Reprint **ISSN 1997-2571 (Web Version)**

Journal of Innovation & Development Strategy (JIDS)

(J. Innov. Dev. Strategy)

Volume: 7 **Issue: 1** **April 2013**

J. Innov. Dev. Strategy 7(1): 12-16 (April 2013)

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100 Leeward Glenway
Apartment # 1601
M3c2z1, Toronto, Canada
E-mails: publication@ggfagro.com, editor@ggfagro.com
http://ggfagro.com/ejournals/current issues

JIDS** issn 1997-2571, HQ:19-10 central place, saskatoon, saskatchewan, s7n 2s2, Canada

ISSN-1997-2571 (Online)
J. Innov. Dev. Strategy 7(1):12-16(April 2013)

FEASIBILITY STUDY OF JUTE-BASED BLENDED FABRIC

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Accepted for publication on 15 March 2013

ABSTRACT

Haque MT, Azad MAK, Mahabubuzzaman AKM, Jafrin S, Khan MAS (2013) Feasibility study of jute-based blended fabric. *J. Innov. Dev. Strategy.* 7(1), 12-16.

There are many natural fibre such as Jute, cotton, wool, silk, dhuncha, coconut bark, supari-bark etc. Among them cotton is mainly use for textile purpose. Jute is another fibre which produced in huge amount in Bangladesh and use to produce rope, sake etc. All the natural fibres are not suitable for blending with cotton. In that case, jute is the best natural fibre for blending with cotton. It is very cheap & available in the country. To determine the quality of fabric various properties of yarn are considered such as strength, count, count strength product (CSP), twist per inch (TPI), co-efficient of variance (CV) etc. The properties of 50:50; jute: cotton blended yarns are almost similar to the properties of 100% cotton where the price of cotton is almost 4.2 times of jute. So it is very much cost effective in case of raw materials. Jute can be used commercially in cotton processing system to produce blended yarn which will reduce the demand of cotton. This commercial use of doesn't required hues change in production line. Blended fabric can to produce by adding only one or two machine before production line. Therefore new product can be produced from existing facility. Production of quality blended fabric will be increase by dissemination of evolved technology.

Key words: *textile industry, value added jute product, feasibility, yarn*

INTRODUCTION

Long fibre like jute is processed in jute processing system. Short fibre is processed in cotton processing system. All natural fibres are not suitable for spinning in cotton processing system (Nudding 1952). Jute & cotton, jute & wool, jute & silk, jute & rayon etc. blended fibres in cotton processing system will definitely increase the diversified use of jute. Addition of jute in the blend will decrease the cost of ultimate products. Entrepreneurship development through technology transfer for commercial production of the evolved jute blended yarns and fabric will meet the demand of the users (Zurele 1979).

MATERIALS AND METHODS

a) Collection of raw materials: jute fibre, cotton, rayon, wool, silk fibre, etc.
b) Collection of chemicals.
c) To modify the jute fibre by chemical and physical means for blending with other fibers.
d) Blending of chemically modified jute with different textile fiber at different ratio to produce, the various count of yarns.
e) Study on the modification of mechanical processing units for semi commercial production of the jute blended yarn and fabrics in associate with textile mills/garments industry.
f) Production of jute base diversified products with the adoption on technology.
g) Development of diversified products, identification of products, extension of research finding to the level of cottage industry, hand loom weaving, garment industries etc.
h) Publicity of the products through various media, sales and display centers and fair to popularize the use of jute and jute based products.

Analysis and interpretation of Data

Defination

Analysis is the process of breaking a complex topic or substance into smaller parts to gain a better understanding of it. The technique has been applied in the study of mathematics and logic since before Aristotle (384–322 B.C.), though analysis as a formal concept is a relatively recent development. The purpose of the data analysis and interpretation phase is to transform the data collected into credible evidence about the development of the intervention and its performance (Chowdhury and Saha, 1930).

The data of commersialzation of jute base balended fabric are devided into three part for analisis. They are 1. Quality analysis 2. Investment analysis and 3. Cost analysis.

Quality Analysis

Existing samilar product of blended yarn & fabric in market is 100% cotton yarn & fabric. So to compite with this the quality need to compare.The measure of compairing this yarn & fabric are different propaties which are describe below.

Micronier value

Micronier value denotes the coarseness and fineness of fibre. Coarser fibre shows the higher micronier value and finer fibre shows the lower micronier value. From the below table, it is seen that in case of 100% cotton fibre micronier value is minimum i.e. 2.6. On the other hand, during blending fibre, when the % of coarser fibre is increasing in the blend, the micronier value is also increasing accordingly (New Bery 1981).

(Jute : Cotton)	Micronier value
(0:100)%	2.6
(40:60)%	4.5
(50:50)%	4.7
(60:40)%	5.2

Irregularities

Blended Ratio Jute : Cotton	10^s Yarn			15^s Yarn		
	No. Of Thick/km	No. Of Thin/km	CV%	No. Of Thick/km	No. Of Thin/km	CV%
60:40	302	410	18	410	105	18
50:50	227	314	15	314	65	15
40:60	267	398	17	398	92	17
0:100	216	305	14	305	56	14
Blended Ratio Jute : Cotton	20^s Yarn			25^s Yarn		
	No. Of Thick/km	No. Of Thin/km	CV%	No. Of Thick/km	No. Of Thin/km	CV%
60:40	505	190	19	580	202	19
50:50	395	130	17	471	146	18
40:60	460	125	19	520	142	18
0:100	310	85	18	315	91	19

It is seen from the above table, that the irregularities i.e. thick, thin & CV% of the 10^s yarn are lower than the another count of yarn. On the other hand, 50:50/ Jute : cotton blend ratio shows the good performance than the other blend i.e. 60:40 & 40:60.

TPI

Blend Ratio Jute : Cotton	10^s (TPI)	15^s (TPI)	20^s (TPI)	25^s (TPI)
60:40	14	16	17	17
50:50	15	16	18	18
40:60	16	17	18	19
0:100	16	17	18	19

For blended ratio 50:50, TPI of 10^s, 15^s, 20^s, & 25^s yarn is comparable to the TPI of 100% cotton yarn. But the TPI of 10^s yarn is also acceptable for good strength of yarn.

Strength

Blend Ratio Jute : Cotton	Lea strength in kgf			
	10^s Yarn	15^s Yarn	20^s Yarn	25^s Yarn
60:40	135	86	81	70
50:50	151	95	90	85
40:60	146	91	86	78
0:100	158	108	102	94

From the above table, it is seen that for each blend ratio the strength of 10^s yarn is nearer to the strength of 100% cotton yarn. But 50:50 blend ratios shows the good strength of yarn. 25^s yarn shows the poor strength in every step of blending.

CSP

Blend Ratio Jute : Cotton	Count Strength product (CSP) in kg of yarn			
	10^s Yarn	15^s Yarn	20^s Yarn	25^s Yarn
60:40	1350	1290	1620	1750
50:50	1510	1425	1800	2125
40:60	1460	1365	1720	1950
0:100	1580	1620	2040	2350

C.S.P is the main criteria to evaluate the performance of yarn. It is seen form the above table that for each type of yarn i.e. 25^s, 20^s, 15^s & 10^s C.S.P is comparable to 100% cotton yarn. But for 10^s yarn, especially for 50:50/ Jute : cotton blend, C.S.P is very nearer to the C.S.P of 100% cotton yarn.

Properties of denim fabric

Sl. No	Type of Test	Jute : Cotton (50:50) Blended ratio		100% Cotton (Denim)	
		Grey fabric	Design	Grey fabric	De-sized fabric
1.	Count of warf	10^s	10^s	10^s	10^s
2.	Count of weft	10^s	10^s	10^s	10^s
3.	Ends/inch	36	68	38	71
4.	Pick/inch	18	47	26	49
5.	Wt./Sq. in gm	355.5	344.8	347	345
6.	Warp ways strength	141.6	132.4	142.2	134.1
7.	Weft ways strength	139.2	112.2	139.5	116.2
8.	Abrasion resistance	Excellent	Excellent	Excellent	Excellent
9.	Bending length	4.8	4.1	4	3.2

From the above table it is seen that all the properties of blended denim fabric is nearer to the properties of 100% cotton denim fabric.

Investment analysis

A) PRODUCTION: Assume production based on 20 count 50:50 Jute-Cotton blended yarn, Rotor m/c running at RPM 80,000 and at 80% efficiency in 500 Rotor head 3404 lbs./day × 300 days = 10,21,203.18 lbs. or, 4,63,210kgs./year.

B) PROJECT COST

Description	**Tk.**
1) Land 6 bigha @ tk. 30 la c	1,80,00,000
2) Building 30,000 sft. @ tk. 1000/sft.	3,00,00,000
3) Other Civil Works @ 10%	30,00,000
4) Imported Machinery including waste opener	3,15,00,000
5) Insurance, Bank, Clearing up to site @ 12%	37,80,000
6) Local Machinery & Equipment	10,00,000
7) Erection & Installation	15,00,000
8) Power Installation (REB)	20,00,000
9) Vehicles	30,00,000
10) Preliminary & Startup Expenses	30,00,000
11) Furniture & Fixture	15,00,000
12) Miscellaneous & Unforeseen Expenses	39,20,000
13) 1 year working capital	6,00,00,000
Total	16,22,00,000

Cost-benefit analysis

Cost–benefit analysis (CBA), sometimes called **benefit–cost analysis** (BCA), is a systematic process for calculating and comparing benefits and costs of a project, decision or government policy (hereafter, "project"). CBA has two purposes:

1) To determine if it is a sound investment/decision.
2) To provide a basis for comparing projects. It involves comparing the total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much.

Cost–benefit analysis is often used by governments and other organizations, such as private sector businesses, to evaluate the desirability of a given policy. It is an analysis of the expected balance of benefits and costs, including an account of foregone alternatives and the status quo (Patrica *et al.* 1984). CBA helps predict whether the benefits of a policy outweigh its costs, and by how much relative to other alternatives (i.e. one can rank alternate policies in terms of the cost-benefit ratio). Generally, accurate cost-benefit analysis identifies choices that increase welfare from a utilitarian perspective. Assuming an accurate CBA, changing the status quo by implementing the alternative with the lowest cost-benefit ratio can improve Pareto efficiency. An analyst using CBA should recognize that perfect evaluation of all present and future costs and benefits is difficult, and

while CBA can offer a well-educated estimate of the best alternative, perfection in terms of economic efficiency and social welfare are not guaranteed (Mothers 1947).

Cost per kg analysis

Here variation may occur due to fluctuation of product & Service. But a fix rate has been assumed during analysis.

Item	**100% cotton (Cost of 2 kg)(Tk)**	**Jute : Cotton/50:50 (Cost of 2 kg)(Tk)**
Raw Material	420/-	(50+210) 260/-
Chemical Modification	00/-	5/-
Commercially Processing Cost	10/-	20/-
Sub-Total(A)	430/-	285/-
Wastage	64/- (15) % of(A)	49/- (17) % of (A).
Net cost of Production	494/-	334/-
Price of 100% Cotton Yarn(TK)	Selling price of 1 kg 100% cotton yarn= 275/- Selling price of 2 kg 100% cotton yarn= 550/- Net profit = 550/- – 494/- = 56/- Net profit per kg = 56/2 = 28/-	
Price of Jute-Cotton blended yarn(TK)	Selling price of 1 kg blended yarn= 250/- Selling price of 2 kg blended yarn= 500/- Net profit = 500/- – 334/- = 166/- Net profit per kg =166/2 = 83/-	

N.B:-13% wastes are reuse-able among 17%

Total cost analysis

A lot of parameter has to be assumed during cost analysis to simplify the analysis. They are

a) Accounting period is 1 yr.
b) A 500 head rotor m/c of a new factory starts its operation at 80% efficiency from 1st day of the year.
c) All the goods manufactured are sold-out within last day of the year.
d) No work in process at the last day of the year.
e) In-case of calculating depreciation life time and salvage value has to be assumed.

Item	Life time	Salvage value	Depreciation
M/C	20 yrs	2,15,00,000/-	10,00,000/-
Building	30 yrs	30,00,000/-	10,00,000/-
Furniture	10 yrs	2,00,000/-	1,30,000/-
Vehicle	10 yrs	15,00,000/-	1,50,000/-

Cost of Goods Manufactured(CGM)

Description	**Tk**	**Tk**
Direct Material		
Jute 2709878kg @ 50/kg including 17% waste	1,35,48,900	
Cotton 266346kg @ 210/kg including 15% waste	5,59,32,660	
Chemical cost @ 5/kg Jute 270978×5	13,54,890	
Packing Material @ Tk1.5/kg 463210×1.5	6,94,815	
Total Direct Material		7,15,31265
Total Direct Labour		48,00,000
Factory Overhead:		
Indirect Labour (Managers & Officer's salary)	18,00,000	
Factory Utility (Power, fuel etc)	76,00,000	
Depreciation	22,80,000	
Bank Interest on Working Capital	8,40,000	
Total Factory Overhead		1,25,20,000
Cost of Goods Manufacture (CGM)		8,88,51,265

Income Statement

Income statement of "X" for the year ended on 31th December,20…

Description	**Tk**	**Tk**
Sales (463210kg of yarn @ 250/-)		11,58,02,500
Less : Cost of Goods Sold(CGS)		8,88,51,265
Gross Profit (GP)		2,69,51,235
Less(Operating Expense)		
Sales Expenses	1,95,000	
Admin Salary	6,00,000	
Insurance, Excise duty, Licensing	9,00,000	
Miscellaneous & Unforeseen	47,25,000	
Total operating Expenses		64,20,000
Net Operating Income		2,05,31,235

So percentage of net operating profit is (2,05,31,235/6,00,00,000) x 100 = 34.21%

CONCLUSION

This is an on-going project but very initial stages. There is a large scope for developing research work on this project specially, modern diversified jute based products has to be produced through this projects. Commercialization of jute base blended fabric will initiate a new era in Textile Industry. To extend the line of production and uses of the jute based new and non-conventional products in the rural areas. Yarn produced from jute and jute blended fibre will be supplied to the weavers in the rural areas and steps are to be taken to give incentives and inspiration for making fabrics of diversified textile uses. An effective program under the project will be taken in order to ensure the regular uses of the jute based products in the rural cottage industries. Joint program with private enterprises will be taken up. In consequences, the production and uses of jute based products will be increased and extended at all levels of the society. The use of jute will increase in cotton processing system as a partial replacement of cotton in the cotton spinning industry. Ultimately, jute growers, jute good manufacture, small entrepreneurs, users exporter will be benefited.

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