

ASSESSING THE LEVELS
OF
CARBONYL AND PHENOLIC COMPOUNDS
IN
INDOORS DUE TO THE COMBUSTION
PROCESSES.

By

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ABSTRACT.

When wood, incense sticks, candles, mosquito coils, cigarette, household garbage, plastics or leaf are burnt, they produce smoke and may release toxic gases. The smoke contains vapors and solid compounds suspended in the air called particulate matter. Incomplete combustion associated with many burning substances causes the release of toxic air pollutants. Toxic chemicals released during burning include carbon monoxides, nitrogen oxides, sulfurdioxide, volatile organic chemicals (VOCs) and particulate matter.

Exposure to polycyclic aromatic hydrocarbons (PAHs) and some of the volatile organic chemicals has been shown to cause cancer. People who are exposed to these air pollutants can experience eye and nose irritation, breathing difficulties, coughing and headaches. People who are having heart disease, asthma or other respiratory diseases are especially sensitive to air pollutants. In addition, some of these chemicals react with nitrogen oxides in the air to produce ground level ozone, especially during hot sunny weather. Ground level ozone contributes to unhealthy smog, haze and reduce visibility. Ozone is a respiratory irritant. Smog causes oxygen levels in the blood to drop leading to angina or chest pain and heart attacks.

Phenols and carbonyl compounds are groups of VOCs, often released in indoor air during indoor combustion. Among numerous indoor pollutants, here our concerns with carbonyls and phenolic compounds only. Among the carbonyls, ketones having higher threshold values are believed less hazardous than aldehydes.

Carbonyls can be converted into less volatile hydrozones derivatives and be able to quantify by HPLC/UV. Here 2,4-dinitrophenylhydrazine coated filter papers were used, for trapping the airborne carbonyl compounds. Alkaline spiked silica was used to collect phenolic compounds and they were analyzed by GC-MS.

From this research work, it was proved that household combustion sources releasing quite lot of hazardous chemicals to the environment. The risk level is very much higher in indoor than the outdoor. Because all these hazardous compounds are accumulating in a poorly ventilated indoor. Firewood, cigarette and mosquito coils showed significant amount of both carbonyls and phenolic compounds. Apart from these chemicals, many other compounds (PAHs, some VOCs not interested to this research and CO were also detected by the mass spectroscopy detector of GC.

Day by day the risk level may increase, so this is the time to show alarm to alert our country people about the risk of burning such things in indoors. Finally it is our duty to give the path to overcome this problem.