

ASSESSMENT OF MARINE LITTER AT MANDVI CREEK OF VENGURLA, SINDHUDURG

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ABSTRACT

Mandvi creek of Vengurla has rich and vast patch of mangrove vegetation. Due to nearby residential areas, fishing, religious activities the creek has got polluted with domestic waste as well as plastic litter. The present study focused on different types of marine litter accumulated in the water basin. The litter was classified into seven categories namely plastic waste, thermocol, footwear, clothes, plastic bottles, glass bottles, fishing net debris etc.

Key words: Vengurla, Mandvi, Estuary, Litter, Recycle.

Introduction

Marine litter can be defined as any litter that is disposed, dumped or abandoned in marine environment (Pham et al., 2014). It is composed of things that are used or made by people which are discarded or are unknowingly lost on beaches or into the sea and are transported to marine environment by rivers, winds or from land (UNEP,2009). Litter generally consists of plastics, rubbers, Clothes, metals etc. It is observed in oceans all over the world, even in remote places which are away from human activities. The problems that are caused because of litter are at very high level and are easily ignored in today's world. In today's world marine and coastal environment have major menace from climate change, overfishing, pollution, marine debris, degradation of habitat,

explosion of human population, tourism and vast range of human activities that take place in coastal zones (Gray,1997). Today marine debris are found in marine territory throughout the world. They are observed from shore line and estuaries to ocean surface and ocean floor (Thompson et al.,2009). This marine debris is harmful to marine biota as well as to human health. (Gregory,2009). Marine debris showed slow decomposition rate which has resulted in sinking of litter (Ryan et al., 2009). Majority of marine litter is composed of plastics, in number and weight according to the assessment of marine litter pollution at different coastal regions (Pham et al., 2014; Kusui and Noda 2003).

Plastic material is perceived disastrous pollutant entering into the marine environment and is a major global threat which causes inimical impact on marine biodiversity (Derraik,2002). Improper waste management practices in coastal regions have resulted in accumulation of large quantities of plastic (Ryan et al.,2009). Multiple sources like dumping areas near coastal region, discharge of municipal sewage, medical waste and most important aspect that is tourism contributes for 70% to 80% of plastic present in marine environment (UNEP,2005).

Marine litter has multiple drawbacks. They are responsible for degradation of quality and health of ocean, destruction of coastal and marine habitat and deterioration of marine biota. About 6.4 million tons of marine litter is disposed into the sea annually (UNEP,2009). Undisciplined human life style has resulted in dumping of 8.8 million tons of plastic waste in ocean every year, because of this over 700 species of marine organisms are on verge of extinction (Jenna *et al.*,2015). The present study was conducted to quantify the type as well as amount of litter in Mandvi creek of Vengurla District Sindhudurg which is currently under the threat of domestic waste dumping.

MATERIAL AND METHODS

Vengurla is the coastal taluka, located in south part of konkan in middle of Dabhol and Mochemad hills on the bank of Mandvi estuary. (15°. 85' 36. 65" N and 73°. 61' 68. 89" E) This estuary is considered to be polluted with domestic waste. The study was conducted from January 2022to may 2022 for a period of 5 months. Fiber boat was used for collecting the litter. The study site was sampled once in very month. The sampling was carried out according to the low tide as it made the collection easier. This activity would be carried out for about 2hours. Large fiber buckets were carried in to the boats for collection of litter. The litter was collected into the buckets and brought outside. It was segregated and dividied into different categories according to standard protocol of Lippiatt *et al.*, (2013). The assessment of various categories of litter was done on basis of weight and number of individuals.

Analytical balance was used for weighing the litter. After that the litter is collected by municipality vehicle for further processing.



AIJRPLS

VOLUME 9, ISSUE 2 (2024, Apr/May/Jun)

(ISSN-2456-3889)ONLINE

Anveshana's International Journal of Research in Pharmacy and Life Sciences

Anveshana's International Journal of Research in Pharmacy and Life Sciences

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PLATE.1



Fig1- Mandvi creek in Vengurla



Fig 2-Plastic bags and food wrappers



Fig3- Litter accumulated in



Fig 4-Fibre buckets and sacs containing



Fig5- Plastic and glass bottles

Marine litter observed in Mandvi belt of Vengurla

OBSERVATIONS

Table.1- Marine litter found in Mandvi estuary

S R N o	Typ e of litte r	Tot al qua ntit y (5m	1 st sa mp lin g	2 nd sa mp lin g	3 rd sa mp lin g	4 th sa mp lin g	5 th sa mp lin g

		ont hs)					
1	Plas tic was te	6Sa cs	2sa cs	1sa c	1sa c	1sa c	1sa c
2	The rmo col	4Sa cs	1sa c	1sa c	1sa c	1sa c	-
3	Foo twe ar	3Sa cs	-	1sa c	-	1sa c	1sa c
4	Clot hes	5Sa cs	1sa c	1sa c	1sa c	1sa c	1sa c
5	Gla ss bot tles	99 Nos	13	20	7	36	23
6	Plas tic bot tles	143 Nos	43	32	10	33	25
7	Fish ing nets debr is	53N os	12	10	11	11	9

(Polypropylene cement sacs having capacity of 50kg)

Table. 2-Quantification of marine litter by weight

Sr no	No of sampling	Weight of collected litter
1	First sampling	13.8kg
2	Second sampling	12.6kg
3	Third sampling	9.23kg
4	Fourth sampling	14.01kg
5	Fifth sampling	13.95kg
		Total=63.59kg

RESULTS AND DISCUSSION

To determine the impact of litter on marine environment it is necessary to identify the litter present in the environment. The present study was undertaken to investigate the status of litter in Mandvi creek of Vengurla (Plate1, Fig 1) which is polluted with domestic waste. Marine litter was collected, quantitative analysis was done and litter was segregated and classified into seven categories namely plastic waste, thermocol, footwear, clothes, plastic bottles, glass bottles, fishing net debris. (Table 1) The plastic waste comprised of food wrappers, plastic cups, tooth brushes, Colgate tubes, earbuds etc (Plate 1, Fig2, Fig3, Fig 4, Fig 5). The collected items were recorded in terms of number of items and weight.

It was observed that the residential areas, fishing market, religious temples around the Mandvi estuary are major sources of litter. Waste materials enter into the estuary through various water channels. The site was sampled once in a month for total 5 months. The collected litter was stored in polypropylene cement sacs having capacity of 50kg. After first sampling 2 sacs of plastic waste, 1 sac of thermocol, 1 sac of clothes, 13 glass bottles, 43 plastic bottles, 12 fishing net debris were recorded. In Second sampling 1 sac of plastic waste, 1 sac of thermocol, 1 sac of clothes, 20 glass bottles, 1 sac of footwear, 32 plastic bottles and 10 fishing net debris were recorded. Third sampling resulted in collection of 1 sac of plastic waste, 1 sac of thermocol, 1 sac of clothes, 10 plastic and 7 glass bottles, along with 11 fishing net debris. 1 sac of plastic

waste, 1 sac of thermocol, 1 sac of footwear 1 sac of clothes, 36 glass bottles, 33 plastic bottles and 11 net debris were recorded in fourth sampling. The last sampling which took place in May resulted in collection of 1 sac of plastic waste, 1 sac of footwear, 1 sac of clothes, 23 glass bottles 25 plastic bottles and 9 fishing net debris. The total weight of marine litter recorded during the field sampling was 63.59 kg. The marine litter abundance of first, second, third, fourth, fifth sampling by weight was 13.8kg, 12.6kg, 9.23kg, 14.01kg, 13.95kg respectively (Table 2). The highest abundance of marine litter by weight was observed in fourth field sampling and lowest abundance of marine litter by weight was observed in third field sampling. The observations propose that there was significant difference in number and weight of marine litter during all 5 visits.

The collected and segregated litter was taken up by municipality vehicle, for further processing where the plastic waste is crushed using plastic crusher machine and crushed plastic is used for road development. Glass and other materials are disposed of by selling to the vendors.

Similar study was done on quantitative analysis of marine litter on Juhu beach which reported highest quantity of macroplastic (Bentotage *et al.*, 2013). Similar studies on assessment of marine litter were conducted by (Ganesapandian *et al.*, 2011; Sulochanan *et al.*, 2014) along the beaches of India which showed high occurrence of plastic and marine debris in low tide. Singare (2012)

reported that plastic materials such as carry bags, milk packets, oil packets, plastic bottles are major waste causing pollution along Thane and Vasai creek in Mumbai. Kaladharan *et al.*, (2017) conducted studies on prevalence of litter along the beaches of India and graded the beaches according to their cleanliness. His results concluded that plastic made up the major components of marine litter. Plastic being floating materials will remain dispersed in water columns and settle at bottoms which will remain in marine sediments for several years (Hansen, 1990; Goldberg, 1995; 1997). Rochman *et al.*, (2013) studied the transport of chemical to marine organisms through plastic ingestion. Sridhar *et al.*, (2009) conducted studies on marine litter along the beaches of Karnataka.

CONCLUSION

Mandvi estuary is flourished with various species of mangroves and has good faunal diversity. This estuary is under threat due to excessive disposal of domestic waste. The excessive disposal of domestic waste is due to improper management and lack of implementation of rules and regulations. The present study gives idea about the type of litter that is disposed of in estuary and monitor the level of pollution. Further studies should be conducted which will help to understand the status of pollution, and implement rules for its control.

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