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Study on the Effect of Neem (*Azadirachta indica*) Leaves Smoke in Controlling Airborne Bacteria in Residential Premises

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Abstract: The effect of smoke produced by burning of neem leaves (*Azadirachta indica*) was studied for controlling airborne bacteria in four rooms of house premise viz., kitchen, dinning hall and two meeting halls in Dubai. Petri plates containing with bacterial agar medium were sterilized in an autoclave and placed at Cassella airborne bacterial silt for monitoring. Bacterial colonies developed in those petri plates which were exposed to ambient environment, whereas no bacteria colony were seen in petri plates exposed to neem leaves smoke treated environments. Maximum bacterial colonies were developed in kitchen followed by dinning hall and the meeting rooms (majlis) in the ambient environment. Neem leaves smoke treatment resulted in controlling bacterial growth on bacterial agar medium petri plates. Studied revealed that neem leaves smoke has antibactericidal properties and could be used for controlling airborne bacterial contamination in the residential premise.

Key words: Airborne bacteria, autoclave, cassella airborne bacterial monitor, antibacterial properties

INTRODUCTION

Neem tree (*Azadirachta indica*) belongs to family Meliaceae grows naturally in Asian countries, especially Indian sub-continent, both under subtropical and tropical regions. It has shown adaptability in Arabian countries with dry hot desert agroecological conditions. Thus, this plant is being planted along side roads and in residential premises for greening and for providing shade for the peoples and others in hot sunny days. The success of neem tree plantation has increased the green picturesque environment in dry desert plains and hilly forest tracts in Arabain countries. (Pennington, 1981). Neem tree is known to have medicinal properties since long. It has been reported earlier that, its different parts contained several medicinal, insecticidal and antibacterial properties (Tella, 1977; Siddiqui *et al.*, 1992; Biswas *et al.*, 2002; Subapriya and Nagini, 2005; Roop *et al.*, 2005; Mahfuzul Hoque *et al.*, 2007; Prashant *et al.*, 2007).

Neem bears green leave round the year, which along with its fruits are used for making many medicinal and insecticidal formulations and neem cake as biofertilizer. Neem leaves are often used for creating smoke for warding off insects and flies in premises of animal and human habitation. But what effect the neem leaves smoke has on airborne bacteria is not known. So, the present study was, therefore undertaken on the concept of the Chairman, Haji Saeed Lootah, that everything existing in nature could be investigated for its properties and utilized by mankind for their benefit.

MATERIALS AND METHODS

Two environments, one ambient environment and other neem leaves smoke treated environment were used to study the effect of fresh neem leaves smoke on the airborne bacteria in four rooms of the

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premises of S. S. Lootah group of companies, Dubai viz., Kitchen, dining hall and inside and outside meeting (majlis) halls. Therefore, an investigation was conducted to study the effect of neem leaves smoke on airborne bacteria in the residential premises of the chairman, S. S. Lootah group of companies, in Dubai in the last week of March, 2008. Petri plate containing bacterial nutrient agar medium were prepared and sterilized in autoclave. Petri plates with nutrient agar medium were placed on Cassella airborne bacteria monitor for exposing them to ambient environments of rooms for 30 min after closing the doors of the rooms. Subsequently, neem leaves smoke was created by putting the fresh neem leaves in automatic incense burner. The neem leaves smokes was allowed to spread in each room after closing the doors of the rooms for 10 min for creating neem leaves smoke treated environment. Thereafter, sterilized fresh nutrient agar plates were placed on Cassella airborne bacteria monitor (slit) and exposed to neem leaves smoke treated environment of each room separately for 30 min. All the nutrient agar plates exposed to ambient environment (untreated) and neem leaves smoke treated environments were placed for incubation at 37°C for 24 h for bacterial colony development.

RESULTS AND DISCUSSION

The antibacterial potentiality of the fresh neem leaves smoke was studied in present investigation. The petri plates containing bacterial agar nutrient medium were placed on Cassella airborne bacteria monitor (silt) and exposed in two type environments (ambient environment and smoke leaves treated environment) at four places i.e., Kitchen, dining hall and two meeting hall (majlis). In present study, it was observed that; at all the studied places, bacterial growth was checked after creating the neem leaves smoke, therefore, a clear-cut differences between the petri plates exposed to ambient environment and the neem leaves smoke treated environment with respect to bacterial colony development was noticed. Bacterial colonies were developed in all the plates exposed to ambient environment of the rooms, whereas no bacterial colonies were observed in neem leaves smoke treated environment. However, a significant variation in bacterial colony was found at all the studied places. Maximum bacterial colony was in ambient environment of the kitchen followed by dining hall and outer and inside meeting (majlis) halls (Table 1).

Here, we have reported high antibacterial potentiality of fresh neem smoke in residential premises. The presence of food and other eatables and occurrence of comparatively high humidity in kitchen and dining hall could be reason for higher airborne bacterial population than the meeting rooms of the premises. The non development of bacterial colonies in the plates exposed to neem leaves smoke environment is the indication of killing of airborne bacteria. Therefore, the present study support that the neem leaves smoke has a potential antibactericidal properties. These finding agreed with the previous reports, where antimicrobial activity has been reported by Rao *et al.* (1986), Almas (1999), Das *et al.* (1999), Sai-Ram *et al.* (2000), Vanka *et al.* (2001), Baswa *et al.* (2001), Roop *et al.* (2005), Subapriya and Nagini (2005), Mahfuzul Hoque *et al.* (2007), Prashant *et al.* (2007) and Thakurta *et al.* (2007) using different parts of neem plant. From this preliminary study it could be concluded that neem leaves smoke can be used for inhibiting bacterial development and or clearing the environment from the bacteria in the premises. However, further investigations on the effect of neem leaves smoke in controlling particular bacterial strains/populations are required.

Table 1: Extent of colonies in different places in ambient environment

Place	No. of colonies in petriplates
Kitchen	8
Dinning hall	5
Majlis	4

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REFERENCES

- Almas, K., 1999. The antimicrobial effects of extracts of *Azadirachta indica* (Neem) and *Salvadora persica* (Arak) chewing sticks. Indian J. Dent. Res., 10: 23-26.
- Baswa, M., C.C. Rath, S.K. Dash and R.K. Mishra, 2001. Antibacterial activity of Karanj (*Pongamia pinnata*) and Neem (*Azadirachta indica*) seed oil: A preliminary report. Microbios, 105: 183-189.
- Biswas, K., I. Chattopadhyay, R.K. Banerjee and I. Bandopadhyay, 2002. Biological activities and medicinal properties of neem (*Azadirachta indica*). Curr. Sci., 82: 1336-1345.
- Das, B.K., S.C. Mukherjee, B.B. Sahu and G. Murjani, 1999. Neem (*Azadirachta indica*) extract as an antibacterial agent against fish pathogenic bacteria. Indian J. Exp. Biol., 37: 1097-1100.
- Mahfuzul Hoque, M.D., M.L. Bari, Y. Inatsu, V.K. Juneja and S. Kawamoto, 2007. Antibacterial activity of guava (*Psidium guajava* L.) and Neem (*Azadirachta indica* A. Juss.) extracts against foodborne pathogens and spoilage bacteria. Foodborne Pathog. Dis., 4: 481-488.
- Pennington, T.D., 1981. Flora Neotropica. 1st Edn., New York Botanical Garden, New York, Monograph, ISBN: 100893272353.
- Prashant, G.M., G.N. Chandu, K.S. Murulikrishna and M.D. Shafiqulla, 2007. The effect of mango and neem extract on four organisms causing dental caries: *Streptococcus mutans*, *Streptococcus salivarius*, *Streptococcus mitis* and *Streptococcus sanguis*: An *in vitro* study. Indian J. Dent. Res., 18: 148-151.
- Rao, D.V., I. Singh, P. Chopra, P.C. Chhabra and G. Ramanujalu, 1986. *In vitro* antibacterial activity of Neem oil. Indian J. Med. Res., 84: 314-316.
- Roop, J.K., P.K. Dhaliwal and S.S. Guraya, 2005. Extracts of *Azadirachta indica* and *Melia azedarach* seeds inhibit folliculogenesis in albino rats. Braz. J. Med. Biol. Res., 38: 943-947.
- Siddiqui, S., S. Faizi, B.S. Siddiqui and Ghiasuddin, 1992. Constituents of *Azadirachta indica*: Isolation and structure elucidation of a new antibacterial tetranortriterpenoid, mahmoodin and a new protolimonoid, naheed. J. Nat. Prod., 55: 303-310.
- Subapriya, R. and S. Nagini, 2005. Medicinal properties of neem leaves: A review. Curr. Med. Chem. Anticancer Agents., 5: 149-156.
- Tella, A., 1977. The effects of *Azadirachta indica* in acute *Plasmodium berghei* malaria. Nig. Med. J., 7: 258-263.
- Thakurta, P., P. Bhowmik, S. Mukherjee, T.K. Hajra and A. Patra *et al.*, 2007. Antibacterial, antisecretory and antihemorrhagic activity of *Azadirachta indica* used to treat cholera and diarrhea. India. J. Ethnopharmacol., 111: 607-612.
- Vanka, A., S. Tandon, S.R. Rao, N. Udupa and P. Ramkumar, 2001. The effect of indigenous Neem *Azadirachta indica* mouth wash on *Streptococcus mutans* and lactobacilli growth. Indian J. Dent. Res., 12: 133-144.