

# An Alternative Approach to Waste Management: A Study on Toothpaste

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## Abstract

Waste management is becoming the most inevitable circumstances of this globalised world. So our prime duty is to minimize the waste from industry to household. For that firstly we have to move a step ahead towards the recovery of nature by minimising the use of paper box for those product which come into tubes specially toothpaste. This paper critically examines the behaviour of creating waste and proposed towards the changing of attitude in household useless waste management. So the authors proposed here the tooth tablet (tooth tab) which can be easily used as a substitute of toothpaste that can be introduced in a glass jar without any paper cover box. Tooth tab will be also easy to carry and use.

**Keywords:** Waste Management; Environment; Sustainability; Paper Box; Toothpaste; Tooth tab.

## Introduction

Our world is poised towards rapid industrialization. So we have to face scarcity of all kind of resources soon. As because we can't stop industrialization but we can take care of wastage and maintain sustainability, with a special emphasis on environmental degradation. For that first we would like to minimise the use of useless things. When we talk about useless things, so many things come into our mind, specially the cover box of some tube products. Those useless boxes are made up by cutting down the trees which is threatening for our future world. Protection of environment is going to be a major issue in recent times. Performance of environment should be measured to assess different kind of waste (Coelho et al, 2012).<sup>1</sup>

Waste is generated by most of the human activities (Brunner and Rechberger, 2014).<sup>2</sup> And the quantity of waste is increasing day by day. As the volume is increased the variety and pattern of waste

is also increasing (Vergara and Tchobanoglous, 2012).<sup>3</sup> So community participation in waste management is very vital (Kalra, 2019).<sup>4</sup> Jeswani and Adisa (2020)<sup>5</sup> worked on Environmental impacts and consumer behaviour of healthcare and pharmaceutical products. Berkun et al. (2011)<sup>6</sup> worked on Solid waste management and Kasim, A. (2007)<sup>7</sup> moved towards wider adoption of environmental responsibility in the service sector. Buah et al. (2007)<sup>8</sup> characterized municipal solid waste and took care of environmental protection.

We should move towards the direction of Zero Waste which may be a Sustainable Approach for Waste Management (Hamid et al, 2020).<sup>9</sup> Now before discussing about waste management first we have to know what a waste is. It is basically the useless by product of any human activities. The waste contains the same physical substance or may be in a changed form which is present in the main useful product (White et al, 1995).<sup>10</sup> Wastes are materials that people would want to dispose of

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(Dijkema et al, 2000).<sup>11</sup> According to Basu (2009)<sup>12</sup> waste is any product or material which is useless to the producer. Giusti (2009)<sup>13</sup> reviewed on waste management practices and their impact on human health.

All over the world most of the people use tooth paste on daily basis. The tooth paste which is normally within a paper box makes it more expensive for the makers and consumers. Though it may be a cause of beautification or protection for the makers but it's totally useless for the consumers. After getting the product, consumers just throw out the packets and becoming a participant in creating valuable (paper box that are made up of trees) waste. Though the millions of people throughout the world use boxed toothpaste still some places like Iceland, Sweden are using toothpaste without box that means toothpaste can be used without box. It depends entirely on the user acceptability. If on an average one single person using three tubes per year that's more than 90,00,00,000 useless boxes only in the United States.

The global toothpaste market is growing at a rapid pace and the projected rate of growth during the period of 2109-2024 is 6.1%. 55% of the Indian population which means approx 682 million users uses toothpaste at daily basis. 10 tubes of 80 gms toothpaste is used by every individual in every year. This creates a useless packet of 6820 million each weight 3 gms. So on an average Indian people are wasting 20460 tonnes of paper by using toothpaste. According to centre for environment and development, paper box may be the second biggest organic waste which contributes 13% of the total domestic solid waste.

### Objective

Though the paper is concerned for the minimization of waste (not at all required for the direct users) so our primary objectives is to protect our environment from unwanted waste or recovery of our natural resources. Our secondary objectives are

1. Welfare of the entire population of the world by protecting the trees from which the useless outer paper cover of those products which carries a tube inside.
2. To examine the relationship between waste management and product cost cutting
3. To examine the possibilities of minimization the size of the product through which supply chain management can be more beneficial.
4. To impose the Government policy in the form

of a token Tax on creating waste in industry and as well as household.

5. To develop an overall general awareness for the entire consumers regarding useless waste.
6. Promoting a completely new introductory concept of toothtab.

### Methodology

One of the main components of toothpaste is water. The main function of water in toothpaste is that it gives the toothpaste a semi liquid form. Water content of toothpaste is 20-42% which helps in keeping it from drying out. If we are able to reduce/eliminate water content form the toothpaste, the size or volume of the gel will be reduced which will help in the transportation process and as well as increase the efficiency of the supply chain.

First we have to reduce the infused water from the toothpaste to make it in the form of a tablet.

We are proposing the name of that special form as toothtab. Toothtab should come in a glass jar in the form of tablets. Users will take a tablet from it and after putting it in mouth then it will convert to gel by getting water from saliva and user can brush after that.

Now the main emphasis of the authors is to prepare toothtab. Most of the toothpaste share some common ingredients. Among those ingredients some are active and some are inactive.

Active ingredients help fighting against gum disease and cavities. Basically here the authors proposed a two layer architecture model.

In the very first step, the characteristics, the interdependency of the main physical components of the toothpaste such as Fluoride, Glycerol, Sorbitol, Calcium Carbonate ( $\text{CaCO}_3$ ), Sodium lauryl sulphate, PEG-32, cocamidopropyl betain, water, hydrated silica etc are studied. Humectants act to retain moisture and prevent the toothpaste from hardening on exposure to air. Glycerol, sorbitol and propylene glycol are commonly used. Glycol and sorbitol also serve the toothpaste, though this is not their main function. The chemical reaction and the bonding among those components are also studied.

In the next step, the water content is reduced from toothpaste. The paste is will be converted to tablet form. The main components of toothtab will be Tricalcium phosphate as polishing agent, Keltrol as swelling agent, Sodium bicarbonate and citric

acid as foaming agent, Sorbitoleum as filling agent, Texapon K 12 wetting agent, Magnesium Stearate as lubricative agent, Cyklsmate as taste giving agent. Now we can add some mint or neem as different taste agent. For children we can introduce vanilla and strawberry as a testing agent if clinically possible.

In the final step, the tablet will be converted into gel or paste form taking water content form saliva so that user can brush with that.

### Suggestion

1. To introduce the reusing strategy for toothpaste tubes
2. To reduce the size of toothpaste tubes by eliminating the water containing in it for better logistic as well as supply chain management.
3. To introduce glass jars/ reusable container for dry or tablets like toothpaste which can be easy to carry in those transport sector where provision exists regarding carrying of liquid or gel.
4. To purchase toothpaste on a bulk basis for household use so that minimum useless packaging will be required.
5. Instead of using paper for large packaging we can introduce jute for large packaging so that we can save gigantic number of trees every year.
6. To promote the healthy environment concept among rural and urban people by using social media and other medium which is largely accepted by the global citizen

### Limitation

1. It's not very easy to generate the concept of buying toothpaste without its prior traditional concept of using paper box among the users.
2. Lots of difficulties are there in recycling of toothpaste tubes and boxes.
3. From the marketing point of view very tough to generate potential respondent against the use of useless toothpaste box.
4. Very difficult to implement the law among the general people regarding the concept of token tax for the creation of waste (toothpaste paper boxes and plastic tubes).

### Conclusion

As because population of the world is aggressively growing at high pace, it's becomes our every individual's duty to take care of the planet for future generation. From water to land resources are limited. If we waste these resources in the same way in the long run it can be threatening for ourselves. Though we are recycling but its consequences are unable to mitigate the challenges the problems arising out of waste throughout the world. Though we are unable to promote zero waste concept but we can move towards minimization of waste. If we can able to generate minimum waste concept throughout the world it will be easy to find out some environmentally sustainable feasible solution towards the disposal of waste.

### Reference

1. Coelho HMG, Lange LC, Coelho LMG. Proposal of an environmental performance index to assess solid waste treatment technologies. *Waste Management*.2012;32:1473-1481.
2. Brunner PH, Rechberger H, Waste to energy key element for sustainable waste management. *Waste Management*.2014;37:3-12.
3. Vergara SE, Tchobanoglous G, Municipal Solid Waste and the Environment: A Global Perspective. *Environment and Resources*. 2012;37:277-309.
4. KalraN, Community participation and waste management. *Sustainable waste Management: Policies and case studies*.2019; special issue:115-123.
5. Jeswani HK, Adisa A, Environmental impacts of healthcare and pharmaceutical products: Influence of product design and consumer behaviour. *Journal of Cleaner Production*.2020; 253:1-12.
6. BerkunM, Aras E, Anılan T, Solid waste management practices in Turkey. *Journal of Material Cycles and Waste Management*.2011; 13(4):305-313.
7. Kasim A, Towards a Wider Adoption of Environmental Responsibility in the Hotel Sector. *International Journal of Hospitality and Tourism Administration*. 2007; 8(2):25-49.
8. Buah WK, Cunliffe AM, Williams PT, Characterization of Products from the Pyrolysis of Municipal Solid Waste. *Process Safety and Environmental Protection*.2007; 85(5): 450-457.
9. Hamid S, Skinder BM, Bhat MA, Zero Waste: A Sustainable Approach for Waste Management in Bhat, R.A. et al (Eds). *Innovative Waste Management Technologies for Sustainable Development*.2020;134-155.
10. White PR, Franke M, Hindle P, Integrated Solid

- Waste Management: A Lifecycle Inventory. Berlin: Springer.1995.
11. Dijkema GPJ, Reuter MA, Verhoef EV, A new paradigm for waste management. Waste Management.2000; 20(8):633-638.
  12. Basu R, Solid Waste Management-A Model Study. Sies Journal of Management.2009;6:20-24.
  13. Giusti L, A review of waste management practices and their impact on human health.Waste Management. 2009; 29(8):2227-2239.

