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Survey on Inorganic Waste Generated in Karwar City

Mr. Akshay Tinekar[1], Mr. Santosh Bhuimbar[2]
[1]*UG Mechanical Engineering Student, Girijabai Sail Institute of Technology, Karwar, Karnataka, India*
[2]*Assistant Professor, Mechanical Engineering Dept, Girijabai Sail Institute of Technology, Karwar, Karnataka, India*

Abstract: ***Presently in India approximately 950 million tonnes of solid waste is being generated yearly (Industrial, Municipal, Agriculture, Households, Mining and other sources). In that solid waste approximately 400 tonnes organic waste generated from market, agriculture and households, approximately 300 tonnes inorganic waste generated from Industries, agriculture, households and mining. Inorganic waste is silent threat the environment and their disposal is a very serious issue because of their wide range of applications and they can easily available everywhere. This paper explain about inorganic waste generated in Karwar city and utilization of inorganic waste into useful products like liquid fuel, Recycling products and also to create awareness among the public regarding Inorganic waste management.***
Keywords: Inorganic waste, agriculture waste, market waste, liquid fuel.

I. INTRODUCTION

Waste is defined as discarded materials which has no value in normal use or ordinary use or waste can also defined undesirable, useless, unwanted materials. Waste came from mainly the human activities and now a day the increasing in population and industrialization. Managing of this waste assumes important in view of environment.

Wastes can classified into biodegradable and non biodegradable. Biodegradable waste which can completely decomposed by biological process in the presence of air or absence of air, like municipal waste and Non-biodegradable waste which does not decomposed by biologically. These products have a longer-lasting effect on the environment and health hazards. The products like non-biodegrade will continue to pile up over time, requiring more land devoted to holding waste.

Karwar is port city, located in north Karnataka. The total population of this city is 1.5 lakhs and having 27.9 km^2 area and the waste is generated in this city is 27 tonnes per day and in this around 95% is organic waste and rest of 5% is inorganic waste. Comparing other major city's it's not that much of waste producing. The major problems with Karwar city is municipal solid waste management.

The organic waste we can easily manage but the problem is how to dispose the inorganic waste like plastic bags, glass bottles, metal pieces etc. In Karwar around 0.833 tonnes per day inorganic/ non-biodegradable waste is produces and in the Karwar city there is no proper disposal method to dispose this inorganic waste. Non-biodegradable / inorganic waste can cause dangerous issues like 'Contaminated Ground Water' long term exposure to air, light and water can cause synthetic materials like plastic to emit toxic pollutants. Plastics, which are petroleum-based, contain toxic that can leach into water supplies; 'Out gassing' plastic pollutes the air in much the same way in taints water supplies. Constant exposure to heat melts plastic, emitting gases into the atmosphere in a process known as out gassing [6].

II. SURVEY ON INORGANIC WASTE IN KARWAR CITY

According to survey waste generated in world is around 2.1 billion tons per year and per capita waste generated is 1.6 kg per day. India is second most populated country in the world and nearly around 18% to the world population and the 2.49% of the world land. In India municipal waste production is around 62 million tons /day and the plastic waste production approximately 405918 tons /day.

Karwar is the headquarters of Uttar Kannada district and also largest town in the district population. Karwar municipal council (KMC) comprises of 31 wards and it is situated on National Highway No. 17. Area of the Karwar city is 27.15 sq, kms and the percent population of the Karwar city is 155213 and this city having around 16369 houses, number of commercial establishments are around 1205, marriage halls, apartments, markets are 117 are there in Karwar city.

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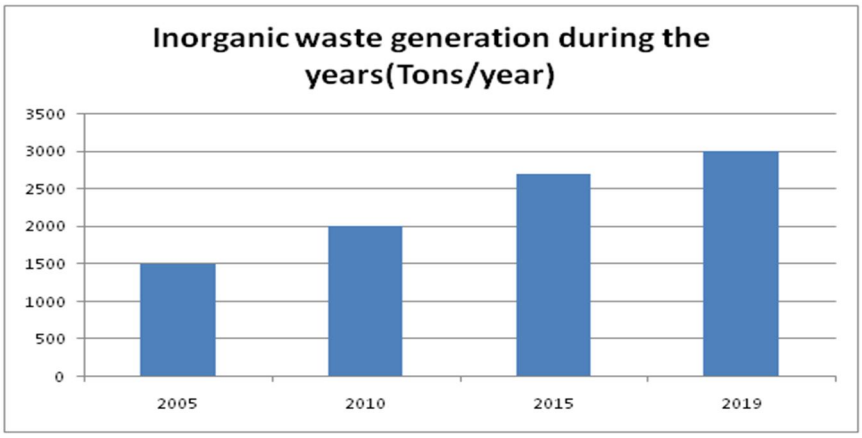


Fig-1 MSW generated in Karwar city during the years (tons/day)

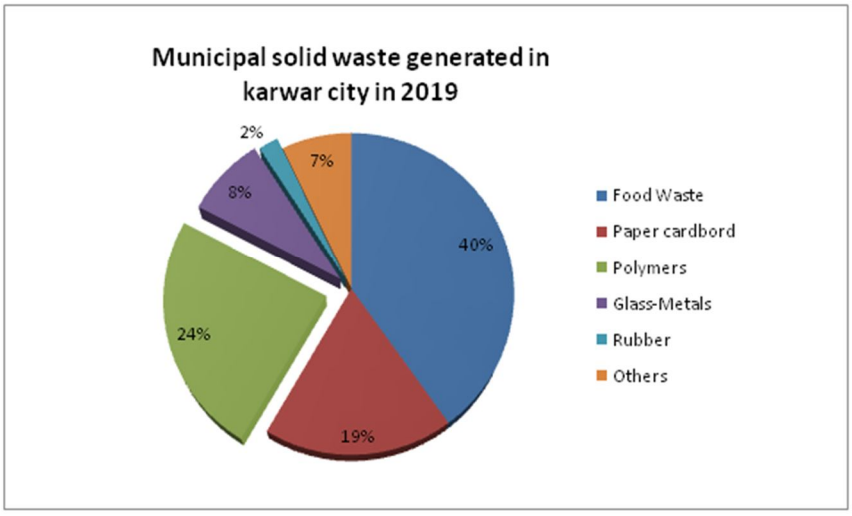


Fig -2 Different types of waste generation in Karwar city in 2019

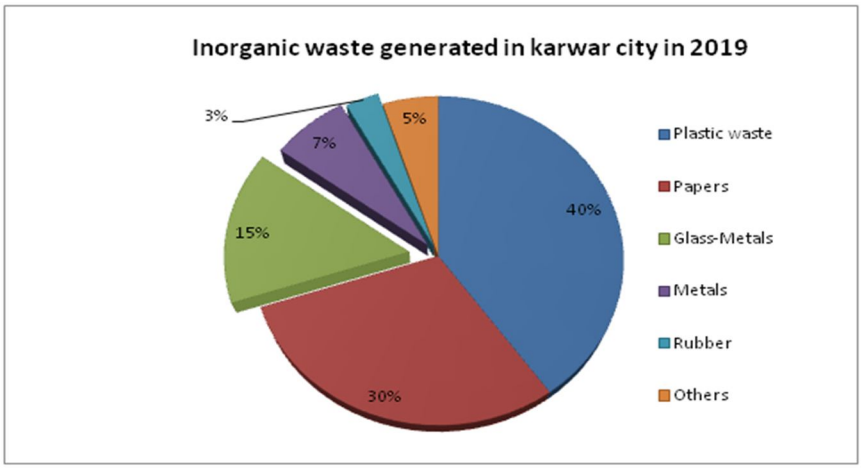


Fig -3 Varies types of Inorganic waste generated in Karwar city in 2019

A. Issues Concerning to Management of Inorganic Waste in Karwar City

1) Majority of the Inorganic waste, municipal authorities of city does not have waste processing and disposal facilities.

2) In Karwar city there is no any recycling unit.

3) In Karwar city there is no pyrolysis unit.

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Fig –4 Waste plastic bottles in Majali, Karwar



Fig -5 Waste Metals in Karwar city



Fig -6 Waste Rubber materials in Karwar city

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In Karwar city around 7-8 shops are there to collect the inorganic waste like plastic bottles, rubber, glass bottle, metals etc.



Fig –7 Punching Machine is used to punch the plastic bottles .



Fig -8 Storing and packing punched plastic bottles

Fig-7 shows punching machine is used to punch the plastic bottles and then it stored and packed the bottles and packed bottles transfer the bottles to Huballi region because in Karwar there is no recycling unit.

III. METHODS AND METHODOLOGY

Following the major methods to converting Inorganic wastes into useful products.

1) Recycling process using recyclable materials.
2) liquid fuel production from inorganic wastes [5].
3) Landfill.

A. Recycling Process

Recycling process is a process which is converting the waste into useful materials or new materials. It's an alternative method for disposal of waste it can reduce the usage of new materials.
Recyclable materials included many kind of glass, paper, cardboard, metal, plastic, tiers, textiles, etc.

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1) *Collections:* Collect the recyclable waste like plastic bags, bottles, metals, papers, textile, etc.
2) *Manual Sorting:* Collect the recycle waste segregate manually with their properties so we can easily recycle it and make new materials.
3) *Bundle and Crushing:* Once the sorting is done than we bundle the waste materials with same type and then we crush this bundle materials with a crusher and make fine gradients.
4) *Washing and Regeneration:* After cursing the fine products are washed and removed all darts and send it to the regeneration unit and it regenerate by melting these materials.
5) *End Products:* After the regeneration the materials can us for making different products

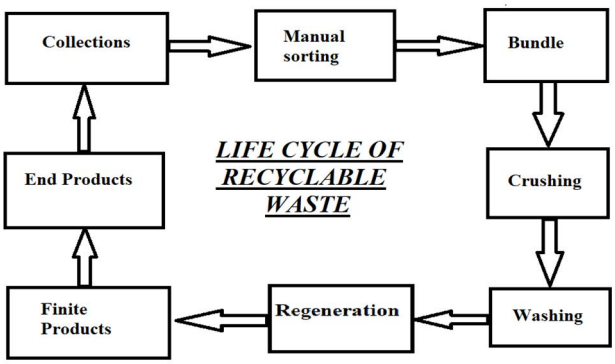


Fig. 9- recycling process is waste materials in to new materials.

B. liquid fuel production using Pyrolysis process-

Following steps are involved in Pyrolysis process.

1) *Collection of Plastic Waste:* In this step collect the different type of plastic wastes.
2) *Drying and Storing the Plastic:* Collected plastic waste is washed and then dry it and store in storage area.
3) *Feeding in to the Reactor:* Feed the plastic waste into the reactor through feeder and closes the feeder inlet.
4) *Heating the Plastic Waste in the Presence of Catalyst:* Increase the temperature of the reactor in the presence of catalyst by using heating source.
5) *Liquid- Vapor into Condenser/ Condensing:* After heating of the plastic get melted and then it vaporized and condensed.
6) *Purification of liquid fuel:* After getting the liquid fuel then purification process because this fuel can having some amount of impurities in it.

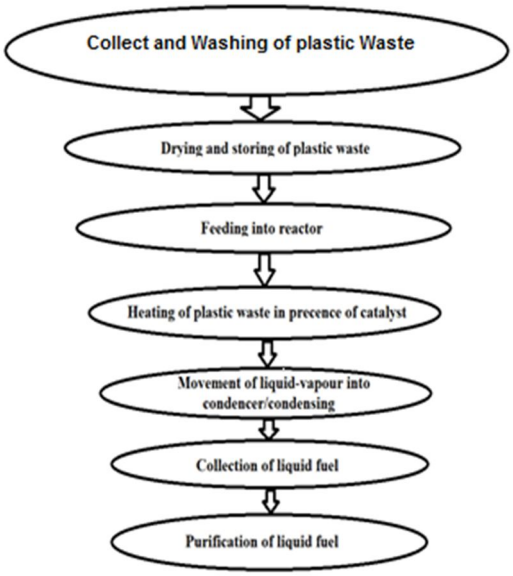


Fig 10– Steps involved in the Pyrolysis process to get the liquid fuel

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C. Landfill

Landfill involves the damping of waste into a Landfill. This method is oldest method is used from 1960's and 70's. It is actually a biological reactor and it's not the most environmental friendly option but it is the most common method is used in all country.

1) Collect the waste from different places.
2) Separate the collected waste like recyclable, non-recyclable, biodegradable, etc.
3) Than collected non-recyclable waste is damp in landfill site by burin.



Fig –11 Landfill site Shirwad in Karwar

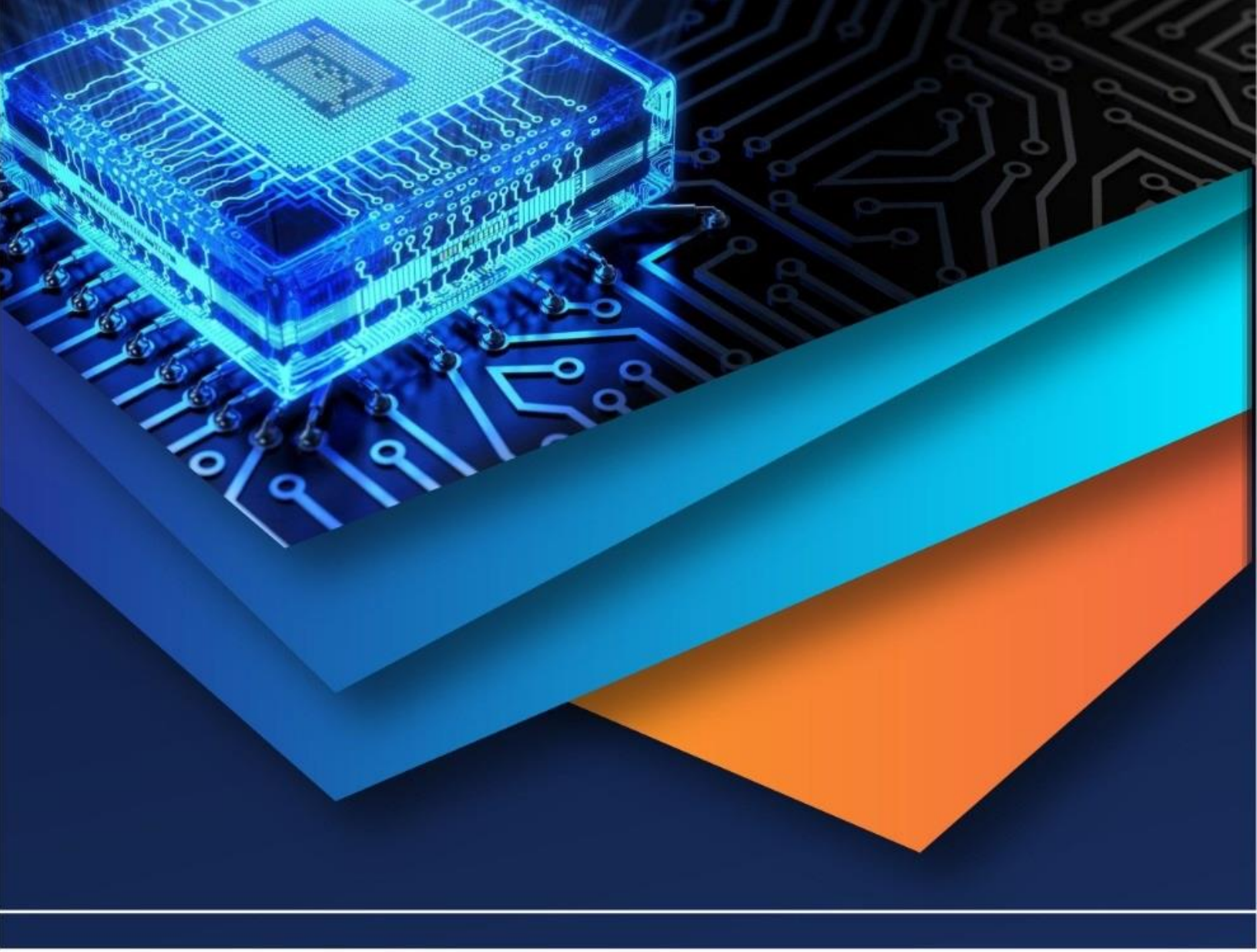
IV. CONCLUSION

A. In Karwar city around 3000 tons /year inorganic waste is generated and per capita waste is around 0.05kg /day waste produced.
B. In inorganic waste around 40% of waste is plastic waste. So we can convert this plastic waste into liquid fuel by using the Pyrolysis process.
C. In inorganic waste around 40% Recyclable waste. So we can recycle this waste and produce new materials likes bags. Shoes, bricks etc and can reduce the usage of new materials.
D. Rest of the 20% of waste in non-recyclable waste like Hospital waste biomedical waste treat it with scientifically method than go for the land filling.

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