Research Paper | *Asian Journal of Home Science* | December, 2011 | Volume 6 Issue 2 :107-111

Market potential of developed consumer products of bonded material using plastic wastes

MEENU SRIVASTAVA AND RAJESHWARI BHATI

See end of the paper for authors' affiliations

Correspondence to:

MEENU SRIVASTAVA
Department of Textile and Apparel Designing, College of Home Science
Maharana Pratap University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA
menuclt@yahoo.com

ABSTRACT

One of the biggest challenges with plastic waste is that it is extremely hard to dispose of and persist in the environment for longer period. While the problem of plastics disposal has to be recognized and accepted globally, India's particular situation could be worsened by its poor drainage infrastructure in the cities, and fewer resources to spare for post disaster rectification. The study was carried out at Udaipur city of Rajasthan on Development of Bonded fabric using plastic waste for developing consumer products and assessment of their market potential. Finding of the study revealed that developed bonded fabrics of 200-300 GSM was suitable for the development of those consumer products requiring more thickness, stiffness and bursting strength. On the other hand, the developed bonded fabrics of 100-200 GSM was found more suitable for developing consumer products of general use on account of less stiffness and other related properties. Majority of the respondents appreciated developed value added consumer products. Thus, it can be concluded that the developed value added consumer products by the use of polythene bags for developing bonded fabrics were found highly acceptable in terms of acceptability and further this will also be helpful in reducing the environmental pollution in a fruitful manner.

KEY WORDS : Bonded fabric, Plastic waste, Products, Market potential

How to cite this paper: Srivastava, Meenu and Bhati, Rajeshwari (2011). Market potential of developed consumer products of bonded material using plastic wastes . *Asian J. Home Sci.,* **6** (2) : 107-111.

Article chronicle: Received: *26.04.2011*; **Revised:** *04.08.2011*; **Accepted:** *08.10.2011*

The environment on earth is a highly sensitive eco-system, which is being disturbed by disposal of numerous non-biodegradable man-made objects causing long lasting harm and damage. One such man-made material is plastic. Polyethylene is one of the most popular packing materials in recent times. It is used for the majority of bags- whether shopping bags or bin liners, and is a non-biodegradable substance, which contains harmful chemicals. Because of its vast use in packing items, 80 million metric tones of polyethylene are produced every year.

Plastic bags are widely used because they are easy to carry, cheaper to make, stronger and have longer life. Unfortunately, these useful qualities of plastic bags create huge pollution problem. Being inexpensive, the plastic bags are easily discarded in the environment but its persistence in the environment does great harm. Urbanization has added to the plastic pollution in concentrated form in cities. Plastic thrown on land can enter into drainage lines and chokes them resulting into floods in local areas in cities as experienced in Mumbai, India in the year 1998. Over 50 per cent of all plastic produced in India is used for packaging. Most of this is discarded once used - and in a country where traditionally waste is largely unknown, this has caused a massive environmental problem.

Looking into the above facts, it was felt the need to carry out the present research on development of bonded fabric using waste polythene to developed consumer products and assessment of its market ponntatial

RESEARCH METHODS

Three different types of waste polythenes were selected and twelve different types of cotton rags comprising of three each from saris, kameez/rajputi dress, curtains and bed sheets for use as upper layer fabric depending on the easy availability and suitability. Similarly, for backing material, required in thermal bonding technique, six different types of cotton materials were selected in the form of old cotton saris, curtains and bed sheets. All the selected materials to be used as upper and lining fabrics along with three different type of polythene sheets of different GSM were used in several combinations to develop bonded fabrics.

RESEARCH FINDINGS AND DISCUSSION

The time and temperature required for bonding fabrics of different GSM was carefully observed.

Perusal of data presented in Table 1 depicts that fabrics of lower GSM (*i.e.* below 100) and higher GSM (*i.e.*100- 200) required the same time for bonding *i.e.* 28 seconds, while the temperature of bonding varied from 150^{0}C for lower GSM (*i.e.* below 100) and 200^{0}C for fabrics of higher GSM (*i.e.* 100-200).

Table 1: Optimized time and temperature of bonding different fabrics and polythene sheets of varying thickness and GSM

Sr. No.	GSM (g/m^2)	Time	Temperature
1.	Below 100	28 Seconds	150°C
2.	100-200	28 Seconds	200°C

The data revealed that fine cotton saris and other lightweight fabric samples required a lower temperature for bonding (150^{0}C) while bed sheets, curtains and other heavy weight fabric samples required a higher temperature *i.e.* 200^{0}C for bonding.

When all the developed bonded fabrics were analyzed GSM wise, it was found that the GSM of the developed bonded fabrics showed much variation by bonding fabrics and polythenes of different GSM as shown in Table 2.

All the six selected cotton materials to be used as lining fabric showed GSM in three ranges. There were 2 samples falling in GSM below 50, 2 in range of 51-100 and remaining 2 in 101-150. Similarly in case of upper material also, 3 range of GSM were found for all the selected 12 materials. Table 2 shows the GSM range of developed bonded fabric samples obtained in different categories.

Perusal of data in Table 2 depicts the final GSM of developed bonded fabric after bonding with 3 different polythenes of different GSM by varying the GSM of upper and lining fabric *i.e.* when the GSM of upper and lining fabric was similar and when the GSM of upper fabric was higher and lining fabric was lower. The categories of GSM of upper and lining fabric were made on the basis of availability of fabric samples of different GSM.

Evaluation of developed bonded fabric samples:

When all the developed bonded fabrics were analyzed individually, the GSM and thickness of most of the developed bonded samples was found at par. So, for the selection purpose, these developed bonded fabric samples were evaluated by a panel of ten judges comprising of clothing and textile experts on a 3 point rating scale. The evaluation was done on the basis of proposed end uses (The list of value added consumer products to be developed was enclosed with the rating performa). The rating performa included the scores as 3, 2 and 1 for extremely preferred, preferred and not preferred, respectively.

On the basis of the preferences of judges, 15 developed bonded fabric samples of different GSM were selected for developing value added consumer products. Table 3 describe the luster and texture of developed bonded fabrics of two different GSM.

The lustre and texture were found best in developed bonded fabrics of 200-300 GSM followed by 100-200 GSM bonded fabrics. All the developed bonded fabrics of 200-300 GSM scored higher mean values as compared to

Table 3: GSM wise mean values of lustre and texture of developed bonded fabric samples

GSM	LUF	LLF	TUF	TLF
100-200	2.3±0.31	2.25±0.37	2.05±0.20	2.20±0.45
200-300	2.51±0.20	2.53±0.18	2.64±0.32	2.38±0.27
S.E.	0.116	0.131	0.12	0.167
T	1.812	2.128*	4.902**	1.081

* and ** indicate significance of values at P=0.05 and P=0.01, respectively.

(LUF: Lustre of upper fabric; LLF: Lustre of lining fabric; TUF: Texture of upper fabric; TLF: Texture of lining fabric)

Table 2: GSM of developed bonded fabrics after thermal bonding with selected fabric samples (Upper and Lining) and polythenes of different GSM

Sr. No.	GSM (g/m^2)				
	Individual fabric sample		Developed bonded samples (After bonding with 3 different polythene samples)		
	Upper fabric	Lining fabric	A (35)	B (43)	C (57)
1.	Below 50	Below 50	100-150	100-150	150-200
2.	51-100	51-100	150-200	200-250	200-250
3.	51-100	Below 50	100-150	150-200	150-200
4.	101-150	101-150	150-200	200-250	250-300
5.	101-150	51-100	200-250	150-200	200-300
6.	101-150	Below 50	150-200	200-250	200-250

100-200 GSM bonded fabrics as shown in Table 3.

Development of value added consumer products:

The findings obtained by the analysis of developed bonded fabrics showed bright prospects for developing a variety of consumer products as per current market trends. There were used developed bonded fabric sheets of different GSM for development of different value added consumer products. For developing light weight/delicate articles, bonded fabric of lower GSM (*i.e.* 60-150) and for strong /heavy weight articles higher GSM (*i.e.* 200-300) bonded fabrics were more suitable. Hence, for developing value added consumer products of two different categories, bonded fabric sheets of 100-200 and 200-300 GSM were developed in required quantity. Since the bonded fabric sheets possessed some positive inherent characteristics such as increased lustre or shine, low moisture absorption, dust repellency, good drapeability, strength etc, more emphasis was given on developing those products which do not need frequent washing such as computer cover, fridge cover, suitcase cover etc. On the basis of this, were 21 value added consumer products finalized which would be developed using bonded fabric sheets of different GSM.

The data in Table 4 reveals that 14 consumer products were developed using 200-300 GSM bonded fabric sheets and 7 consumer products were developed using 100-200 GSM bonded fabric sheets.

Table 4: Categories of developed value added consumer products

Category –I (Articles of 100-200 GSM)	Category-II (Articles of 200-300 GSM)
Cushion covers	Apron – I
Wall hanging	Apron – II
Baby set	Suitcase cover
Hand purse – I	Fridge cover
Hand purse – II	Table cover
Jewellery bag	Table mat set with tea coasters
Multipurpose pouch bag	Computer cover
	Folder
	Tray mats
	Hand bag
	Shoulder bag
	Invitation card (base)
	Placemat
	Telephone mat

Evaluation of developed value added consumer products:

Once the value added consumer products were developed, these were evaluated by 60 respondents comprising of two categories, (1st) 30 marketing personnels and (2nd) 30 women homemakers.

The responses obtained by marketing personnels and women homemakers were compared on four parameters and revealed the significant difference as shown in Table 5 and 6.

Table 5: Mean squares assigned by the marketing personnels according to four parameters

Sr. No.	Variables	Source	
		Treatment (20)	Error (609)
1.	Suitability of design of consumer products	0.69	0.62
2.	Colour combination	0.47	0.66
3.	Utility of consumer products	0.44	0.67
4.	Overall appearance	0.53	0.64

The data in Table 5 depict that there was no significant difference between the developed value added consumer products according to the selected four parameters observed in the mean squares assigned by respondents of Ist category *i.e.* marketing personnels. On the other hand, mean squares assigned by the respondents of 2nd category *i.e.* women homemakers revealed significant difference as shown in Table 6.

The data in Table 6 show that there was significant difference between the developed value added consumer products at 5 per cent level of significance on two parameters *i.e.* according to suitability of design of consumer products and utility of consumer products. Significant difference was also found between the developed value added consumer products at 1 per cent level of significance according to overall appearance.

Table 6: Mean squares assigned by the women homemakers according to four parameters

Sr. No.	Variables	Source	
		Treatment [20]	Error [609]
1.	Suitability of design of consumer products	1.017*	0.59
2.	Colour combination	0.807	0.606
3.	Utility of consumer product	1.194*	0.723
4.	Overall appearance	1.317**	0.548

* and ** indicate significance of values at P=0.05 and P=0.01, respectively

Table 7: Preference mean scores for different value added consumer products and their relative ranking assigned by marketing personnels (n = 30)

Developed value added consumer products	Criteria of evaluation of consumer products									
	Suitability of design of consumer products		Colour combination		Utility of consumer products		Overall appearance		Total mean scores (20)	
Suitcase cover	4.47	4	4.43	2	4.47	1	4.53	1	17.90	1
Apron – II	4.57	1	4.50	1	4.27	6	4.40	3	17.74	2
Shoulder bag	4.50	3	4.40	3	4.27	6	4.40	3	17.57	3
Table cover	4.47	4	4.33	5	4.37	3	4.37	4	17.54	4
Computer cover	4.30	7	4.33	5	4.40	2	4.43	2	17.46	5
Handbag	4.53	2	4.33	5	4.30	5	4.27	7	17.43	6
Baby set	4.27	8	4.37	4	4.37	3	4.40	3	17.41	7
Apron – I	4.33	6	4.30	6	4.33	4	4.43	2	17.39	8
Fridge cover	4.43	5	4.27	7	4.20	8	4.33	5	17.23	9
Table mats with tea coasters	4.33	6	4.27	7	4.23	7	4.33	5	17.16	10
Folder	4.23	9	4.27	7	4.23	7	4.37	4	17.10	11
Placemat	4.23	9	4.27	7	4.20	8	4.27	7	16.97	12
Tray mats	4.23	9	4.23	8	4.17	9	4.33	5	16.96	13
Telephone mat	4.23	9	4.23	8	4.20	8	4.30	6	16.96	13
Hand purse – I	4.23	9	4.20	9	4.10	11	4.23	8	16.76	14
Cushion covers	4.23	9	4.10	11	4.13	10	4.23	8	16.69	15
Wall hanging	4.10	11	4.13	10	4.13	10	4.23	8	16.59	16
Invitation card (base)	4.23	9	4.10	11	4.10	11	4.13	10	16.56	17
Hand purse – II	4.13	10	4.13	10	4.07	12	4.17	9	16.50	18
Jewellery bag	4.23	9	4.03	13	4.03	13	4.00	12	16.29	19
Multipurpose pouch bag	3.97	12	4.07	12	4.07	12	4.03	11	16.14	20
Total score (5 × 21) = 105	90.24		89.29		88.64		90.18		358.35	
Preference index	85.94%		85.03%		84.41%		85.88%		85.32%	

However, there was no significant difference when the products were compared with respect to there colour combinations.

Table 7 and 8 depict the preference mean scores for different value added consumer products and their relative ranking assigned by marketing personnels and women homemakers.

The ranks, achieved by developed value added consumer products from marketing personnels and women homemakers on the basis of their mean scores for selected parameters *viz.*, suitability of design of consumer products, colour combination, utility of consumer products and overall appearance and total scores have been shown in Table 7 and 8.

On analyzing the total scores assigned by both marketing personnels and women homemakers on the basis of selected four parameters *viz.*, suitability of design of consumer products, colour combination, utility of consumer products and overall appearance, it was surprising to know that almost each developed value added consumer product got more than 80 per cent preferences in all the parameters and ranged between 80-90 per cent. It concludes that each effort made by the researchers was appreciated by all the respondents.

Yates (1996) has discussed that many popular design types are derived from historical art and craft style. Familiarity with the origins and history of the art and craft decoration not only provide understanding of the frame work within which contemporary designers work but also increases access to valuable reference material.

Thus, it is apparent from the analysis of Table 7 and 8 that developed value added consumer products were found highly acceptable. Idea of developing bonded fabric by plastic polythene was liked by all the women homemakers and marketing personnels. It can be suggested from the present study that a micro enterprise on development of bonded fabrics can be successfully established. This will also be helpful in eradicating this

Table 8: Preference mean scores for different value added consumer products and their relative ranking assigned by women homemakers (n = 30)

Developed value added consumer products	Criteria of evaluation of consumer products									
	Suitability of design of consumer products		Colour combination		Utility of consumer products		Overall appearance		Total mean scores (20)	
Table cover	4.47	2	4.47	1	4.63	1	4.53	1	18.10	1
Handbag	4.50	1	4.47	1	4.50	3	4.50	2	17.97	2
Shoulder bag	4.47	2	4.43	2	4.53	2	4.53	1	17.96	3
Suitcase cover	4.33	3	4.27	4	4.50	3	4.50	2	17.60	4
Computer cover	4.33	3	4.27	4	4.47	4	4.47	3	17.54	5
Baby set	4.30	4	4.30	3	4.43	5	4.37	4	17.40	6
Table mats with tea coasters	4.23	6	4.30	3	4.37	6	4.37	4	17.27	7
Fridge cover	4.33	3	4.23	5	4.33	7	4.37	4	17.26	8
Apron – I	4.33	3	4.20	6	4.37	6	4.30	5	17.20	9
Apron – II	4.27	5	4.17	7	4.33	7	4.30	5	17.07	10
Folder	4.17	7	4.13	8	4.30	8	4.30	5	16.90	11
Tray mats	4.13	8	4.13	8	4.30	8	4.23	6	16.79	12
Telephone mat	4.13	8	4.17	7	4.27	9	4.20	7	16.77	13
Placemat	4.13	8	4.17	7	4.20	10	4.13	9	16.63	14
Cushion covers	4.03	9	4.10	9	4.10	12	4.17	8	16.40	15
Invitation card (base)	4.00	10	4.07	10	4.07	13	4.03	10	16.17	16
Wall hanging	4.00	10	4.00	12	4.13	11	4.00	11	16.13	17
Hand purse – I	4.00	10	4.03	11	4.03	14	4.00	11	16.06	18
Multipurpose pouch bag	3.97	11	3.90	15	4.07	13	3.97	12	15.91	19
Hand purse – II	3.97	11	3.97	13	3.97	15	3.90	14	15.81	20
Jewellery bag	3.90	12	3.93	14	3.93	16	3.93	13	15.69	21
	87.99		87.71		89.83		89.1		354.5	
	83.8%		83.53%		85.55%		84.85%		84.40%	

non-biodegradable waste problem in a fruitful manner there by reducing the environment pollution.

Conclusion:

Hence, it can be concluded that polythene bags has great potential in textile industry and extensive research needs to be conducted to optimally use this non-biodegradable waste for the benefit of man kind.

Acknowledgement:

Authors are thankful to the Department of Science and Technology, Jaipur for providing necessary funds to carry out the present investigation.

Authors' affiliations:
RAJESHWARI BHATI, Department of Textiles and Apparel Designing, College of Home Science, Maharana Pratap University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA
E-mail: bhati_jdp@yahoo.in

REFERENCES

Anonymous (2008). Next Bag: Plastic or Life? http://www.nextbag.co.in/general-information.html

Chica (2010). Fused plastic sandwich wraps. http://www.chicaandjo.com/ 2010/02/01fused_ plastic_ sandwich_ wraps/

Gupta Sanjay (2008). The Next 400 years. http://economictimes.indiatimes.com/ opinion/columnists/Sanjay_gupta/The_next_400_years/articleshow/3072715.cms?curpg=2

Neto and Manuel (2004). Fused seam for pieces of fabric and process for obtaining the same. http://www.sumobrain.com/patents/wipo/Fused-seam-pieces-fabric-process/WO2004111329.html

Shirin (2010). Fantastic Plastic Tutorial. http://shirinhandmade.com/2010/04/i-am-a-plastic-bag-tutorial/

Hetal, Vaishnav (2009). Plastic makes this girl go green. *The Times of India newspaper*.http://timesofindia.indiatimes.com/city/ahmedabad/Plastic-makes-this-girl-go-green/articleshow/4770184.cms.

*** ********** ***