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Research Paper

Screen out discarded fabrics having ability to transform into bio-fertilizer

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■ **ABSTRACT :** Management of discarded fabric has become one of the problems we are facing today. The huge amount of discarded fabric generated mostly by textile mills, manufacturing units, boutiques, tailor shops and household sectors. Considerable amount of discarded fabric is dumped in open areas and incinerated after removing small percentage for recycling and reuse. This accumulation of discarded fabric from all over the country causes certain serious environmental problems and health hazards. 20 tailor shops / boutiques were selected and questionnaire was designed to find out and collect type of discarded fabric available. Discarded biodegradable fabrics *i.e.* cotton and silk, available in high amount at tailor shops / boutiques and used for development of bio-fertilizer.

■ **KEY WORDS:** Discarded fabric, Biodegradable fabric, Bio-fertilizer

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In the last two decades the amount of solid waste generated in India has been increasing at an alarming rate. It is estimated that in cities and rural areas of India nearly 700 million tones organic wastes is generated annually which is either burned or land filled (Bhiday, 1994). This implies that by the end of 2047, India will be generating around 260 tones of waste annually which is almost 5 times the amount of waste currently generated. In order to dispose that waste, nearly 1400 square kilometers of land is required (Singhal and Pandey, 2001), moreover land diversion is physically impossible as population growth and urbanization has led to serious scarcity of land.

The huge amount of discarded fabric generated mostly by garment industry, textile mills, manufacturing units, boutiques, tailor shops and household textile sectors. With the expansion of the industry, the problem of waste disposal has become a major issue. People today have many more fabrics and throw them away when they no longer want them. We all have discarded fabrics that we no longer wear, with a little inspiration, we can recycle discarded fabric to develop bio-fertilizer. Management of discarded fabric has become one of the problems we are facing today. The rapid increase in the volume of discarded fabric is one of the aspects of the environmental crisis, accompanying recent global development. Disposal of discarded fabrics can be done by methods like land filling, incineration, recycling, conversion into biogas, and composting. Most common practices of waste processing are uncontrolled dumping

which causes mainly water and soil pollution. Considerable amount of discarded fabric is dumped in open areas and incinerated after removing small percentage for recycling and reuse. This accumulation of fabric waste from all over the country causes certain serious environmental problems and health hazards. In most instances, they are combusted under adverse conditions, generating toxic gases. Utilization of this waste material for productivity process is important for both economical and environmental reasons (Bharadwaj, 2010).

A process for using recycled discarded fabrics for producing bio-fertilizer. This process can include collecting different categories of discarded fabrics from tailor shops and boutiques. The process can also include selecting specific categories of discarded fabric. Today, recycling has become a necessity not only because of the shortage of any item but also to control pollution. Discarded fabric waste management from boutiques/ tailor shops is an innovative idea that can serve as a sustainable source of raw material for bio-fertilizer production. This method not only reduces the generally discarded waste produced by boutiques/tailor shops but also recycles and reuses it as an environment friendly bio-fertilizer.

■ RESEARCH METHODS

Locale of the study:

The present study was conducted in Udaipur city.

Sample and sample size:

The researcher made a comprehensive list of boutiques and tailors shops of Udaipur city. For screening out the discarded fabrics having ability to transform into bio-fertilizer, Udaipur city had divided into four zones *i.e.* North-East (NE), North West (NW), South East (SE), South west (SW) and from each zone five tailor shops and boutiques were selected. Twenty tailors shop and boutiques were selected randomly with 'simple random sampling technique' from a list of available boutique and tailor shop in each zone to collect the discarded fabrics.

Development of research tool:

Keeping in mind the purpose of the study and subjects included in the sample a questionnaire was designed to interview the respondents. Interview method was considered most appropriate to elicit different shades of responses from the respondents. This technique was found to be most practical as it ensures complete response and helped in establishment rapport between the researcher and respondents. Researcher personally visits the selected tailor shops and boutiques for collecting the primary data.

Data collection procedure:

The researcher interviewed 20 tailor shop and boutique professionals to collect primary data about discarded fabrics (Fig. A). An authentic questionnaire was developed to screen out discarded fabrics having ability to transform into bio-fertilizer. Here the questions raised by the interviewer in face to face as interview serve as an effective means of collecting necessary information. Questions related to background information of tailors shop and boutique professionals (age, sex, education, monthly income, working hours and number of assistant), type of work, type of garment stitched and disposed off in trash, utilization pattern of left over fabric, disposing pattern of discarded fabrics produced at tailor shops and boutiques, disposal details of left over fabrics (type, size, quantity, duration) and knowledge about recycling of discarded fabrics etc. On the basis of primary data, researcher decided to collect discarded fabrics *i.e.* cotton and silk to develop bio-fertilizer because these were available in the higher amounts at tailor shops and boutiques (Fig. A).

Fig. A : Researcher interviewing for collection of primary data

Collection of discarded fabrics:

Discarded fabrics were sorted and screened out by the researcher on the basis of visual inspection and generic nature of the fibre. On the basis of large amount of availability of discarded fabric and results of pilot study, cotton and silk were collected for further experimental work (Fig. B).

Fig. B : Collection of discarded fabrics

Segregation/characterization of discarded fabrics:

The collected fabrics were a mixture of biodegradable and non-biodegradable fabrics. The biodegradable cotton and silk fabrics were segregated by using visual inspection method as well as burning test and separate lot of cotton and silk fabric was made (Fig. C).

Fig. C : Segregation/of discarded fabrics

■ RESEARCH FINDINGS AND DISCUSSION

Based on pilot study results, survey of 20 tailor shop and boutique professionals was conducted to collect information about the backgrounds, utilization pattern of left over fabrics, disposing pattern of discarded fabrics produced at tailors shop, disposing details of left over fabrics as well as knowledge about recycling of discarded fabrics in Udaipur city. The results of surveys on different aspects are mentioned below.

Background information:

Age:

Perusal of Table 1 reveals that half of the respondents (50%) belonged to the middle age group, followed by 35 per cent were young and 15 per cent professional were old. Thus, majority of the respondents were from middle age group.

Sex:

Data in the Table 1 depicts that among the professionals in the tailors shop and boutique, majority of the respondents (65%) were male whereas 35 per cent of respondents were female.

Education:

It can be observed from the Table 1 that 20 per cent respondents were having education upto graduate and above, whereas equal percentage (15%) were educated upto primary, middle and senior higher secondary. Rest of the respondents were in the category of can read and write, educated upto high school and diploma holder in tailoring (10%), respectively, and only 5 per cent were illiterate.

Monthly income:

The Table 1 illustrates that equal percentage (35%) had a monthly income between Rs. 25,001/-to 50,000/- and Rs. 50,001/-to 1,00,000/- and 20 per cent respondents had monthly income below Rs. 25,000/-. Least (10%) respondents had monthly income above Rs. 1,00,001/-.

Working hours:

It is evident from Table 1 that majority of the respondents (60%) were working 9-12 hours and 30 per cent and 10 per cent were working 6-8 hours and below 6 hours, respectively.

Number of assistants:

Regarding number of assistants in tailor shops and boutiques for tailoring work, Table 1 indicates that half of the respondents (50%) had 1-2 assistant. 40 per cent and 10 per cent had 3-4 and above 4 assistant, respectively.

Table 1 : Background information of the selected boutiques and tailors shop (n=20)

Sr. No.	Categories	Frequency	Percentage
1.	**Age**		
	Young	7	35
	Middle	10	50
	Old	3	15
2.	**Sex**		
	Male	13	65
	Female	7	35
3.	**Educational qualification**		
	Illiterate	1	5
	Can read and write	2	10
	Primary school	3	15
	Middle school	3	15
	High School	2	10
	Sr. Higher secondary	3	15
	Diploma in tailoring	2	10
	Graduate and above	4	20
4.	**Monthly income**		
	Below Rs. 25,000/-	4	20
	Rs. 25,001/-to 50,000/-	7	35
	Rs. 50,001/-to 1,00,000/-	7	35
	Above Rs. 1,00,001/-	2	10
5.	**Working hours**		
	Below 6 hours	2	10
	6-8 hours	6	30
	9-12 hours	12	60
	Above 12 hours	-	-
6.	**Number of assistants**		
	1-2	10	50
	3-4	8	40
	Above 4	2	10

Type of work:

The analysis of facts collected during the interview also showcase that, type of work done at tailors' shops and boutiques, equal percentage (50%) were doing stitching work and all type of work related to garment stitching, 45 per cent were selling fabric/garments, 35 per cent respondents were involved in embellishment work and 20 per cent involved in alteration/repairing work (Table 2).

Table 2 : Type of work of the selected boutiques and tailors shop (n=20)

Sr. No.	Type of work*	Frequency	Percentage
1.	Stitching	10	50
2.	Embellishment work	7	35
3.	Sell of fabrics/ garments	9	45
4.	Alteration/repair	4	20
5.	All types of work related to garment stitching	10	50

* Multiple responses

Type of garment stitched and disposed off in trash:

The Table 3 and Fig. 1 illustrates that there were nine categories of fabric in all three ladies, gents and kids garments. On the basis of type of garment stitched and disposed off in trash, cent per cent respondents preferred cotton fabric in all ladies, gents and kids garments. 60% respondents preferred silk fabric in all ladies, gents and kids garments.

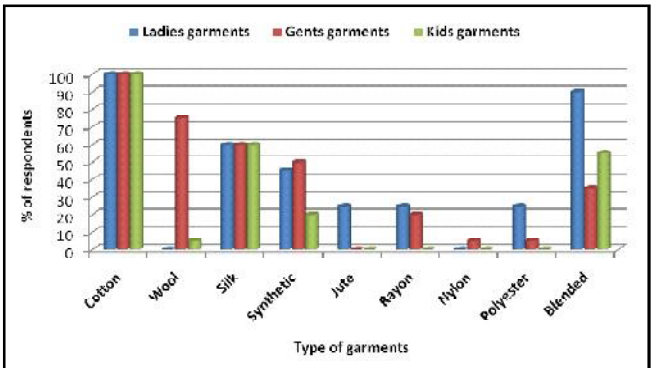

Fig. 1 : Type of garment stitched and disposed off in trash

Maximum of the respondents (90%) preferred blended fabric in ladies garment while 55 per cent in kids garments but only 35 per cent in gents garments. Wool was taken by 75 per cent respondents for stitching gents garment and only 5 per cent for kids garment. While none of the respondents used wool for ladies garments. Similarly, half of the respondents preferred synthetic fabric for gents' garments, 45 per cent for ladies garments but only 20 per cent for kids garments. Jute, rayon and polyester fabrics were preferred equally (25%) in ladies garment. Only 20 per cent and 5 per

Table 3 : Type of garment stitched and disposed off in trash of the selected boutiques and tailor shops (n=20)

Sr. No.	Fabrics*	Ladies garments		Gents garments		Kids garments	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Cotton	20	100	20	100	20	100
2.	Wool	-	-	15	75	1	5
3.	Silk	12	60	12	60	12	60
4.	Synthetic	9	45	10	50	4	20
5.	Jute	5	25	-	-	-	-
6.	Rayon	5	25	4	20	-	-
7.	Nylon	-	-	1	5	-	-
8.	Polyester	5	25	1	5	-	-
9.	Blended	18	90	7	35	11	55

* Multiple responses

cent, respectively used rayon and nylon in stitching gents garments.

Utilization pattern of left over fabrics:

About the utilization pattern of left over fabrics Table 4 depicts that the similar number of respondents (25%) reused the left over fabrics in designing other customer garments and by selling it to needy people. Equal number of respondents (20%) used to make to something new, give to relatives, throw to garbage, make quilt out of it and sell clothes at used market or internet equally. Again, only 2 respondents (10%) used the left over fabrics for their own garment, just keep it or dump it for further use or give it to charity equally (Table 4).

A study conducted by Dave and Shrivastava (2013) supported the results that to assess the awareness about the utilization of clothing amongst working women and to find out the ways to utilize the old clothing. Cent per cent of the respondents gave various reasons to worn out the old clothing *viz*., clothing when not in fashion, fading of colour of the clothing, got bored by wearing, burning / tearing, damaged design / motif / pattern, not suitable for figure etc. All the respondents tried to suggest that old clothing can be used in making other apparels. Cent per cent respondents confessed that they make any new product from the old clothing.

Disposal pattern:

It is evident from Table 5 and Fig. 2 that the information collected during the interview regarding disposal pattern of discarded fabrics it was mentioned by more than half (65%) of the respondents were throwing away the waste directly into landfills, 50 per cent were dumping in corporation bin. 15 per cent were giving discarded fabrics to fabric collectors, use incineration method and giving this to authorized discarded fabric collection centre equally.

A study done by Joshi and Sharma in 2016 described that 10,000 tones of waste dumped in the landfills every day - much beyond their capacity-contains waste of all

Table 4 : Utilization pattern of left over fabrics of the selected boutiques and tailors shop (n=20)

Sr. No.	Utilization pattern of left over fabrics *	Frequency	Percentage
1.	Reuse in designing other customer garment	5	25
2.	Use for own garment	2	10
3.	Use to make something new	4	20
4.	Use as duster cloth	-	-
5.	Just keep it/ dump it for further use	2	10
6.	Sell it to needy	5	25
7.	Give it to charity	2	10
8.	Give it to relatives	4	20
9.	Throws clothes to garbage	4	20
10.	Make quilt out of it.	4	20
11.	Sells clothes at used market or internet	4	20

* Multiple responses

Table 5 : Disposal pattern of left over fabric of the selected boutiques and tailors shop (n=20)

Sr. No.	Disposal pattern	Frequency	Percentage
1.	Dumping in corporation bin	10	50
2.	Incineration	3	15
3.	Any authorized discarded fabric collection centre	3	15
4.	Directly into landfills	13	65
5.	Give to discarded fabric collectors	3	15

* Multiple responses

kinds, leaves, paper, metal, cloth and glass because the refuse is not segregated. There are no notified municipal waste rules that stress on the process either. According to a place Steen Trasborg approximately 65% of the collected clothes can be reused or recycling in some form, whereas the remaining 35% is disposed for incineration.

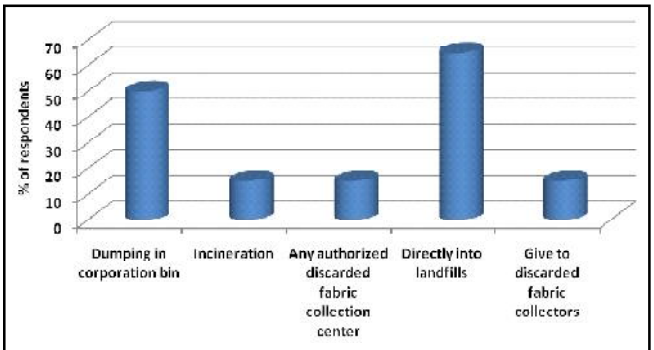

Fig. 2 : Disposal pattern of left over fabrics

Table 6 : Disposal details of left over fabric of the selected boutiques and tailors shop (n=20)

Sr. No.	Categories	Frequency	Percentage
1.	**Type**		
	Very small pieces	-	-
	Small cutting waste	-	-
	Decorative pieces	-	-
	Remaining fabric	-	-
	All of above	20	100
2.	**Size**		
	Bigger than ¼ meter	3	15
	Smaller than 10 cm	8	40
	Smaller than 5 cm	9	45
3.	**Quantity (g)***		
	50-100	6	30
	100-200	5	25
	200-300	7	35
	300-400	6	30
	More than 400	6	30
4.	**Duration***		
	Every Day	11	55
	Once a Week	2	10
	Once a Month	8	40
	2-3 Times a Year	11	55
	Once a year	2	10
	Every few years	1	5

*Multiple responses

Disposal details of left over fabrics:

Type:

Perusal of Table 6 reveals that regarding type of discarded fabrics generated at tailors' shops and boutiques cent per cent respondents generated very small pieces of fabrics, small cutting waste, decorative pieces and left over fabrics.

Size:

About the size of left over fabric disposed off regularly as illustrated in Table 6 entails that 45 per cent of the respondents, disposed smaller than 5 cm fabric regularly. 40 per cent and 15 per cent respondents disposed smaller than 10 cm and bigger than ¼ meter regularly, respectively.

Quantity :

It is depicted in the Table 6 that equal percentage (30%) of respondents were generating fabric wastage of approx 50-100 g, 300-400 g and more than 400 g daily, respectively. While 35 per cent respondents answered that in the shops daily approx 200-300 g fabrics are being discarded and 25 per cent of the sample responded approx 100-200 g fabric scraps is being generated daily in the firms.

Similar ideas have been expressed by Benedette and Samual (2013). Findings indicated that the total quantity of the fabric waste in the two states is 799.3kg every week. This quantity of tailoring fabric waste is of reasonable size and could be utilized to produce useful

products instead of allowing them to constitute environmental hazards.

Duration :

Regarding frequency of discarded fabric disposal, Table 6 entails that more than half of the respondents (55%) discard the wastage of fabric every day and same per cent discard the fabric 2-3 times in a year, whereas 40 per cent do this once in a month. Two extremes conditions noticed regarding this that only marginal percentage of respondent reported to discard the waste once in week as well as another involved this activity only once in a year.

Knowledge about recycling of discarded fabrics:

Data of Table 7 shows that 90 per cent respondents were having knowledge about recycling of discarded fabrics, rest (10%) were not aware about this.

Table 7 : Knowledge about recycling of discarded fabrics of the selected boutiques and tailors shop (n=20)

Sr. No.	Categories	Frequency	Percentage
1.	Yes	18	90
2.	No	2	10

Conclusion:

The study shows that discarded fabric when is disposed off as landfills, not degrading properly which ultimately leads to infectious diseases and release of foul odour causing a hindrance to the ecosystem and people. Most of this waste is disposed of by burning, which in turn in increases carbon dioxide level in the atmosphere hence, adds on to the global warming. These discarded fabrics are directly thrown away on landfills and simply burnt or discarded by tailor and boutique professionals. It was very much surprising during the interview of tailor's and boutique professionals that a lot of fabrics discarded daily greater quantity is of cotton, silk and blended fabrics. On the basis of primary data and result of pilot study, researcher decided to collect discarded biodegradable fabrics *i.e.* cotton and silk to develop bio-fertilizer because these were available in the higher amounts at tailor shops and boutiques. So, there is a dire need of the solution to utilize the discarded fabrics in creating new products, which does not cause any harm to the environment as well as on humans.

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