

These are --- saffron, musk, agar, tagar, chandan, illaychi, jayphal, javitri and camphor.

(2) Substances with Healthy Constituents:

These are clarified butter (ghee), milk, fruits, cereals like wheat, rice, barley, til (*Sesamum indicum*), kangu, munga, chana, arhar, masur or peas, durva grass (*Cynodon dactylon*), prickly chaff flower (*Achyranthes aspera*), vayuvidanga (*Embelia ribes*), sarshapa (*Brassica nigra* linn), cow dung, cow urine.

(3) Sweet Substances:

These usually are --- sugar, dried grapes, honey or *chhuhara*.

(4) Medicinal Herbs:

These are used as per specific requirement. Some common herbs are

Somalata or Giloya (*Sarcostemma acidum*),

Brahmi (*Bacopa monnieri*),

Shankhpushpi (*Convolvulus pluricaulis*),

Nagkesar (*Mesua ferrea*),

Mulhati (*Glycyrrhiza glabra*),

Red & White chandan (*Santalum album*),

Baheda (*Terminalia bellirica*),

Jatamansi (*Valeriana jatamansi*),

Sonth (*Zingiber officinale*), and

Harad (*Terminalia chebula*).

Now-a-days *Havan samagri* is readily available in the market consisting of the following substances in a crude powder form:

Saw dust of sandal-wood and pine wood, the agar and tagar wood chips, kapurkachari (*Hedychium Spicatum*), gugal (*Commiphora wightii*), nagarmotha (*Cyperus scariosus*),

balchhaar or jatamansi (*Nardostachys jatamansi*) , narkachura (*Curcuma caesia*), sugandhbala (*Valeriana wallichii*), illayachi (*Elettaria cardamomum*), jayphal (*Myristica fragrans*), cloves (*Syzygium aromaticum*), khadir (*Acacia catechu*), charu, dalchini (*Cinnamomum verum*) and Kamal Gatta (lotus seeds).

(Fumigating Substances used in *Yagna*, 1996; Sharma, 2001).

[Scientific studies done by us especially on a few above referred ingredients have their effects on various CNS (Central Nervous System) diseases. It has been noted that Sandalwood (*Santalum album*) and Tagar (*Valeriana wallchii*), has got very soothing & calmness effect showing mental peace and equilibrium of persons suffering from different mental disorders (Bagchi P and Kar A, 2011; Bagchi P and Hopper W, 2011).

Besides, studies on Shankhapushpi (*Convolvulus pluricaulis*), Tagar (*Valeriana wallchii*), & jatamansi (*Valeriana jatamansi*) reveal their extraordinary effect on different degenerating diseases of nervous system, eg., Alzheimer, Dementia, memory losses (Bagchi P and Hopper W, 2011; Gore M, Bagchi P *et. al.*, 2010).

Bioinformatics study on Gugal (*Commiphora wightii*) has shown gugul's efficacy in treating atherosclerosis (Bagchi P, Mussavira S, Vinobha CS, 2011).

Also, it has been reported that *Nardostachys jatamansi* has got significant lipid lowering & anti-oxidant (free radical scavenging activities) and thus protecting cardiac & other metabolic disorder in aging people (Kar A & Choudhary BK, 2013).]

Biological Benefits of Combustion

The substances used in yajna are organic in nature and in no way pollute the environment upon combustion. In the agni-kund pipal (*Ficus religiosa*) sticks are laid in bottom and shami (*Propolis spicigera*) sticks in the top.

Yajna proves beneficial and has rejuvenating effects on the five fundamental life components i.e., fire, sky or space, water, air and earth. The holy yajna-fire enhances the value of the fire component. The yajna-flumes are directed to the sky and carries water vapour to the upper layers of the atmosphere to bring rain, makes the atmosphere pollution free and clean and the yajna-ash acts as fertilizer to the soil. The yajna-flume carries the medicinal active principles from the medicinal plants (used in the yajna) to the atmosphere in gaseous form and makes the atmosphere healthy & free from causative germs. The different ingredients used in the yajna-fire enhance medicinal values of the medicinal herbs & radiates cumulating healthy positive energy to the entire locality.

The products formed on combustion of the yajna ingredients depend on the following factors like:

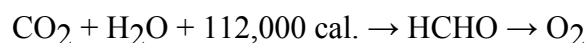
- (a) The nature of substances used and their proportions;
- (b) Temperature attained;
- (c) Controlled supply of air, and
- (d) Interaction amongst the various products formed.

After complete combustion of cellulose material from wood, it is also subjected to vaporization. This happens due in the manner *Samidhas* are arranged in the *Agnikunda* and the conditions of temperature and air supply which prevail in it. The temperature in the *Kunda* varies between 250°C and 600°C, while in actual flames it can go to as high as 1200°C to 1300°C. Due

to this volatile constituents get diffused over in the surrounding atmosphere. Also when cellulose and other carbohydrates undergo combustion, steam is formed in profuse quantities by the combination of hydrogen of organic substances with the oxygen. This is how the substances like thymol, eugenol, pinene, terpinol etc., are carried over in the surroundings and the aroma of a *Yajna* can be smelt even at a considerable distance. In addition to steam, smoke is also given out in abundant quantities and solid particles existing in a highly divided state offer sufficient surface for mechanical diffusion. Thus smoke also functions as colloidal particles for diffusion of volatile aromatic substances depending on temperature and direction of the wind.

The fatty substances used in yajna are mainly ghee and other of vegetable origin. Ghee helps in rapid ignition of cellulose and keeps the fire alight. All fatty substances used are combinations of fatty acids, which volatilize easily.

When all the volatile substances are diffused in the surrounding atmosphere, they are further subjected to photochemical reactions in the sunlight. This may be the reason why it has been recommended that yajna should be performed in strong sunlight. These changes occur in the ultra-violet and other short wavelength regions. Because of this the products of fumigation go photochemical decomposition, oxidation and reduction. To some extent even CO₂ is also reduced to formaldehyde as follows:



From environmental angle, reduction of CO₂ produced in yajna as above and liberation of oxygen cannot be ruled out.

The *Agni kunda* is pyramid in shape. The word ‘pyramid’ means the fire in the middle’ (<http://www.gizapyramid.com/mehler-originword.htm>). This ancient-word meaning is closely

connected with the mysterious energies emanating from its central shape. The pyramid shape is widely practiced to generate and store a special energy field, which possess bacteriostatic properties. The inverted pyramid shape of the *Agni kunda* (or *Havan Kunda*) allows controlled generation and multidirectional scattering of energy. It acts as a generator of unusual energy fields and spreads them in its surrounding atmosphere. This has an obvious link with energy, electro-magnetic force and because of its inverted pyramid; it does have connection with the cosmic energy fields (Fumigating Substances used in *Yajna*, 1996; Sharma, 2001).

Purification of Environment by Yajna

The industrial wastes, rapid urbanization, deforestation, air and water pollution, disturbs the ozone layer, radioactive waves etc., & they have destabilized the human, animal and plant life & creating ecological imbalance. Experiments show that the physical ailments, sickness and disease are considerably reduced in the houses, where the Yajna is performed because it creates a pure, nutritional and medicinal atmosphere. It renews the brain cells, revitalizes the skin, purifies blood and prevents growth of pathogenic organisms. It removes harmful radiation and radioactivity. Yajna is basically a healing process. ‘Heal the atmosphere and the healed atmosphere will heal you’--- is the Modus Operandi (Narayana Rao NM *et.al.*, 2012).

Environment purification by the constituent electrons of the fumigated substances in the *Yajna* is an obvious effect of this process and this observation by some distinguished scientists is note worthy.

Dr. Hafkine has mentioned that --- “mixing ghee and sugar and burning them creates smoke which kills the germs of certain diseases and secretion takes place from some glands relate to the wind-pipe, which fill our heart and mind with pleasure.”

Sugars present in *Havishya* have great power to purify the atmosphere. It kills the germs of T.B., measles, smallpox and cow-pox --- remarks Prof. Tilward.

According to Dr. Shirowich, a Russian scientist has remarked that

- (i) Cow's milk contains great power of protection from atomic radiation;
- (ii) Houses having cow-dung covered floors enjoy complete protection from atomic radiation;
- (iii) If cow's ghee is put into *Yajna* fire, its fumes lessen the effect of atomic radiation to a great extent.

The medicinal fumes emanating from yajna have been observed by microbiology researchers' states clearly its bacteriolethal in nature. These eradicate bacteria and other disease micro-organisms.

Purification of air by the process of yajna takes place in the following four ways:

1. Removal of Foul Odors:

Due to volatilization, the various volatile oils get diffused and scattered in the surrounding atmosphere along with yajna smoke. Since these oils have distinct good smell, the foul odors are automatically replaced. This aroma can be experienced easily in the surroundings where yajna is performed due to diffusion of substances like thymol, eugenol, pine, terpinol and oils of sandalwood, camphor and clove.

2. Removal of Bacteria:

Due to partial oxidation of hydrocarbons and decomposition of complex organic substances produce formaldehyde which is a powerful antiseptic. Also noteworthy that germicidal action of

formaldehyde is only effective in the presence of water vapor which is also produced in large quantities in yajna. The oxidation of hydrocarbons also produces formic acid and acetic acid and these both are good disinfectants. Usage of formic acid in preservation of fruits and that of acetic acid in preserving vinegar is a common practice. The antiseptic and antibiotic effects of fumes of yajna have also been examined by conducting suitable experiments on rabbits and mice and also it has been established that fumes emitted in yajna are powerful antibiotic. Also, yajna ash purifies and cleanses the water making it fit for drinking.

3. Removal of insects:

There are non-bacterial parasites like flies, ringworm, lice, fleas etc., which are generally immune to bactericides but are harmful to other living beings. They either get killed or are driven away, when they come in contact with the fumes of volatile oils like camphor diffused in the environment due to yajna fire and smoke

4. Effects on Plants and Vegetation:

The disinfection of air is useful to animal life and as well as plant's life though the micro-organisms responsible for diseases in both may be different. The aromatic substances used in yajna get diffused in the air and offer protection to plant life against harmful organisms. This ensures healthy plant growth. Yajna's atmosphere and ash can be used as adjuncts in the 'Natural farming' methods. It is a holistic concept of growing plants in healthy atmosphere and maintaining ecological balance by performing yajna in the middle of the farmland and using the yajna - ash as a fertilizer. It is not only safe and productive but also holistic & novel in its approach towards environment.

5. Role of CO₂ generated in Yajna:

Usage of the wood and other organic matters to flames has been always controversial because of generation of carbon monoxide (CO) and carbon dioxide (CO₂) and increase in consequent 'green house' effect. It had been argued that performance of yajna, both produces CO and CO₂. It should be noted here that the way in which the *Samidhas* and *Havishya* are burnt in yajna is a slow combustion process at higher temperature. Usually the burning of coal in factories or in the household fire involves rapid combustion, wherein oxygen is taken in large quantities and enormous CO₂ (along with CO) is emitted. In the slow combustion process of yajna, small quantity of O₂ is utilized and scanty CO₂ is emitted that poses no threat to the environment. In fact whatever CO₂ is generated it is readily absorbed by the surrounding vegetation and CO₂ cycle (and photosynthesis) is strengthened. The other important aspect is the fact that CO₂ produced in yajna is mixed with other aromatic oils and antiseptic products. It therefore, acts as a vehicle in transporting such products to distant surroundings. The use of CO₂ as a cerebral stimulant used to assist the patients suffering from lack of ventilation is common in medical world. It is used to control and cure many mental disorders. Small amounts of CO₂ is inhaled by the persons performing yajna acts as a stimulant and more and more aromatic fumes are inhaled which help in curing mental disorders. Particularly effective results with respect to the elimination and reduction in radiation were achieved through yajna's fire, smoke and ash. These observations are made by Dr. L. Maela Anatoninhowska of Poland after using Pollutant Standards Index (PSI) techniques ('Does *Yagna* Add to the Prevalent Pollution?' 1996; Sharma, 2001).

Chanting of Mantras

The Veda says that yajna and Gayatri mantra are the only ways of attaining Moksha or Salvation or Self-realization. All four Vedas have innumerable mantras related to yajna. Atharvaveda deals with sound therapy aspects of Mantras for the treatment of the ailing human system at the physical, psychological and spiritual levels. The Samaveda focuses on the musical chanting patterns of the Mantras and the subtle form of yajna by defining the latter as the process of mental oblation on the surface of internal emotions through the cosmic radiation of the omnipresent subtle energy of sound.

The power of sound (mantra) vibrations is acknowledged in the field of science. The sound vibrations can penetrate the energy spheres at the subtle and cosmic levels. All the alphabets (and also mantras) of the Sanskrit language are endowed with special vibrational powers, which set out harmonious wave (frequency) patterns when pronounced. It is interesting to note that Dr. Howard Steingull, an American Scientist has established that recitation of *Gayatri Mantra* produces 110,000 sound waves per second. In fact recitation of the *Gayatri Mantra* during the yajna acts supplementary. The patterns of chanting of mantras are so considered that they latently contain the spirit of the music or the quite essential sound of the violent flow of life sustaining energies emanating from the cosmic energy centre of the corresponding mantras. The cosmic energy centre associated with the *Gayatri Mantra* is the Sun. Uttering of these mantras produces vibrations which are soothing to human psyche and mind and to all plant and animal life and they achieve the desired physical, psychological and spiritual benefits. These vibrations also spread specific energy waves in the surrounding atmosphere as the offering are offered (Sharma, 2001).

The neuroscience of chanting

Chanting is a meditative repetition of a mantra. Mantra is a sound, syllable, word or group of words that is believed to have transformative powers. Chanting is nāda yoga, which is the science of using vibratory frequency and sound current to help a person experience mental calmness and consciousness. It uses primal sounds to connect the cells of the body to the subtle qualities of the mind. Chanting mantras (The word mantra is a Sanskrit word composed of the root *man* meaning “to think” and *tra* meaning “instrument to liberate us from bondage.” Thus, the word means “an instrument of thought that can free us from the constraints of our mind.”) can affect the body in several ways (Chernin DK, 2010). Nāda yoga (yoga of sound) is an ancient Indian metaphysical system. The etymological meaning of nāda is ‘flow of consciousnesses’. Different waves or vibrations of nāda are attractive to different stages of conscious awareness. The world system of the nāda yogis - the belief that the universe is a projection of sound vibrations alone - was formulated from actual experience. It is both a philosophical system, a medicine, and- as the name suggests- a form of yoga. The system's theoretical and practical aspects are based on the principle that the entire cosmos and all that exists in the cosmos, including human beings, consists of sound vibrations, called nāda. This concept holds that it is the sound energy in action rather than of material and particles which form the building blocks of the cosmos. Russill Paul author of “The Yoga of Sound” says that:

“Nāda Yoga embraces the notion that the universe is vibratory, and therefore sonic in nature. Yoga claims that the universe is made up of infinitesimally small subatomic strands of energy vibrating at different frequencies. This cosmology recognizes that the shapes we see in nature are constructed of vibrating entities, each with a different frequency and wavelength. The speed at which an object vibrates (as well as its size,

however infinitesimal) contributes to its particular sound, thus, all the tones and frequencies that comprise the known universe become the subject of meditation in Nāda Yoga.”

Nāda yoga is also a way to approach with respect and react to sound. Sound and music is more than just the sensory properties and sources of sensuous pleasure, sound and music play the role as a potential medium to achieve a deeper unity with both the outer and the inner cosmos. Nāda yoga aims pursue soothing effects on various problematic psychological and spiritual conditions. Vibrations and resonances (nāda) have effects on psychological and spiritual conditions which raise the level of awareness in the postulated energy centers called “Chakra”. According to Yoga, the nādis (nerves) and chakras have healing powers that unlock the spirit and can be obtained with a dedicated practice of chanting on the sounds of the chakras. During chanting, when a specific sound is produced, the sound vibrates the specific chakra. They have corresponding centers in the spinal cord and the nerve-plexuses in the gross body. Each Chakra has control and function over a particular centre in the gross body yet cannot be seen by the naked eyes. These are the centers of consciousness (naadayoga, 2012).

Research has shown that the brain neurotransmitter deficiencies contribute to hundreds of health problems. The brain is the greatest electricity generator in the human body. The brain sends electric currents/signals throughout the entire body through brain chemicals called neurotransmitters which then send energy and information to the rest of the cells, glands and organs. The brain’s four primary neurotransmitters: dopamine, acetylcholine, γ -aminobutyric acid (GABA), and serotonin which affect the brain health in different ways. Central nervous system (CNS) fatigue is any person’s worst enemy (Wholistic Medicine Specialists of Atlanta, 2013).

Evidence supports the role for neurotransmitters in brain-related fatigue. Neurotransmitters, and their balance with each other, play a role in individual's reaction to daily events. When one experiences depression, the level of serotonin, norepinephrine or other neurotransmitter may be abnormal. Due to the well-known effects on arousal, lethargy, sleepiness and mood, serotonin may have the biggest role as a moderator of central fatigue. The serotonergic system is associated with numerous brain functions that can positively or negatively affect sleep and performance. Evidence has shown an inverse relationship between serotonin and dopamine in certain brain areas. A low ratio of brain serotonin to dopamine favors improved performance, whereas a high ratio of serotonin to dopamine favors decreased performance. This latter scenario would constitute central fatigue (Wholistic Medicine Specialists of Atlanta, 2013).

Research findings say that prayer, yoga, meditation and chanting boost serotonin levels. The brain cells & nerves become more receptive & responsive by meditation. Many dormant brain cells are activated by meditation. Repetition of mantras causes vibration in the sphenoid bone and sella turcica of the brain while the tongue stimulates acupuncture meridian points on the roof of the mouth, thus causing stimulation of the hypothalamus, pituitary, and pineal gland (Dennis K. Chernin, 2010). It has been noted that intoned mantras can stimulate endorphins and neurotransmitters and change brain wave patterns (Khalsa DS, 2009). From a Tantric yoga perspective, as mantras are chanted, energy of the sound current creates a channel of healing energy, which travels through the spinal cord (it is advised to keep our back straight during chanting & meditation) to stimulate the energy centers of the body, the chakras (Chernin DK, 2010).

Nāda, or chanting, can affect our brain's activity in a beneficial way as follows:

“There are 84 meridian points located on the hard palate of the roof of the mouth. The movement of each part of the tongue stimulates these meridian points. The points are like a keyboard input to a computer. The computer is located in the hypothalamus area of the brain. It receives the impulses from the repetition of the patterns of sound in the Mantra. This is translated into instructions that regulate chemical messengers that go to all vital areas of the brain and body. The hypothalamus lies just below the thalamus in the middle of the brain. It is connected by blood vessels to the pituitary gland, the master gland of the body. The hypothalamus is known to regulate vital functions like hunger, drinking, body temperature and sleep. It also triggers the regulations of moods, emotional behavior and sexuality.” (Coneway N, 2003-2013).

“In studies performed at Arizona University, it was shown through a Positron emission tomography (PET) scan how a change occurred in the activity of the brain from the frontal part to the parietal part during the chanting of the mantra Sa Ta Na Ma. This change indicated an improvement in mood and alertness.” (Indri K, 2013).

Through the practice of nāda yoga, we can enhance efficient cellular communication, stimulate our immune system, improve our physical health, and calm the mind. Altered states of consciousness also stimulate the serotonergic system. Serotonin receptors, which have high nerve cell concentrations in the hippocampus, amygdala, frontal cortex, visual and auditory centres, act as a “modulatory system” throughout the brain (Winkelman, 2004:199). Altered states of consciousness produced by meditation have been subjected to numerous scientific studies (Cahn and Polich, 2006; Piron, 2001; Kwon et al., 1996; Ragpay et. al., 2000; Kjaer et al., 2002; Newberg and Iversen, 2003; Newberg et al., 2003; Newberg et al., 2001). Research studies say

that during meditation & chanting there is a relative increase in the neurotransmitters dopamine, serotonin and acetylcholine. Chanting leads to an increase in the parasympathetic and sympathetic systems activities which are reflected in lowered heart rate and blood pressure. Furthermore, dopamine seems to be important in parasympathetic tone and functions. Meditation & chanting induces “significant reorganization of frontal hemispheric activity” which is related to increases in α and θ brain patterns (Cahn and Polich, 2006; Davidson *et. al.*, 2003). Newberg *et. al.*, (2002), says that there is an alteration (increase) in the inferior parietal lobe during meditation which mediates the self’s orientation in space. Recent imaging studies indicate altered attention mechanisms of the right dorsolateral prefrontal cortex (DLPC) as well as the parietal lobe during meditation & chanting (Fenwick, 2003). Euphoric emotions of bliss associate with θ brain wave action, arising from the anterior cingulate gyrus. θ action is also linked to “attentional frontal lobe mechanisms” (Fenwick, 2003), which is possibly encouraged by dopamine. The overall effect of dopaminergic/serotonergic activation involves the transmission of information from “emotional and behaviroal preverbal brain” centres into the “personal and cultural systems mediated by language and the frontal cortex” (Winkelman, 2004:199). These biological substrates present the source of ecstatic states and religious experiences of personal integration (Winkelman, 2004:199) in nāda (Saniotis A, Henneberg M, 2011).

The psychological basis of Yajna

Yajna teaches truthfulness. It advises us to be honest and truthful from within so that we can form a pure, healthy & truthful society and thereby country. It is a source of every human needs and gives not only for existence but for eternal growth. Yajna enhances unity and integrity

and aims to eradicate hatred, communal tension and teaches us unity, selfless love and cooperation in society. It makes us self esteemed.

The fire of yajna is the symbol of holy sun. As sun gives pure & equal heat and energy to all humans, animals, plants & other living & non-living entities, in the same manner the holy fire of yajna spreads its essence in the atmosphere. It means, it clears the badness in the environment and cleans the ecospace in which we live, thus giving all a clean, pure & healthy environment to live in. The holiness & purity of yajna spreads equally in ecosystem, i.e., human, plants & other creatures and no one (one involved or not involved in yajna) will be spared from getting the holiness, purity & essence of yajna.

As per the Yajur Veda, yajna-kunda symbolizes mother (Yajur veda 12:15) & yajna is considered as the mother of all creations. As stated earlier, yajna fire symbolizes the sun. The seven chakras get activated by the absorbing the energy of the yajna fire. Thus the holy fire of yajna makes a person as powerful as sun by activating the chakras. A person sitting near this yajna fire develops the zeal of creation & development and not of destruction. Such a person acquires the power like sun who can lead a nation in the best manner and can perfectly take care of the people.

Yajniks (persons performing yajnas) are great & devoted counselors. Before performing yajna, they vow for making the society peaceful & devoted. They, through their knowledge, counsel each and every person to follow the path of leading a truthful & healthy life. No atheists can ignore their powerful & rigorous teaching & counseling. Thus all person fall at the feet of yajniks and the yajniks help them in cleansing their sin through the chanting of the holy mantras.

Chanting holy mantras bring psychosomatic & spiritual integration of an individual.

The psychological impact of dāna: The person who gives Dāna, will experience the feeling of contentment. His cognition will not allow him to be arrogant, dominant and superior due to his abundant wealth.

(with inputs from yajur veda)

Conclusion

During the yajna period (April 26th to May 5th, 2013) in Kalyanpur, Deoghar, no disease in the locality was reported. A social harmony during the period was noted that people, forgetting the difference between caste, creed & mutual hatred, congregated. Also, no intoxication was found in the family & society.

Regarding green house effect it will not be out of place to mention here that no such effect is at all noted. CO₂ produced during yajna ritual, was in the ionizing stage which the plants & vegetation of the region immediately collect for photosynthesis & thus excess distribution of CO₂ in the atmosphere is totally ruled out.

The divine rhythmic vibration generated through specially chanted mantras and bringing special calm & quite behavior of the inhabitants of the entire locality may be attributed to the balance secretion of different neurochemicals of the individual & thus maintaining homeostasis in different neurotransmitters. Further, this activates higher brain centre of devoted worshippers performing yajna ritually helping balance flow of positive energy through different chakras especially Sahasrara & Ajna. As a result, elevation of cosmic consciousness and serenity is created which unfolds the divine nature within.

Rain is experienced as after effect of yajna may be because the yajna-flumes aggregate the water vapors present in the atmosphere (formed by evaporation by the sun and other heat

sources) and yajna-flumes takes this aggregated water vapour to upper & cooler regions of the atmosphere. Also, due to yajna-heat, a low pressure region is created as detected by barometer. A high difference in atmospheric pressure contributes strong cool breeze or rain. This might be the cause of the shower & cool breeze at Deoghar on the following day of yajna (May 5th, 2013).

Further, yajna involves several biological & psychological activities which prove beneficial to a lead a healthy life.

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