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# Detection of Flue Gases from Sanitary Napkin Incinerator

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## ABSTRACT

Presently in the urban and rural areas the utilization of the sanitary napkins is increased through the motivation offer by the state and central government to use these sanitary napkins, but on the other hand there is heavy load coming on the disposal facilities. In most cases it is directly dumped into open spaces and in some cases it is burnt scientifically or unscientifically. Incineration is a process in which combustion of material takes place; the main goal in incinerating of waste materials is to reduce the volume of waste. Exhaust gases generated through combustion processes is called as flue gas. This work contains detection of flue gas emitted from stacks, chamber and other combustion outlets of sanitary napkin incinerator. It also focuses on developing an economical model for detection and analysing of flue gas emissions through them.

**KEYWORDS:-**Sanitary Napkins, Incineration, flue gas

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# 1. INTRODUCTION

As the standard of living increases there is an increase in the quantity of waste generated due to the over increasing demands from our society. The most effective means of dealing with the problem of waste generation is to reduce the amount of wastes generated i.e. reduction at the source. Incineration is one of the oldest technologies to reduce the amount of generated waste with a goal of serious volume reduction. But one serious drawbacks of this process is the emission of flue gas. These flue gases coming out from the incineration process can harm the environment on a large scale. Depending upon the input material there are a variety of harmful gasesgetting out of the stacks of incinerators. In case of incineration of modern sanitary napkins the harmful gases which are let out into the environment are a variety of dioxins and furans.

Modern disposable sanitary napkins are complex products which are manufactured with the conventional methods and are presentglobally. Sanitary Napkins include two important exposure parameters, i) frequency of Napkin use & ii) constituent transfer from Napkin to skin from direct and indirect skin contact materials.

## *1.1Composition of a Sanitary Napkin*

**Table1: Composition of aSanitary Napkin**

| Component | Function | Raw material composition |
|---|---|---|
| Top sheet | The function of top sheet is that it should feel soft to skin and allow fluid penetration | Non-woven perforated polypropylene / polyethylene fibres |
| Absorbent core | Absorption and retention of fluids | Open celled polymeric foam |
| Perfume | Fragrance | Fragrance raw materials |
| Back sheet | Prevent leakages | Low density polyethylene film |
| Adhesive | Fasten pad to the undergarment | Hydrocarbon resins , mineral oil , polyaromatic copolymers |

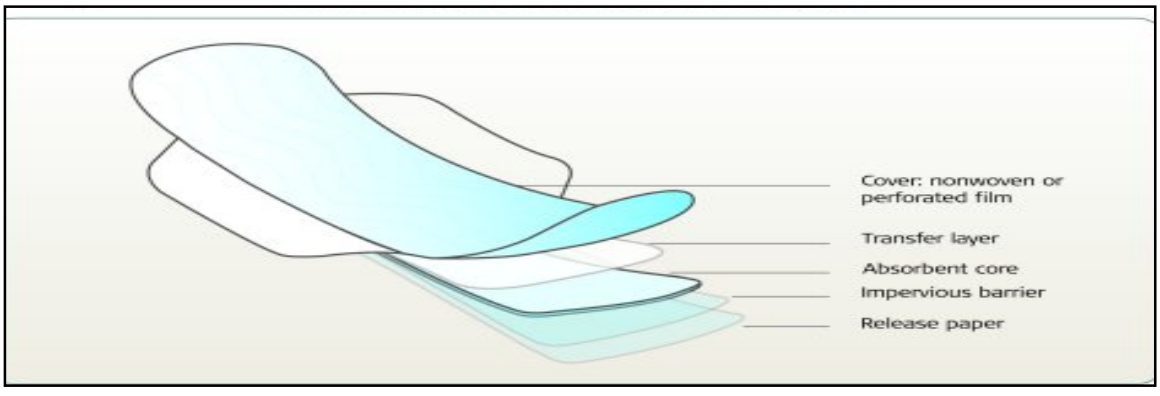


**Fig 1: Showing Schematic View of Sanitary Napkin**

### *1.2 Chemicals used in Sanitary Napkins*

The vaginal region contains many tiny blood vessels, making it highly vascular. The chemicals easily enter the body through them and accumulate over a time period, thus affecting the reproductive health of an individual.

- **Plastic chemicals**: Bisphenol-A and Bisphenol-S are used in sanitary napkins which are responsible in complicating embryonic development in an individual.
- **Carcinogens**: Cellulose gel used in the absorbent core causes cervical cancer. Dioxins, a byproduct of chlorine bleaching process may stay in the body for a very long time after exposure causing organ damage, ovarian cancer and also harm the immune system. Rayon, a byproduct of dioxin is used in absorbing the wetness is also a carcinogenic.
- **Pesticides and herbicides**: Cotton used in the manufacturing of sanitary napkins are sprayed with pesticides and herbicides during rearing of cotton. Traces of these pesticides and herbicides are found on the cotton which can enter the blood stream on exposure Pesticides and herbicides are linked to thyroid malfunction, infertility.

## 2. NEED FOR DISPOSAL OF SANITARY NAPKINS

According to experts, the half-life for disposal of a sanitary napkin is 110 years. There is no clarity on whether sanitary napkins should be classified under bio-medical waste or dry waste, also there is no awareness regarding the disposal even among those who stay in societies, whereas in slum areas it is usually thrown in nullahs. While there have been talks about menstrual hygiene lately, data provided by Menstrual Health Alliance India states that 45% of the menstrual waste collected across the country, primarily consisting of sanitary napkins, is disposed of as routine waste along with other household garbage. The data was compiled by doing a systemic review [4] .Of this 45%, rural areas constitute 25% (the highest), followed by 16% from urban areas and 3% from slums. The data goes on to add that in urban areas, 13% of menstrual waste is thrown in open spaces such as rivers, wells, lakes and by the roadside, followed by 10% disposed of in toilets, 9% is burnt and 8% is buried. The maximum usage of commercial pads takes place in urban areas at 38%, followed by cloth, which constitutes 35% of products used during menstruation.

Considering the current population of India 1,350,438,098, out of which the men truing population is about 47.8%, so by doing the math we come to the conclusion that the amount of sanitary napkin waste generated annually is around 9000 tonnes. These 9000 tonnes of harmful must be disposed of in a way which produces least harm to the environment and to humans.

# 3. METHODOLOGY

## *3.1Sample Selection*

Different sanitary napkin brands are taken into account for this research. Sanitary napkin having different feature for example extra large, cotton based or thin or thick are going to be used.

## *3.2 Sample Collection*

For this research used sanitary napkins are collected from different age group women. Sanitary napkins are of different brands and having different size and features. The weight of each sample is calculated for further laboratory analysis.

## *3.3 The Design of the Proposed Model*

The proposed design of the incinerator is shown in the figure below; the following are the parts of the design

1. Flue Gases Outlet
2. Incineration Chamber
3. Wire Mesh
4. Spiral Heating tube
5. Ash Collection Tray
6. Flue Gases Collector

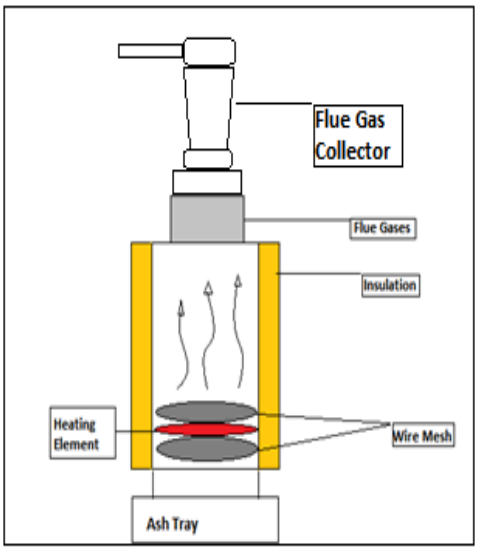


**Fig No 2: Parts of the Proposed Sanitary Napkin Disposal Incinerator**

**FigNo 3: Actual Photo of the Model**

# 4. CONCLUSION

Pulp, the main material used in sanitary products, is bleached to increase its brightness. Pulp is sometimes bleached with molecular chlorine or hypochlorite. Chlorinated phenols, phenolic

carboxylic acids, dicarboxylic acids, resin acids and hydrocarbons originating from lignin and wood extracts have been detected in bleaching elution solutions. Among organic chlorine compounds contained in effluents from bleached pulp mills, tetrachlorodibenzodioxin(TCDD) and tetrachlorodibenzofuran (TCDF) have a very strong toxicity in humans and animals and many studies on their presence in paper products and the safety of the products in use have been conducted. Based on the precursor materials used in the manufacturing of sanitary napkins, we found out that the flue gases coming out of the incinerator contain are traces of chlorine gases and traces of dioxins and furans[1]

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