

EFFECTS OF CIGARETTE BUTTS ON OUR ENVIRONMENT AND THEIR FEASIBLE REMEDIES

Environmental Science

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ABSTRACT

In all over the world, thousands of smokers do not think twice about leaving cigarette butts behind. The essence of most cigarette filters, the parts that looks like white is actually a type of plastic called cellulose acetate. By itself cellulose acetate is too slow to degrade in our environment. Depending on the soil type the cigarette butts are discarded, it may take 20 months to 10 years for the cigarette butts to decompose. These filters are full of toxins, which can leach into the soil and rivers, damaging the organisms which live in the soil and waterbodies. These filters also affect the ecosystem. These are also a threat to wildlife that could be ingested by them, mistaking these butts for food. With growing concerns arising from inadequate waste disposal facilities and growing environmental awareness of toxic waste burning, there is an urgent need for an alternative waste disposal system for cigarette butts which is environmentally acceptable. In India two entrepreneurs started a company named CODE, which offers a one-time recycling solution to this waste. Although we can consider that smoking is a personal choice of human beings but we cannot overlook its harmful effects on our environment. Our paper mainly focused on threats of cigarette butts in our environment, their toxicity level and types of harmfulness and of course their potential remedies.

KEYWORDS

cellulose acetate, ecosystem, toxin, recycling.

INTRODUCTION

Cigarette waste is one of India's and also world's most prevalent litter problems. Discarded cigarette butts are a form of non-biodegradable waste. Carried as runoff from streets to drains, rivers, and ultimately the ocean and its beaches, cigarette filters are the most collected item in international beach cleanups each year. The increasing numbers of butts have become an inland soil and water pollution problem and a consequent important environmental issue. Distribution and diffusion of cigarette butts and their associated toxic compounds in the aquatic environment could be a threat to various animal and plant species in aquatic habitats. Worldwide smokers buy an estimated 6.5 trillion cigarettes each year. That is 18 billion every day. Trillions of cigarette filters—also known as butts or ends—are left over, only an estimated third of which make it into the trash. The rest are casually flung into the street or out a window. Many reports and studies emphasize the necessity to identify cigarette butts as a 'waste of concern' that should be prioritized, monitored and recycled.

Efforts like campaigns, posters and stickers such as “Bin it or swim in it...”, “The Butt Stops Here”, “Don't Be a Tosser”, “You are fool if you think smoking is cool” etc. need to be implemented on the street walls and other places to reduce the Cigarette butts littering problems.

Toxic Materials of Cigarette Butts: Cellulose acetate and its effect

The core of most cigarette filters, the part that looks like white cotton, is actually a form of plastic called cellulose acetate. By itself, cellulose acetate is very slow to degrade in our environment.

A recent study found that cellulose acetate inhibits plant growth. They also routinely get into waterways, and eventually oceans.

Other Toxic Materials of Cigarette butts

- Polycyclic aromatic hydrocarbons (PAHs)
- N-nitrosamines
- Aromatic amines
- Formaldehyde
- Acetaldehyde
- Benzene

Although other toxic metals such as aluminium, zinc, lead, selenium, chromium, nickel and cadmium combine to form more than 60 chemicals that are known to be carcinogenic which are present in cigarette butts.

Cigarette Butts Effects In Marine Ecosystem:

With so many toxic chemicals finding their way into the surrounding environment as a result of cigarette butt litter, it shouldn't be a surprise to learn that it adversely affects marine life. This is the most important part of the relationship between marine life and cigarettes.

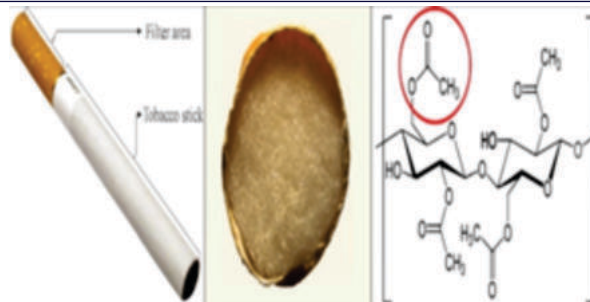


Fig 1:- Chemical structure of cellulose acetate Source: <https://bit.ly/3NoopN1>

Studies have shown that cigarette butts in water are toxic to fish, water fleas and marine bacteria. For fish, the evidence shows that smoked cigarette filters with some remaining tobaccos are toxic to fish species at concentrations as low as one butt per liter of water. Smoked butts without any residual tobacco are toxic at levels between 2 and 4 butts per liter, and unsmoked filters without tobacco were toxic at concentrations of 5 to 13 butts per liter. Clearly, this is a significant problem affecting the health of our waterways.

Cigarette Butts Effects In Soil:

A study led by Anglia Ruskin University found that the presence of cigarette butts in the soil, reduced germination success and shoot length of clover by 27% and 28%, respectively. For grass, germination success reduced by 10% and shoot length by 13%. An estimated 4.5 trillion butts are littered globally each year making them the planet's most pervasive form of plastic pollution, the study said.

The researchers found that non-smoked cigarette filters had nearly the same effect on plant growth as used filters, indicating that plant damage was caused by the filter itself, without the additional toxins released by burning tobacco.

Management of Cigarette Butts:

- Take necessary measures by municipal level to suitable landfills of these plastic wastes.
- Government should take necessary steps to prevent people from throwing cigarette butts here and there after smoking.
- A possible long-term solution to deal with these wastes is to recycle it into building materials and use it for beneficial purposes.
- One environmentally friendly way is to recycle the Cigarette butts into fired clay bricks. This is because the materials used in the brick industry are generally very diverse, as the composition of the clay, which is used as the main raw material, is also naturally variable in its characteristics.

Recycling Cigarette Butts in India:

A Noida-based start-up is recycling cigarette waste into creative by-products. Vishal Kanet and Naman Gupta, in their 20s, wanted to eliminate the discharge of these hazardous products, which are dumped into the environment. Naman and Vishal's company 'CODE' is based in National Capital Region, Noida and was launched in 2016. They collect cigarette butts from the waste generators like customers' house, ragpickers and shopkeepers who sell it and recycle it.



Fig 2:-The duo dedicated to recycling cigarette butts Source: <https://bit.ly/3DIm9wZ>

CODE provides consumers with user collection units called VBins (Value Bins) into which they can collect cigarette waste. After every 15 days the garbage collector of the company will go to the location of the waste generator and collect the waste. That is not all, the customers who provide the cigarette waste even get money for providing it. For every kilogram of cigarette waste, a person can get ₹700. For every 100 grams, a person can earn ₹80. Once cigarette waste is collected it is separated from the tobacco that is often left behind and the paper covering of the cigarette butt rots and is left for composting, the filter is recycled through a treatment process invented by Vishal. The recovered compost is often sold to gardeners and the treated filter which is 99.9% safe is used to make stuffing for toys and cushions and other packaging materials.



Fig 3:- Collection of butts and compost preparation Source: <https://bit.ly/3DjO057>

Naman and Vishal have also faced unexpected challenges in the past years of their journey. They found many of their bins stolen but continued to deliver more bins. With this enthusiastic service, the code enterprise saw huge public support and media support.

"We want the Indian government to act upon the cigarette recycling with a broader perspective or a sustainable alternative in the coming years. Recently, the Indian Railways and India Post services are the partakers for our smooth as well as systematic operations," claims Naman.

CONCLUSIONS

Although we consider that cigarette smoking is a personal choice of individual but we cannot overlook the potential harmfulness of these cigarette butts in our environment. More research and awareness are called for on many of these issues, especially on the behavioral effects on smokers and potential smokers, and on the economic impact of butt waste cleanup. Governments should use recycling methods like "CODE" to decrease this hazardous waste from our environment. People also need to aware about these waste and act accordingly.

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