

Yagya –Vedic way to Prevent Air pollution

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Abstract

Today, as the environment is getting deteriorated & there is a hue & cry about pollution spreading everywhere, its utility has increased much more as compared to that in the yesteryears. In fact, there are polluted sentiments and motives that are reigning supreme on all animates and inanimate being. As a result, disease, anxiety and friction are spreading everywhere. The only effective scientific solution to this problem has appeared in the form of *yagya*. *Yagyagni*, that is going to be produced by the combined energy or vitality and matter *prima-facie* that may seem a religious act, but its power & effects are extraordinary, and this has been proved through extensive and successful experimentation over the last two decades by the scientists.

Keywords: Yagya, Agnihotra and Air pollution.

The foundation of Vedic culture emanates from the philosophy and science of *Yagya*. *Yagya* is a perennial symbol of this divine culture. The Vedic religion is principally based on *Yagya*. The philosophy of *yagya* appears to be the life of Indology. Talking of the Vedic age automatically flashes in our memory, the images of the great *rishi-munis* performing *agnihotra (yagya)*. It was a common belief and an observed fact in the Vedic Indian society that *Yagya* is essential for refinement of human life (Pandya, 2004).

In all the four Vedas, *Yagya* has been given immense importance. The main reason for this is that *Yagya* is the mechanism through which one can maintain the natural equilibrium in the various components of the environment. They can reduce pollution.

*Ye parvatah som prishtha aapah
Vatah parjanya aadagniste
karvyadmashishman*

(Atharva Veda, 3/21/1).

“*karvyad*”, is the word which has been used as the cause for pollution that is the substance which harm human being. The meaning of above verse is that mountains, water, air, rain and fire reduce pollution and purify the atmosphere. Further in

some mantras, specifically in Riga Veda 10/35/2, 10/66/9, 10/66/10 and 10/64/8, the earth, plant, water, air, cloud, river, forest, mountain and sun have been referred to as purifying agent in nature. They have been called upon to save human beings (Sharma, 1995).

Air is the ocean we breathe. Air is 99.9% nitrogen, oxygen, water vapor and inert gases that are essential for our bodies to live. Air Pollution may be defined as the presence of one or more contaminants in the atmosphere in a certain quantity for certain duration is injurious or tends to be injurious to human health or welfare, animal or plant life. It is the contamination of air by the discharge of harmful substances (Katulski, Namiesmik & Sadowski, 2006).

According to a study published in the Lancet links local traffic fumes to lung development defects, traffic fumes decrease lung function among children and make the organs vulnerable to irreversible long term damage (Gauderman, 2007). Billions of dollars are being spent on air pollution controlling project worldwide but with no satisfactory effect. *Yagya* provides an effective, eco-friendly, economic alternative in this respect. The sublimated herbs in the fumes and vapors of

Yagya counter the toxins in the air at an amazing rapid rate and benefit all humans, birds-animals, trees and plants that inhale them through respiration and skin pores.

Yagya : A Vedic Culture

All activities in the limitless expansion of the universe are said to have generated from a grand eternal *yagya*.

Ayam yagya vishwasya bhuvanasya nabhih.
(*Altharva Veda*, 9/15/14)

means, implying *Yagya* as the fundamental process of manifestation of nature. *Yagya* is a spiritual experiment of sacrificing and sublimating the *havan samagri* in the *yagyagni* with chanting of Vedic mantras. This is only the physical process and rituals of *yagya*, which has scientific importance and beneficial effects (Pandya, 2009). This *agni yagya* when performed at small scale is also known as *havan*, *homam* or *agnihotra*. The brilliance and purity of *agni* (fire) is found as the best symbol for *thy*-worship. The first mantra of *Rig-veda* the most ancient scripture of knowledge on earth, quotes- *Agnimide Purohitam* signifying *Agni* as the sacred idol of God (Pandya, 2004).

Yagya is pivotal in the existence and sustenance of the cycle of nature. Thy creation of nature is an eternal *yagya*. It is the genesis of the flourishing manifestation of *nature*. The sentiment of *yagya* indwells in ecological balance harmonious activities of nature. Lord Krishna describes in the holy *Gita* that – the nature is born out of *yagya* and exists only by the motivating force of *yagya* (Pandya, 2009). The continuum of *Yagya* is the nucleus of continuous activities in the world and the cosmic expansion. The oceans, the seas generously donate from their repository of water. Clouds formed by vaporization of the sea water carry it across the globe and shower the drizzles of rain water – which flowing through the rivers, goes along fulfilling the thirst of soil, plants, trees and all beings and reaches back in the

sea. This is a cycle of natural *yagya* (Pandya, 2004).

Air pollution

Air pollution is the introduction by of hazardous substances into the environment by human beings that cause hazard to human health, harm to living resources and ecological system, damage to structure or interference with legitimate use of environment (Colls, 2002).

Studies shows that the current levels of air pollution in the cities of many developed and developing countries are associated with the increased rates of morbidity and mortality have heightened concern that air pollution continues to pose a threat to public health (Bascom, Bromberg & Costa, 1996).

Air Pollution has both acute and chronic effects on human health. Health effects range anywhere from minor irritation of eyes and upper respiratory system to chronic respiratory disease, heart disease, lung cancer and death. Air pollution has shown in cause acute respiratory infections in children and chronic bronchitis in adults, it has also been shown to worsen the condition of the people with pre existing heart disease (Bascom, Bromberg & Costa, 1996). According to WHO Air pollution permanently kills 2 million people every year accounting for more than half the deaths in developing countries (Chattopadhyay, 2006).

The major cause of all air pollution is combustion, which is essential to man. When complete combustion occurs, hydrogen and carbon in fuel are fully combined with oxygen from air to produce heat, light, carbon dioxide and water vapor. However impurities in the fuel, poor fuel to air ratio or too high or low combustion temperature cause the formation of such by products Carbon monoxide, Sulphur dioxide, Nitrogen dioxide, fly ash and unburnt hydrocarbons which all are air pollutant (Dockery & Pope, 1994).

Essentials of Combustion

Combustion is said to occur if a fuel is oxidized (generally by the atmospheric oxygen) giving rise to thermal energy. Once the combustion takes place, thermal heat is produced that was inherent in the particular fuel. This gives rise to increase in temperature. Some fuels release much more energy than some other fuels. For example, typical hydrocarbon fuels such as methane, propane, gasoline, diesel, etc. have their thermal energy in the range of 10,000 calories per gram of fuel, called calorific value of the fuel. Upon combustion (that is, oxidation by atmosphere oxygen) the final temperatures may be as high as 2500 degree Celsius, called the adiabatic flame temperature of the particular fuel.

There are fuels that have smaller calorific values such as cellulose materials, wood being one of them. Typical firewood may have calorific value around 3000 calories per gram of fuel-about one-third of the hydrocarbon fuel. This is easy to understand because hydrocarbon fuels have only carbon and hydrogen atoms in their molecular structure while cellulose materials have oxygen atoms too in addition to the carbon and hydrogen atoms. That means that the molecular structure of cellulose materials has embedded oxygen atoms. In other words, they are partly oxidized within their molecular structure and upon combustion they can be further oxidized by the atmospheric oxygen to the remaining lesser extent only. Hence their calorific value is much lower. Upon combustion, they are likely to cause maximum temperatures in the range of 800-1200 degree Celsius only. Upon complete combustion, we expect formation of carbon dioxide and water vapor as the products. Due to the deficiency in the availability of oxygen, or other possible reasons some fuels remains unburned, or gets only partially oxidized to carbon monoxide.

Unburned fuel and carbon monoxide are considered undesirable pollutants for the atmosphere. Also, if the combustion gives rise to

high temperatures in the range of 2000 degree Celsius or above then the atmosphere nitrogen and oxygen may react with each other, forming the oxides of nitrogen-another family of undesirable pollutants. Thus, we can see that while combustion of a fuel gives rise to thermal energy, it produces some undesirable pollutants such as unburned fuel, carbon monoxide and the oxides of nitrogen. Nowadays, when man is using energy in greatly unchecked manner even carbon dioxide is considered as undesirable because of it being one of the so-called greenhouse gases (Chandra, 2004).

Combustion in *Agnihotra*

Agnihotra consists of a base fire generated in a specially designed vessel built or fixed on the surface of the level ground. Burning fire of certain specified characteristics forms the base fire. Firewood being a cellulose material has much lower calorific value. The base fire has much lower temperature than in the typical engines. To this base fire certain substances like purified butter (*ghrtm*) & herbal substances are added periodically in the form of oblations. It should be emphasized on that the purpose of *agnihotra* is not to burn the substances that are added in the form of oblations, rather it is to vaporize them i.e. to heat them just to the extent that they are transform the air quality.

Coupled with the Buoyancy and aerodynamic effects due to thermal energy released by the base fire the vaporize substances traverse to all nooks and corners of the enclosed room. In other words the base fire is utilized to convert the herbal substances into gaseous phase, furthermore, to aerodynamically transport the same to the entire surroundings in a most effective manner. The buoyancy forces enhance the transport processes. It must happen that a fraction of the substances added as oblation do go through combustion process, especially so must be true with *ghrtam*. Their effect upon combustion is not expected to be harmful to the atmosphere.

Let us now discuss the production of the pollutants by the base fire, if any. As it has already discussed that the base fire is generated by burning firewood which has lower calorific value than the typical hydrocarbon fuels. This ensures lower temperature when oxides of nitrogen cannot be formed. The design of the vessel (pyramid shaped) ensures plenty of oxygen and the amount of firewood burned is to the minimum extent so that carbon monoxide is minimal, as well as the unburned hydrocarbons. Carbon dioxide, a greenhouse gas is definitely formed, and therefore, it is suggested that the *agnihotra* ought to be performed during and after sunrise, and well before sunset in an area with sufficient green cover. Such local surroundings ensure that the carbon dioxide is well utilized by the green cover the carbon dioxide into oxygen.

In the modern times, our life style gives rise to the formation of carbon dioxide in very large proportion. In the olden days, carbon dioxide was not an undesirable combustion product. Though its control is required now, by any means *agnihotra* should not be criticized for the same. We should concentrate on other sources of carbon dioxide because *agnihotra* has much advantage in the context of air pollution. We are not aware of any other method to purify the air once that has been polluted by us. The requirement of purification is of enormous proportion for the indoor air because that is what we breathe in most of the time. This is becoming increasingly important because the modern man is spending more desirably on the air fresheners that are commercially available but cannot purify the indoor air. Their purpose can be very limited to reduce the undesirable foul odor, and even for that purpose their side effects have to be fully understood (Chandra, 2004).

Effect of Yagya on air pollution

The thinkers and philosophers of Vedic period were fully aware about the importance of their surrounding environment, as it has been stated,

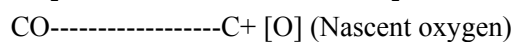
*Aa vata vahi bhenshjam vi vata vahó yadrapa,
Tam hi vishwa bsheshjo devanam doot eyase.*

(Riga Veda,10/137/3).

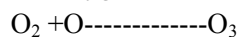
Means that the medicinal air should blow from all directions, contributing to our health and welfare, and it may be possible by performing yagya (Sharma, 1995). Yagya is conducted with selected medicinal preparation of herbs that is sacrificed in the holy fire along with the chanting of specific Vedic hymes (*mantras*). The types and quality of herbs used in the preparation of material (*havan samagri*) for oblation in the fire of yagya, the types of woods (*samidha*) used in the fire, the selection of *mantra*, the timings for yagya etc. are specific for special effects. The fumigation and sublimation of selected wood and *havan samagri* in the scientifically designed (pyramid shaped) yagya *kunda* offer enormous healthy effects and therapeutic and environmental purification applications.

Some postulatory mechanism of reactions involved during yagya can be depicted as follows (Mishra & Gupta 1996),

- (1). Infra red (invisible spectrum) and probably red solar rays (visible spectrum) at the sun rise falls on the side of Copper pyramid and generate electrons by a process known as photoelectric effects. These electrons have capacity to reduce the compounds. After the offering of *havan samagri* mixed with clarified butter (*ghee*), the carbonic compounds present in it are oxidized and generate CO and CO₂ besides other antimicrobial chemical compounds. Electrons generated from copper with the reaction of solar rays may deoxidize CO₂ and CO as

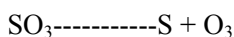
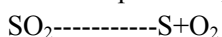


One molecule of oxygen may combine with nascent oxygen and form ozone.

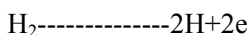
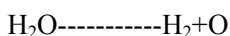


Similar reaction may take place in atmosphere where CO₂ and CO are present. Electrons generated from copper pyramid may be fed back to atmosphere and form ozone. This ozone may either enrich the ozone layer at the top of the atmosphere or heal up the perforated part of ozone layer.

Electron may also deoxidize the other pollutant gases e.g. SO₂ and SO₃ of the atmosphere to a harmless compound as,

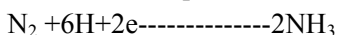


Moisture contents present in wood component of *havan samagri* after burning in yagya fire may be broken as



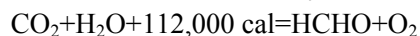
2H (proton) and electron may reduce the other pollutant gas or of atmosphere to a harmless compounds. A number of compounds liberated from the burning clarified butter may also have a masking effect on the pollutant particles in the atmosphere.

- (2). There is another possibility of involvement of electrons (e⁻) and protons (2H) in fixing atmospheric nitrogen (N₂) which is unavailable to crop plants to the bound form of nitrogen.e.g. NH₃ by photochemical nitrogen fixations ammonium nitrogen (NH₃) is easily available to crops.



- (3). When all the volatile substances are diffused in the surrounding atmosphere, those are further subjected to photochemical reaction in the sunlight. This way is the reason why it has been recommended that *Yagya* should be performed in the presence of strong sunlight. These changes occur in the ultra violet and other short wave length regions. The products of fumigation thus go photochemical decomposition, oxidation and reduction

photochemical process. To some extent CO₂ is also reduced to formaldehyde as follows;



It is well known that formaldehyde is a powerful antiseptic. It is also interesting to note that germicidal action of formaldehyde is only effective in the presence of water vapor which is also produced in large quantities in *yagya* (Flanagan, 1911).

During Bhopal Gas Tragedy (1984), the two families which lived in the worst affected area, came out unscathed as they were regularly performing *agnihotra*. This observation proves that *agnihotra* is a powerful antidote to all type of pollution also (Joshi, 2010).

A Russian scientist has remarked that (1). cow's milk contains power of protection from atomic radiation (2). houses having cow dung covered floors enjoy complete protection from atomic radiation (3). if cow's *ghee* is put into *yagya* fire, its fume lessens the effect of atomic radiation to a greater extent (Patil, 2003).

The unique impact of *Mantra-shakti* in *Yagya* is of paramount importance. The configuration of special syllables in mantra and the Vedic patterns of chanting them during *yagya* are derived from absolute research by the *rishis* on the deeper sciences of gross and subliminal sonic vibrations and music. The collective chanting of mantra that adept rhythm in front of *Yagyagni*, magnifies the *mantra Shakti* exponentially and expands the mantra vibrations to un limited heights in all dimensions, which have infinite radiant effect in the outer space (Pandya, 2004).

Conclusion

A recent study at the Scripps Institute of Oceanography, USA, claims that the combined effect of air pollution and green house gases may induce greater variability in the Indian monsoon-heightening its intensity or weakening it (Chung & Ramanathan, 2006).

The knowledge of *Yagya* as realized and deciphered by the Indian *rishis* is indeed a boon bestowed on mankind and by this the human being may cope from all type of environmental problem. The methods of performing *Yagya* as experimented and propagated by these ancient scientists and sages contained the key to ideal maintenance of ecosystem and the environment of life as,

Aesh hi vahi yagyo yo ayam pavate

Idam sarvam punati, tasmadev aev yagyah.
(*Chhandogya upnishad, 4/6*)

means, *yagya* removes all the faults, impurities, pollution and purifies everything. Purification of air is a prominent physicochemical effect of *yagya*. Little dumping, moisture and filth or stinking in or around the house is sufficient for growth of germs. Use of pesticides is harmful as it bears the negative effect of our inhaling the toxins (Sharma, 1995). The harmless use of burning incense sticks or dry powders of *guggul*, camphor etc is quite well known for the purpose of purification. Inflaming mixes of *jaggery*, sugar and pure *ghee* also has good effect on destroying germs and insects. Haffkin has mentioned that mixing *ghee* and sugar and burning them create smoke which kills the germs of certain diseases. Prof. Tilward has also remarked that sugars present in *havan samagri* have great power to purify atmosphere (Joshi, 2010).

The heat of *Yagyagni* lightens and expands the surrounding air after purification. The later moves upward and spreads around in wider areas. New layer of air coming from the below goes through the same cycle of purification. *Yagya* thus continues generating more and more pure air comes from larger and larger space around. The potency of the herbs and other healthy substances amplifies million times after sublimation in *Yagya* and these also reach miles ahead in the space with the spreading vapors and fumes of *Yagya*. Most importantly, these not only destroy germs, but also eliminate the toxic particles and pollutants (Pandya, 2004).

In such a situation when experts infer that if the air pollution is not controlled, soon there will be no warbling of birds in the morning, as they would find it difficult to open their mouths in poisonous air, we can conclude that the relevance & need of grand scale *Yagyas* augments more in the present circumstances when every component of nature is critically polluted & the fumes of *Yagyagni* proves to have excellent purifying, nourishing & medicinal effect on the air as well as on soil & water. Notably it risks no side effects & no perturbations & ecological harmony.

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