

Development of jewellery from solid waste

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■ **ABSTRACT :** The investigation entitled development of jewellery from solid waste was carried out in Ludhiana city. An interview schedule was employed to study the preferences of ninety respondents between the age group of 17-25 years, selected through purposive random sampling technique from three colleges of Ludhiana city. The results of the study revealed that majority of the respondents were students between age group of 17-21 and were higher secondary, belonging to nuclear families and had monthly family income ranging between Rs. 25,000-50,000. Majority of the respondents, *i.e.* 87.78 per cent were aware of jewellery developed from solid waste and 64.44 per cent were interested to reusing it. Whereas, 66.67 per cent of the respondents were interested in purchasing jewellery. Most of the solid waste was collected by the investigator. On the basis of the preferences of respondents, two jewellery miniatures of each waste were developed and were shown to panel of judges. On the basis of the judges preferences, the most preferred designs were used to develop the jewellery.

■ **KEY WORDS:** Jewellery, Solid waste, Miniatures

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In order to maintain a good and healthy environment, thinking green and keeping green are the slogans for the citizens of the twenty first century. Achieving this goal calls for effective management of waste – may it be food or industrial waste. The latter includes a greater part of waste from textile and hosiery industry. In textile and hosiery, each operation of the complete cycle from fibre preparation to garment making generates substantial amount of waste which has not found a proper management channel in the third world countries. Even the most rationalized, fully integrated mills have not been able to achieve the “zero waste” objective (Topalian, 1995). Effective waste management in textile industry is essential for preventing environmental degradation.

To generate the minimum amount of waste, the

waste hierarchy has taken many forms over the past decade, “Reduce, reuse, and recycle” are the 3 Rs. in the waste hierarchy, it classify waste management strategies according to their desirability. Reduce is design for minimal use of energy, minimize or eliminate waste material. Reuse refer to use an item more than once, this is a way without reprocessing which help save time, money, energy and resource. Recycle is the third component of the waste hierarchy, and is processing used waste materials into new products (Leung Yee Man, 2011).

To counter the problem of waste produced, many efforts are undertaken to reduce its negative contribution towards environment. One of such measures is textile recycling- the reuse as well as reproduction of new

products and accessories. This importance of reuse of waste does not just lie in the fact that it is reusable waste but in its usefulness to reduce the human sufferings, so the study is planned to develop jewellery from solid waste with the following objectives :

- To identify and collect different types of solid waste capable of being used for jewellery.
- To develop jewellery designs and select the most suitable designs for making jewellery.

■ RESEARCH METHODS

This investigation was conducted in Ludhiana city. Three colleges of the city namely Government College for Girls, Bharat Nagar Chowk, Guru Nanak Girls College, Model Town and College of Home Science, Punjab Agricultural University were selected for studying the preferences for different jewellery. Thirty respondents were selected from each college. The total samples of 90 colleges going girls between the age group 17-25 years were selected purposively as the respondents from this particular age group were more receptive towards new trends in fashion. An interview schedule was framed for collection of data regarding preferences of the respondents for development of designs for different jewellery from solid waste. On the basis of information collected from the respondents regarding the development of jewellery, ten miniature jewellery sets were developed. The developed miniatures of each waste were shown to a panel of ten judges comprising faculty of College of Home Science, Punjab Agricultural University, Ludhiana. The most preferred ten miniatures were used to prepare jewellery sets by using solid waste.

■ RESEARCH FINDINGS AND DISCUSSION

The present study entitled development of jewellery from solid waste was conducted to develop jewellery by using solid waste on the basis of consumer preferences for designs, texture, accessories, consumer acceptance and cost effectiveness of the developed jewellery was also studied.

Preferences regarding the reuse of solid waste according to their income groups :

It was observed from the Fig. 1 that the 46.67 per cent of the respondents had family income between Rs. 25,000-50,000, whereas, 24.44 per cent respondents had the monthly family income between Rs. 5,000-25,000,

followed by 21.11 per cent respondents and 7.78 per cent respondents whose monthly family income was between Rs. 50,000-75,000 and Rs. 75,000-1,00,000, respectively.

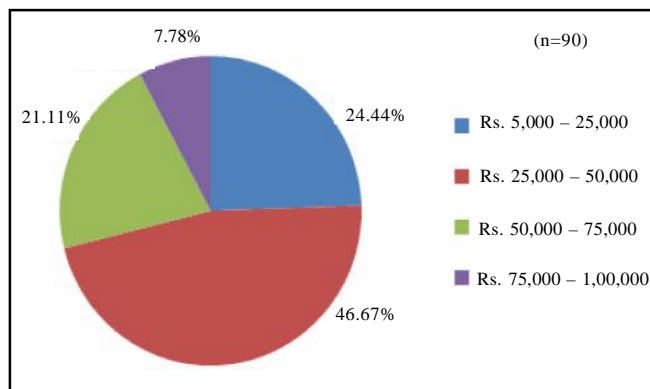


Fig. 1 : Preferences regarding the reuse of solid waste according to their income groups (n=90)

An enquiry into the awareness of its respondents regarding different types of waste elicited that majority of the respondents (48.89 %) were aware of dry waste including papers, cardboards, bottles, cans and caps etc, while 41.11 per cent were aware of organic waste. Only 32.22 per cent of the respondent were aware of hazardous waste rest 13.33 per cent of the respondents were aware of wet waste.

The data in Fig. 2 revealed that 64.44 per cent of the respondents preferred the reuse of solid waste while the rest were not interested in the reuse of solid waste. Fig. 3 revealed that 67.24 per cent, *i.e.* 39 respondents showed their interest in reusing the solid waste for the developing jewellery while 32.76 per cent of the

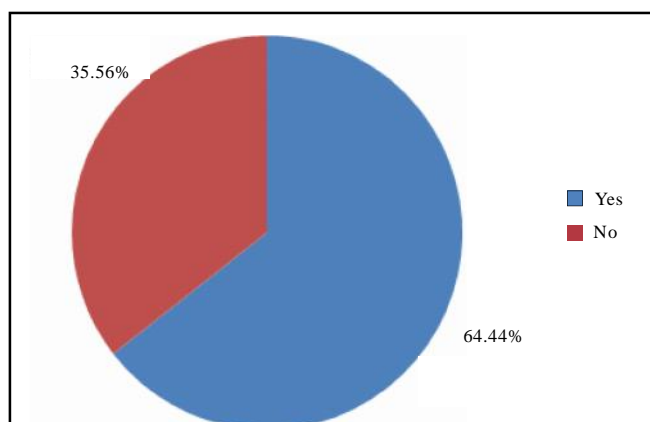


Fig. 2 : Preference of respondents regarding the reuse of solid waste (n=90)

respondents were interested in developing house hold articles. Only 6.89 per cent of the respondents were interested in developing dresses from solid waste.

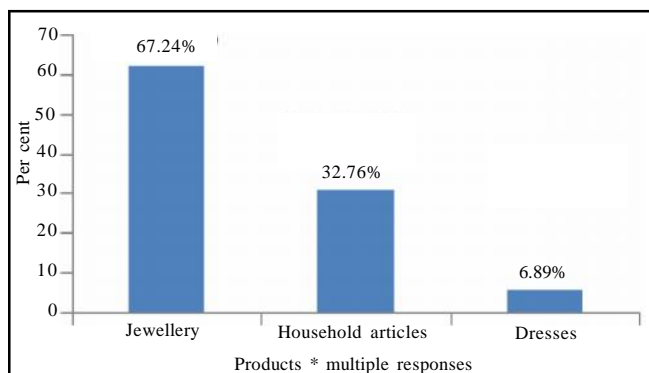


Fig. 3 : Preference of respondents regarding the product development from solid waste (n=58*)

Preferences of respondents for the development of jewellery from solid waste :

Table 2 shows that the largest percentage of respondents *i.e.* 77.78 per cent preferred earrings while 48.89 per cent of the respondents preferred necklaces. Bangles were preferred by 46.67 per cent of the respondents. Preference of the respondents preferred studs (36.67 %), bracelets (26.67 %) and pendants was 14.44 per cent, respectively. These preferences were taken into consideration for the development of jewellery from solid waste.

It is evident from Table 3 that 50.00 per cent, *i.e.* 45 respondents had plastic waste while 45.56 per cent had paper/cardboards waste, 31.11 per cent possessed electronic waste and 27.78 per cent possessed seeds. Only 7.78 per cent respondents each possessed clay, metal waste and textile waste. Waste of CDs was

| Table 1 : Distribution of respondents regarding the awareness of different types of waste (n=90*) | | |
|---------------------------------------------------------------------------------------------------|-----------|------------|
| Different waste | Frequency | Percentage |
| Organic waste- feathers, dry fruit covers, vegetable peels and agricultural waste etc. | 37 | 41.11 |
| Dry waste- papers, cardboards, bottles, cans and caps etc. | 44 | 48.89 |
| Hazardous waste- CDs, batteries, boxes, tetra packs and plastic like buttons etc. | 29 | 32.22 |
| Wet waste- tissue papers and napkins etc. | 12 | 13.33 |

*Multiple responses

| Table 2 : Type of jewellery preferred by the respondents (n=90*) | | |
|------------------------------------------------------------------|-----------|------------|
| Jewellery preferred | Frequency | Percentage |
| Earrings | 70 | 77.78 |
| Necklace | 44 | 48.89 |
| Studs | 33 | 36.67 |
| Bangles | 42 | 46.67 |
| Bracelets | 24 | 26.67 |
| Pendent | 13 | 14.44 |

* Multiple responses

| Table 3 : Different types of waste possessed by the respondents (n=90*) | | |
|-------------------------------------------------------------------------|-----------|------------|
| Waste | Frequency | Percentage |
| Solid waste | | |
| Electronics | 28 | 31.11 |
| Textile | 7 | 7.78 |
| Metal | 7 | 7.78 |
| Paper/cardboards | 41 | 45.56 |
| Wet waste | | |
| Clay | 7 | 7.78 |
| Seeds | 25 | 27.78 |
| Hazardous waste | | |
| CDs (discs) | 4 | 4.44 |
| Plastics | 45 | 50 |

*Multiple responses

available with only 4.44 per cent.

The data presented in Table 4 indicated that wires, beads and glitters were the most preferred decorative material to be used for the development of jewellery from solid waste and their weighted mean scores were 4.18, 3.03 and 2.54 given first, second and third ranks, respectively. Clay was given fourth rank with weighted mean score of 2.08. Plastic and sequins were the least preferred decorative material. Since, the sample size is large the Kruskal–Wallis H-test statistically follows χ^2 distribution=9.49. The Kruskal–Wallis H-test *i.e.* H=7.88* was found to be significantly different from each other at 5 per cent in all the cases.

The data regarding the preferences of the respondents for attributes to be considered while developing jewellery from solid waste have been presented in Table 5. The data revealed that 55.56 per cent, of the respondents selected jewellery due to the colourful combination, 17.77 per cent, were preferred due to the appearance of design of the jewellery followed by 15.56 per cent, due to their overall impact and only

11.11 per cent, of the respondents were of the opinion that the wearability used attract them to purchase the products.

Many economical and socio-cultural factors influence the purchase of jewellery. The data shown in Table 6 revealed that price, was the most influenced factor (weighted mean score 2.30) and hence was given the first rank. Appearance, with a weighted mean score 2.09 was given the second rank and durability was at the third place (weighted mean score 1.70), respectively. Since, the sample size is large the Kruskal–Wallis H-test statistically follows χ^2 distribution=5.99. The Kruskal–Wallis H-test *i.e.* H=0.62* was found to be significantly different from each other at 5 per cent in all the cases.

Selection of miniature jewellery developed from solid waste :

For the development of jewellery sets from solid waste, preferred waste *i.e.* small bulbs, bottle caps, plastic bottles, CDs and Pistachio shells were used. For single jewellery design two miniatures were developed and

| Accessories | Order of preferences | | | | | WMS | Ranks |
|-------------------------------|----------------------|------------|------------|------------|------------|------|-------|
| | I | II | III | IV | V | | |
| Glitter (colours) | 11 (12.22) | 22 (25) | 16 (19) | 12 (12.5) | 14 (15.5) | 2.54 | III |
| Sequins | 7 (7.78) | 6 (6.67) | 8 (8.89) | 10 (11.11) | 20 (22.22) | 1.37 | VI |
| Beads/stones | 18 (20) | 14 (15.56) | 23 (25.56) | 24 (26.67) | 10 (11.11) | 3.03 | II |
| Wire (silver, metal, plastic) | 32 (35.56) | 32 (35.56) | 14 (15.56) | 16 (17.78) | 14 (15.56) | 4.18 | I |
| Clay | 18 (20) | 10 (11.11) | 9 (10) | 12 (13.33) | 6 (6.67) | 2.08 | IV |
| Plastic | 4 (4.44) | 6 (6.67) | 20 (22.22) | 16 (17.78) | 26 (28.89) | 1.8 | V |

Figures in parentheses indicate percentages; Weighted Mean Score – WMS; Kruskal –Wallis H-test H=7.88*; * indicate significance of value at P=0.05, respectively

| Attributes of developed jewellery | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Wearability | 10 | 11.11 |
| Colour combination | 50 | 55.56 |
| Overall impact | 14 | 15.56 |
| Appearance | 16 | 17.77 |

| Factors | Order of preference | | | WMS | Ranks |
|------------|---------------------|------------|------------|------|-------|
| | I | II | III | | |
| Price | 47 (33.30) | 23 (14.44) | 20 (11.11) | | |
| Appearance | 35 (27.77) | 28 (15.55) | 27 (30.00) | 2.09 | II |
| Durability | 19 (10.00) | 25 (22.22) | 46 (30.00) | 1.70 | III |

Figures in parentheses indicate percentages; Weighted Mean Score – WMS; Kruskal –Wallis H-test H=0.62*; * indicate significance of value at P=0.05

were show to panel of judges for the final selection. Table 7 reveals that A_1 design with weighted mean score 1.70 was selected for the jewellery developed from waste small bulbs, B_1 design with weighted mean score 1.80 was selected for the development of jewellery developed from waste matel bottle caps, C_1 design with weighted mean score 1.80 was selected for the development of jewellery based on waste plastic bottles, D_1 design with weighted mean score 1.80 was selected for the development of jewellery from waste CDs (discs), E_2 design with weighted mean score 1.90 was selected for the development of jewellery from waste Pistachio shells.

Table 7 : Weighted mean score of panel of judges according to their preferences regarding the designs of jewellery developed from solid waste (n=10)

| Designs | WMS | Ranks |
|-------------------------|------|-------|
| Small bulbs | | |
| A_1 | 1.70 | I |
| A_2 | 1.30 | II |
| Bottle caps | | |
| B_1 | 1.80 | I |
| B_2 | 1.20 | II |
| Plastic bottles | | |
| C_1 | 1.80 | I |
| C_2 | 1.20 | II |
| CDs | | |
| D_1 | 1.80 | I |
| D_2 | 1.20 | II |
| Pistachio shells | | |
| E_1 | 1.10 | II |
| E_2 | 1.90 | I |

WMS - Weighted mean score

The study by Kakkar (2015) also revealed that prices of the developed accessories from reusable knitwear waste.

Details of the jewellery developed from solid waste:

The investigator selected five the most preferred jewellery designs evaluated by panel of judges. The details of the jewellery have been furnished as follows:

Jewellery A_1 :

Waste of small bulbs was used to make jewellery A_1 that contained a necklace and a pair of earrings. Locks, wire and dangles were used to join the each single piece of bulbs together (Plate 1). Stylized copper wires were used to embellish it.



Plate 1 : Jewellery A_1 developed from small bulbs

Jewellery B_1 :

This jewellery set was developed with painted bottle caps (Plate 2). The selected necklace and earrings of design B_1 was embellished with flowers of five different colours made from clay. White stones were used on the flowers for the decoration purpose.



Plate 2 : Jewellery B_1 developed from bottle caps

Jewellery C_1 :

The necklace and earrings of design C_1 were developed from the plastic bottles that were coloured in red and then decorated with golden coloured stones and painted with golden 3d colour tube (Plate 3). A single



Plate 3 : Jewellery C_1 developed from plastic bottle

leaf and a flower was attached with each other with the help of small locks.

Jewellery D_1 :

This set of neckpiece and earrings was developed from CDs (Plate 4). A beautiful free hand pattern was drawn over CDs with orange coloured paint in case of design G_1 .



Plate 4 : Jewellery D_1 developed from CDs

Jewellery E_2 :

Jewellery E_2 was a black coloured necklace and a pair of earring developed from pistachio shells (Plate 5).



Plate. 5 : Jewellery E_2 developed from pistachio shells

Golden caps and golden beads were used as an embellishment. Each single pattern is joined with a chain of golden shade with the small golden lock. The black and golden colour combination was used to give a traditional look to the jewellery.

Conclusion :

It is concluded that development of jewellery form solid waste, would provide entrepreneurs a new idea for making use of different solid waste to produce new products along with different accessories to start with very less investments. The results related to design development and colour combinations would be beneficial to the housewife's to utilize the solid waste at home.

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