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AGNIHOTRA EFFECT ON MICROBIAL CONTAMINATION OF AIR

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ABSTRACT
In the present study, the effect of agnihotra practices was observed on the microbiological quality of air in an organic environment at Palampur. Air quality of Agnihotra and Non – Agnihotra rooms were compared by collecting samples at three different time interval viz. half an hour before, at the time of agnihotra and half an hour after agnihotra using Settle Plate Method and blood agar as medium. It was observed that the total number of mesophilic colony units per plate (cfu/plate) was higher (70 cfu) in non - agnihotra room as compared to agnihotra room (23 cfu). The average thermophillic count per plate was also found to be 3 cfu in non - agnihotra room whereas, it was not detected in agnihotra room. The present findings indicate that the agnihotra practices have an adverse effect on the pathogenic micro-organisms (especially on those growing at higher temperature) and total microbial load of the air.

INTRODUCTION

Air contains large number of microorganisms and their estimation is important as an index of cleanliness for any particular environment (Ekhaise and Ogboghodo, 2011). The indoor air quality is affected by the presence of microorganisms which include bacteria, moulds and viruses (Wamedo *et al.,* 2012).The quality of indoor environment is not easily defined or readily controlled and can potentially place human occupants at risk (Jaffal *et al.,* 1997a) as people spend 80%-90% of their time in indoor environments (Awad and Farag, 1999) by breathing on average 14 m^3 of air per day (Brochu *et al.,* 2006). Airborne transmission is one of the routes of spreading diseases responsible for a number of human and animal infections of the recent past.

The environmental factors which enhance microorganism's growth and multiplication in the indoor atmosphere, mainly include temperature, humidity, air exchange rate, air movement, building structures and location, poor design, ventilation system as well as interior or redesign (Graudenz *et al.*, 2005; Wamedo *et al.,* 2012 and Meadow *et al.,* 2014). Rintala *et al.* (2008) reported a clear distinction of the effects of seasons on air borne micro flora, where the total concentration of culturable microorganisms in indoor air was highest in summer and fall than in winter. The pathogenic microorganisms which are mostly mesophiles grow at a temperature range of 20-45ºC. Thermophiles are heat-loving, with an optimum growth temperature of 50°C or more, a maximum of up to 70ºC or more and a minimum of about 20ºC. In India, the fluctuation of air temperature varies a lot from one part to the other and the highest temperature was recorded 50.6ºC in Rajasthan (India Meteorological Department , 2010) and lowest -52ºC in Ladakh (De *et al.,* 2005).

Environmental pollution and mechanical approach to life today is adversely affecting the human mind and body. In order to regulate various types of pollution as well as to mitigate the adverse effects of pollution, many nations worldwide have enacted legislations, various environmental protection agencies have been set up and various environmental standards have been made. But all these will take a long time to undo the effects. Paranjpe wrote in his book "Homa therapy - Our last chance" that when things go wrong due to pollution, the elements of nature begin to change (Paranjpe, 1989). Hence there is a need for "Agnihotra" and "Homa therapy", which is the only chance to create sterile, hygienic atmosphere with faster recovery of all sorts of ailments and at a very miniscule cost.

It is the technical term for denoting the process of removing the toxic conditions of the atmosphere with fire as the medium."Homa" is a Sanskrit word used here as synonymous with Yagna. Yagna, when performed at a small scale in day to day life are called - "Agnihotra" or "Havan" (Sharma, 2001).

"Agnihotra" is a gift to humanity from the ancient most vedic sciences of bioenergy, agriculture and climate engineering. It is also stated as a healing fire from the ancient science of Ayurveda (Koch, 2004). Keeping this in view, the present study was conducted to study the effect of agnihotra practices on the microbiological quality of air especially on the mesophiles and thermophiles.

MATERIALS AND METHODS

The present study was conducted at Palampur (31° 54' N and 76° 17' E), Himachal Pradesh, India. Two rooms of equal dimensions were selected for the study. Agnihotra was

Table 1: Effect of Agnihotra practice on microbial contamination (cfu) of air

	Non Agnihotra (Morning time)				Agnihotra (Morning time)			
	Before	At	After	Average	Before	At	After	Average
Mesophilic Microbial Contamination	16	102	87	70	9	31	30	23
Thermophilic microbial contamination	1	4	3	3	0	0	0	0
Hemolytic colonies	3	4	7	5	1	1	0	1

performed as per the standard Homa technique (Paranjpe, 1989). Just prior to the study, inputs *i.e.,*cowdung cakes (80g), ghee (5g) and dehusked rice grains (2g) were weighed for the two rooms respectively.

In both the rooms, basal readings of number of microorganisms were taken by using Settle Plate Method exposing blood agar plates (90cm) placed typically at bench height 1m from the floor, 1m away from the wall for 30 minutes in the air (Rahkio and Korkeala, 1997; Bhatia and Vishwakarma, 2010). The plates containing blood agar were used for the detection of hemolytic microorganisms.This was done exactly half an hour before the agnihotra time. In one of the room, agnihotra was performed at exactly sunrise time and in another room only simple fire was prepared from cow dung cakes and other ingredients in copper pyramid but without mantras. At this time, again bacterial counts were taken in both the rooms by same method (plates were exposed at the time when fire was prepared) and the third reading was taken exactly after half an hour of Agnihotra in both the rooms. The bacterial culture plates were incubated at 37°C for 24hrs. Some of the plates were incubated at 55°C for 24 hrs. to record the thermophilic microbial counts. After incubation, the total numbers of colony forming units (CFU) for the haemolytic bacterial air-flora were enumerated as the number of bacteria carrying particles settling over the area of the plate in a given period of time and converted to organism's colony forming unit (cfu) per cubic meter.The study was laid down in completely randomized design (CRD) with three replications.

RESULTS

In the present study, the microbial contamination was observed to be higher (70cfu /plate) in non agnihotra room as compared to agnihotra room (23 cfu/plate). An average of five hemolytic colonies per plate was found in non agnihotra room as compared to only one hemolytic colony per plate in agnihotra room. The average thermophilic count per plate was also found to be 3 cfu in non agnihotra room whereas; it was not detected in agnihotra room (Table 1).

DISCUSSION

Perusal of the data reveals that number of microbial counts developed in blood agar medium in agnihotra environment was very low as compared to non agnihotra environment. There was significant reduction in the number of colonies of microbial growth after the performance of agnihotra (Mondkar, 1982, Purandare and Prasad, 2012). "Agnihotra" effect on aerial micro flora was also studied. It was observed that bacterial colonies of *Staph albus, B-subtlis, Enterococci, E-coli, Staph Pyo, Pheumonae* grown before agnihotra showed a definite reduction in colony count in 30 to 60 minutes. There was a definite reduction in microflora after performing Agnihotra (http://www.altmedicenter.com/am/agnihotra_homa.asp?page ID=agnihotra_homa5.asp).

In another study, agnihotra was found to be very effective against Airspora. A 63% reduction in bacterial colony and 91% reduction in fungal colony count were obtained after performing Agnihotra (Patil *et al.,* 2008).

In the present study, it was also observed that the plates exposed to agnihotra showed a tremendous reduction in the hemolytic colonies. In an experiment on effects of agnihotra on bioenergetic systems of individual microorganisms (Mondkar, 1982), similar results were obtained.The medicinal fumes emanating from agnihotra have been observed by researchers in the field of microbiology to be clearly bacteriolethal in nature. These eradicate bacteria and other micro-organisms, which are the root cause of illness and diseases (Sharma, 2001). Study conducted at CSK HP Agricultural University Palampur on the effect of Homa Farming practices on agriculturally important microorganisms showed that all the pathogens were inhibited by the Homa environment.The maximum inhibition range (29-42%) was recorded in agnihotra hut followed by tryambecum hut (8-32%) and Homa environment (4-22%) respectively (Saroch *et al.,* 2011).

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