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Research Paper

Harmful Impacts of Dairy Waste Packaging on the Environment

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ABSTRACT
The global demand for dairy products is rising, which encourages the expansion of the dairy industry and the collection of waste. Whey, dairy sludge, and wastewater (processing, cleaning, and sanitary) are produced in significant quantitiesThe dairy industry is considered as a rising factor in the degradation of the quality of the air, land, and water. Tetra-packs, polyethylene, plastics, paper and paper-based products, aluminium foil, and other packaging materials for dairy products are considered to be environmentally hazardous.
This research aims to assess consumer knowledge of the environmental damages caused by dairy industry waste and the various waste management techniques, with a focus on the impact on product quality and effective pollution control. It lays a special emphasis on eco-friendly methods for minimizing the damaging effects of dairy waste on the environment.
This study indicated that 74 per cent of respondents were generally aware and 85 per cent were aware of health and hygiene among the 25 per cent male and 75 per cent female respondents.
Key words *– BOD - biochemical oxygen demand. COD - chemical oxygen demand, DPP- dairy product packaging*

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I. INTRODUCTION

The advancement of new methods to promote the production of milk and milk products has led to significant growth in the dairy industry in recent years (Deepak *et al.,* 2020; Lejaniya*et al.,* 2021).

Due to the huge quantity of waste it produces and the potentially harmful substances it contains, dairy packaging is a developing global concern. We look into dairy packaging's health and environmental implications, primarily emphasizing on plastic, metal, and paper packaging. Plastic packaging is the most frequent and usually the most hazardous to the environment and human health. They contain both organic and inorganic materials, high nutritional concentrations, and have high biological oxygen demand (BOD) and chemical oxygen demand (COD) (T.S, *et al.* 2022). They may also include a variety of different acid and alkaline detergents, along with other sterilising agents

More greenhouse gases (GHG) are produced by human activities on earth than can be absorbed by the carbon and nitrogen cycles naturally. These GHG have the potential to change the climate. It is estimated that the production, processing, transportation, consumption, and disposal of dairy waste accounts for GHG produced by human activities.

Environmental Issues and health hazards:

The waste reduces the percolation of rainwater, which lowers the levels of the water table.Plastics end up in water bodies that are already contaminated from a variety of sources. Fish and other marine species consume plastic waste mistaken for foodBecause some of the inorganic waste is included in manure and stays in the soil for years, the fertility of the soil decreases, In addition to harmful dioxins, burning polythene bags releases highly hazardous gases such phosgene, carbon monoxide, chlorine, sulphur dioxide, and nitrogen oxide. It requires large area for disposal and there are further waste disposal impacts related to landfills and incineration.

Hence, this study has been carried out with the following objectives:
1) To assess consumer awareness of the damaging effects that dairy sector waste has on the environment.

2) To evaluate the various methods of disposing off dairy industry waste.

II. METHODOLOGY

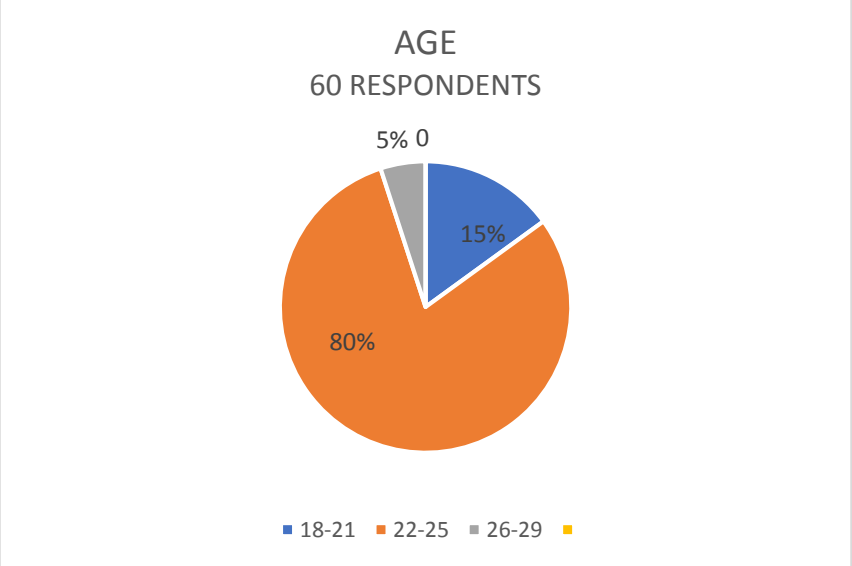
A descriptive study was carried out with the abovementioned objectives. A well-structured questionnaire was developed for the study and60 urban respondents from College of Community and Applied Sciences, MPUAT, Udaipur were selected randomly. Collected data was effectively analysed to obtain the meaningful inferences.

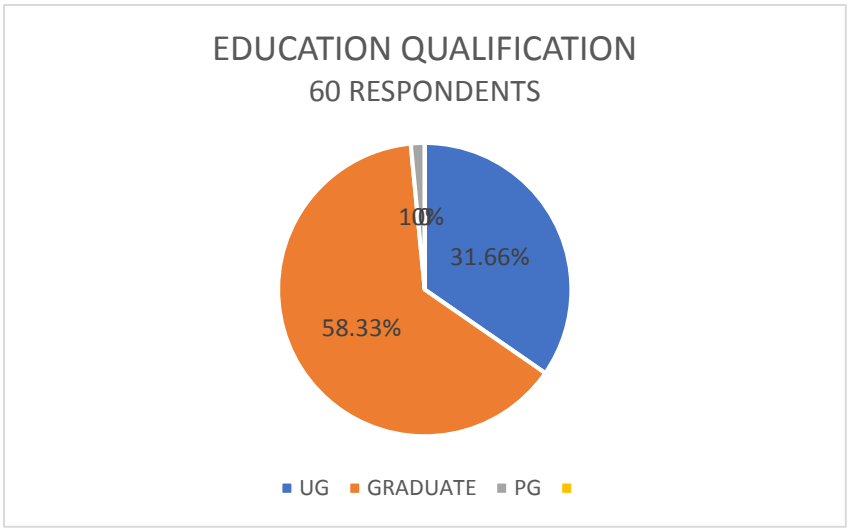
III. RESULTS AND DISCUSSION

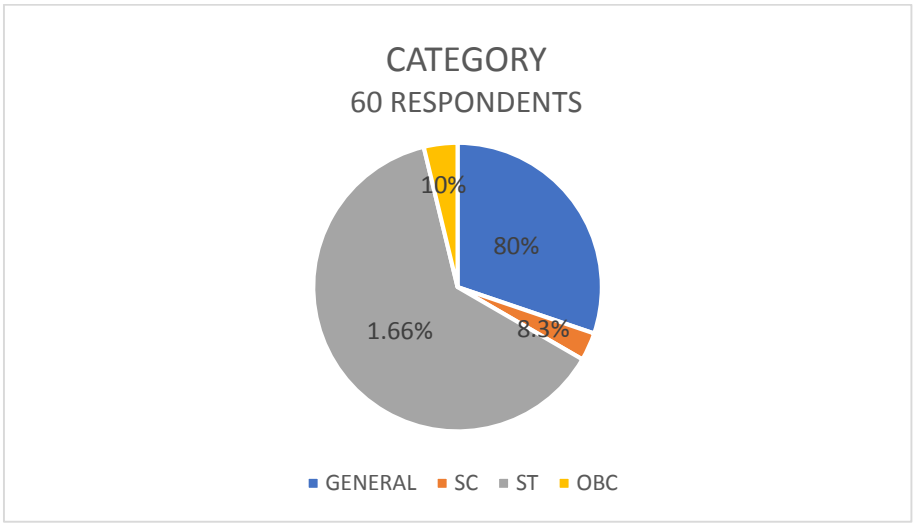
Table 1 shows the demographic profile of respondents. Out of 60 total respondents, 45 were females(75%) and 15 were males(25%). The age group was divided into three main categories,ie, 18-21years, which consisted of 9 members(15%), 22-25years which had the majority of respondents(80%) and 26-29 years (5%). 31.66 per cent of respondents were undergraduate students, 58.33 per cent were graduates and10 per cent were postgraduate students. 80 per cent of the respondents were from the general category and the rest from other categories(SC, ST, OBC).

TABLE 1: DEMOGRAPHIC PROFILE OF RESPONDENTS

S.NO.	PARTICULARS		FREQUENCY (f)	PERCENTAGE(%)
1	Age	18-21	9	15
		22-25	48	80
		26-29	3	5
2	Education Qualification	Undergraduate	19	31.66
		Graduate	35	58.33
		Post Graduate	6	10
3	Category	General	48	80
		SC	5	8.33
		ST	1	1.66
		OBC	6	10
4	Gender	Male	15	25
		Female	45	75







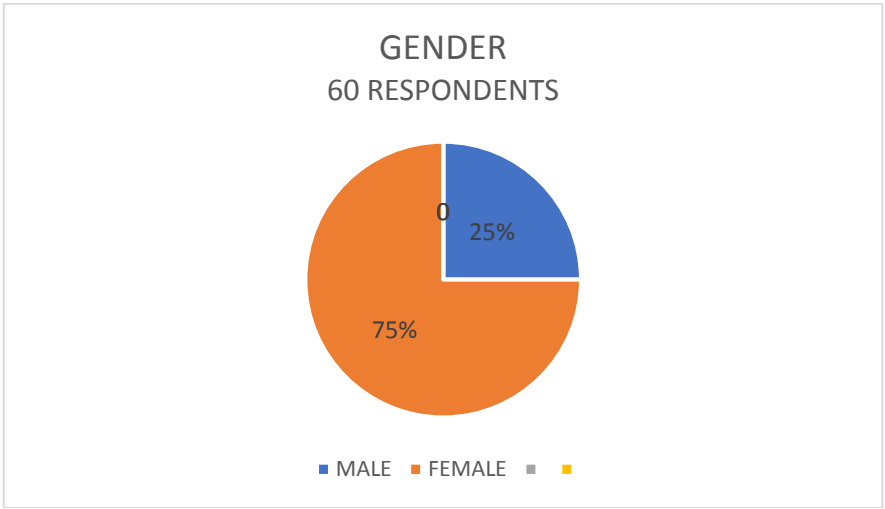


Table 2 depicts the knowledge of respondents regarding general awareness of dairy product packaging and its harmful impacts. The results from the study concluded that 75 per cent of the respondents were aware about the harmful effects.

TABLE 2: KNOWLEDGE REGARDING GENERAL AWARENESS

S.NO.	STATEMENT	YES (%)	NO (%)	DON'T KNOW (%)
1	Disposal of DPP causes harmful impact	88.3	6.7	5
2	DPP causes harm to animals	90	5	5
3	Different ways of disposal of DPP	56.7	36.7	6.7
5	Is DPP environment friendly	8.3	63.3	28.3
6	Diseases caused by polluted environment	93.3	5	
7	Harmful chemicals leached out of DPP	65	26.7	8.3
8	Government responsibility to manage DPP	78.3	11.7	10
9	Quantity of waste should be minimized	78.3	15	6.7
10	done recycling on own	50	41.7	8.3

Table 3 shows the knowledge of respondents related to health and hygiene. Results from the research depicted that 85 per cent of the respondents had knowledge regarding the health and hygiene, whereas 15 per cent of respondents were less aware.

TABLE 3: KNOWLEDGE REGARDING HEALTH AND HYGIENE

S.NO.	STATEMENT	YES (%)	NO (%)	DON'T KNOW (%)
1.	Public bins near locality	68.3	28.3	3.4
2	Noticed burning waste in public area	88.3	8.3	3.4
3	Burning of DPP into open is hygienic	13.3	81.7	5
4	Dispose waste into municipality	85	10	5
5	DPP has harmful impact on human health	86.7	3.3	10

Table 4 shows the knowledge level of respondents on the government rules and regulations regarding waste disposal and safer environment. The data concluded that 60 per cent people were knowing about government norms and policies. More publicity about the policies and rules can result in better results.

TABLE:4 KNOWLEDGE REGARDING GOVERNMENT RULES AND REGULATIONS

S.NO.	STATEMENT	YES (%)	NO (%)	DONT KNOW (%)
1	Follow disposal methods made by government	78.3	11.7	10
2	Aware about government policies of waste disposal	43.3	45	11.7

Table 5 depicts the knowledge regarding sustainable packaging and methods. Results estimated from the study showed that only 58 per cent respondents were aware and others had no knowledge regarding it.

TABLE 5: KNOWLEDGE REGARDING SUSTAINABLE PACKAGING

S.NO.S	STATEMENT	YES (%)	NO (%)	DON'T KNOW (%)
1.	Know sustainable methods of disposal	55	35	10
2	Aware about sustainable packaging	65	28.3	6.7
3	Private sector should emphasize on sustainable packaging	90	5	5

IV. CONCLUSION

One of the major industries involved in food processing sector is the dairy industry, which produces a significant amount of hazardous pollutants. Because waste composition varies by industry, it is challenging to make generalisations about the effective management of waste disposal.

According to the study's findings, 74 per cent of respondents were considered to be generally aware of the harmful effects of dairy product packaging. 85 per cent of the 60 respondents were aware about general hygiene and the adverse health outcomes from dairy product packaging. Only 58 per cent of respondents knew much about environmentally friendly packaging. however, 60 per cent of respondents were aware of the government's policies for a clean and healthy environment and how to effectively dispose of waste.

Dairy product packaging has a high organic content, BOD and COD levels, as well as a general temperature. It can cause serious environmental difficulties and has potential to endanger humans, marine lives, and agricultural operations. if it is not properly handled and deposited on the land.

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