

## **Incense Sticks: A Potential Source of Indoor Air Pollution**

**Shweta Rana**

*Assistant Professor, Department of Mathematics  
Amity University Haryana, India.*

### **Abstract:**

The impact of indoor air pollution on health is a growing area of interest for public health professionals. Most of the (middle & upper class) urban population spend majority of their time in indoor spaces (home/office/school/private transport). Indoor Air can be more polluted than Ambient Air and affects health more severely because of close long term exposure. Because of the poor ambient air quality residents of modern urban dwellings are discouraged to ventilate to outdoors and this may lead to high accumulation of certain pollutants in indoor areas. Rising CO<sub>2</sub> concentration in indoor air is a big concern now days for occupants of air conditioned buildings. Apart from these so well defined problems in Indoor there is a big gray area of traditions and beliefs; like brooming every morning re-suspends settled particles to the breathing zone and burning incense sticks for freshness in air. My idea is to understand, how Indian traditional practices like lighting up a bunch of incense sticks two times every day adds up to the indoor air pollution? What is the overall contribution to the air pollution by such practices?

**Keywords:** Incense, indoor air pollution, particulate matter

### **INTRODUCTION**

Air, water, food, heat and light are the five essentials for the human beings. An adult breathes nearly 22,000 times in a day and inhales approximately 15kg of air per day. Air that we breathe is available freely over the surface of earth but breathing clean & healthy air is becoming a luxury for urban dwellers. Air is chemically composed of 78.08% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.032% (320 ppm) Carbon dioxide, 0.0018% Neon, 0.00052% Methane, 0.00012% 1.2 (ppm) Krypton, 0.5 ppm

hydrogen, 0.5 ppm, 0.08 ppm Xenon, 0.02 ppm Nitrogen dioxide, and 0.001-0.04 ppm Ozone etc. As per WHO, Air pollution is the 5<sup>th</sup> largest killer and single most environmental health risk. The WHO attributes 45% strokes, 40% coronary heart disease, 46% of COPD (Chronic Obstructive Pulmonary Diseases) & 41% LRTI (Lower Respiratory Tract Infections) to air pollution worldwide.

Air is considered polluted when there is a presence of foreign matter in air apart from its natural components or when any of its natural component's concentration exceeds the defined safe limits which affect the wellbeing of animals, plants and other living creatures. Cities like Delhi are highlighted worldwide by media for its highly polluted ambient air and this has resulted in hijacking air pollution analysis concepts from western part of the world. Sources of pollution vary from city to city and country to country and it is crucial to thoroughly understand the local sources of air pollution before deriving any assumptions. Some of the pollutants of most concern in Indian conditions are Particulate Matter (PM10, PM2.5 & PM 1), SO<sub>2</sub> & NO, CO and Ozone. The top 20 most polluted cities have PM2.5 levels (annual mean) between 268 microgram/m<sup>3</sup> and 168 microgram/m<sup>3</sup> for the year 2015. In fact none of the 168 cities that monitor AQI meets the WHO safe standards.

People typically spend up to 90% of their time indoors, particularly women, young children and elders. Burning of Incense sticks regularly for religious/ cultural reasons is a common practice in a number of cultures which is a neglected area for study and research. Its smoke can be a major source of particulates in indoor air, whose emissions may contain contaminants that can cause a variety of health effects. Incense produces particulate matter that can deposit in the respiratory tract, and elevates airborne concentrations of carbon monoxide and benzene. Incense also contains trace amounts of chemicals suspected of causing skin irritation, and exposure to incense has been linked with several illnesses. Incense smoke should be considered a source of indoor pollutants in rooms in which incense is regularly burned.

## **POTENTIAL HEALTH EFFECTS**

In every Indian household, agarbattis (incense sticks) are an essential part of prayer, without which the puja (ritual) is incomplete. Although available in every home, there are no known health benefits of incense sticks, apart from filling the atmosphere with scented aromas. However, what you are unaware of the fact is that this everyday ritual can cause more harm than good to your health.

### ***Respiratory effects***

#### **It may lead to respiratory infection**

According to a recent study, incense sticks come with a health threat. The results proved that burning agarbattis inside the house generate air pollutants, namely carbon monoxide. The smoke causes indoor air pollution that may lead to inflammation of the lung cells, putting you at an increased risk of respiratory

complications. Most people experience coughing and sneezing due to hypersensitivity that is caused when a person inhales smoke in excess. In rare cases, choking might be caused if excess smoke is inhaled. Read how gem therapy can help treat respiratory ailments.

### **It heightens risk of respiratory cancer**

Have you ever thought that burning incense sticks might put at an increase risk of cancer of respiratory tract? A study that appeared in the Journal of the American Cancer Society stated that long-term exposure to incense sticks (agarbattis) put you at an increased risk of upper respiratory tract cancer. It further proved that with the use of incense, the risk of upper respiratory tract ‘squamous cell carcinoma’ is comparatively high in smokers than in normal people.

### **It increases your risk of COPD and asthma**

The pollutants that are released from burning incense sticks cause inflammation of the bronchial tubes that pass air to the lungs. These sticks contain sulfur dioxide, carbon monoxide, oxides of nitrogen and formaldehyde (in particulate as well as gas form), leading to inflammatory responses such as COPD and asthma, when regularly exposed. The amount of smoke inhaled by the lungs is the same as when exposed to cigarette smoke.

### ***Cardiovascular effects***

#### **It Impairs cardiovascular health**

The agarbattis that you use daily can have a negative effect on your heart health. The study estimated that long-term use of incense sticks increased the risk of cardiovascular mortality by 12% and coronary heart disease by 10%. (4) It is mainly caused due to increased inhalation of agarbatti smoke (containing volatile organic compounds and particulate matter). It also increases blood vessel inflammation and affects blood flow leading to heart complications.

### ***Other health effects***

#### **It causes skin allergies**

It is a fact that long-term exposure to agarbattis smoke causes irritation of the eyes, especially in kids and older people. In addition to this, people with sensitive skin also experience itching of skin when come in contact with pollutants and smoke on an everyday basis. The particulate matter present in the smoke of agarbattis causes skin irritation and allergy.’

### **It triggers neurological symptoms**

Common neurological symptoms that were found to be associated with daily exposure to incense sticks were increased headaches, difficulty in concentrating and forgetfulness. (1) The burning of incense sticks contributes to indoor air pollution, which in turn increases the concentration of carbon monoxide (CO) and nitrogen oxide (NO) in the blood. The high concentration of these gases cause neurological problems by acting on brain cells.

### **It increases the toxic load on the body**

Studies have shown that incense sticks, when burnt, emit a toxic smoke that contains lead, iron and magnesium, thereby adding to the toxic load in the body. (3) The chemical gases and particulate matter, when inhaled, increase load on the kidneys to eliminate toxins from the body, leading to various kidney problems. The smoke liberated from lighting the incense stick also increases the concentration of impurities present in the blood.

## **CONCLUSION**

Incense produces particulate matter that can deposit in the respiratory tract, and elevates airborne concentrations of carbon monoxide and benzene. Incense also contains trace amounts of chemicals suspected of causing skin irritation, and exposure to incense has been linked with several illnesses. Incense smoke should be considered a source of indoor pollutants in rooms in which incense is regularly burned.

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