Study of Effects of Controlling Morah and Feeding on Jute Yarn Quality

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Abstract- **Jute is cultivated in tropical areas as one of the most strong and reasonably priced bast fibers. Jute fiber and products are chiefly popular for its basic natural fibre properties and manufactured in industries to use as B.Twill food grain bags, other packaging materials, geotextiles, export quality bags etc. This study is about a understanding of yarn quality produced after use of morahs with standard weight and control feeding at jute Spreader machine. Machinery used for jute fibre processing is quite old and manufactured with old technology. Hence still now the weight and regularity control of jute yarn are based on manual weight control on jute morah as well as the manual feeding rate control at spreader machine. Here in the study efforts has been given to identify the effect of control on morah weight at starting material of jute processing and the effect of morah feeding regularity on jute yarn quality. Based on which, in future any development can be done for mechanical control on morah weight as well morah feeding at spreader. Presently jute fibre/ yarn used in several diversified products other than food grain packaging bag. To improve the quality of jute yarn a study has been carried out in a jute mill where the quality of jute yarn produced by Mill normal process (normal morah and feeding) is compared with quality of yarn produced by control morah& control feeding. As mill normal process is available presently, total four process are compared based on yarn quality produced by them. It is found that the controlling morah weight and also controlling feeding of morah at Spreader machine plays an important role on jute yarn quality in comparison to without controlling the above. Controlling morah weight and also controlling feeding morah at Spreader machine in jute mills will improve the quality of the output sliver. This sliver will be useful for producing regular and fine jute yarn with higher tensile strength, breaking elongation, quality ratio and lower count variation percentage. The produced modified yarn will also be more regular and uniform comparing to the yarn of uncontrolled morah weight and feeding system.**

Keywords: **Jute morah, Spreader, quality ratio, morah weight, sliver weight**

INTRODUCTION

Jute is a natural lingno- cellulosic bust fibre. Due to its unique characteristics, it considered as a good technical textile fibre. Hence food grain packaging B Twill bags are generally made from jute in India.

At present jute industry is using modern rapier loom for production of B. Twill jute fabric. Due to high speed rapier loom, the weaving process demands better even and strong jute yarn to comply the standard loom efficiency. Jute fibre grows abundantly in India having average quality hence use of good quality fibre to improve the yarn strength is not cost effective. The alternate way to increase the yarn strength is to improve the yarn grist variation and to reduce the unevenness.

Jute morahs are made by worker and it is a manually control process. The weight control of jute morah and feeding of jute morah at spreader machine are the two very important initial control points which controls the yarn weigh.

Our project study was designed to understand the effect of control morah and effect of regular spreader feeding on yarn quality, so the jute mills can understand the importance of these two processes and can take remedial action for better control on product.

The main objectives of this study is

- To find out the effect of control morah weight and control feeding systems at spreader on yarn quality individually.
- To compare the quality of yarn produced by different study (normal morah-normal spreader feeding system, normal morah-control spreader feeding system, control morah-normal spreader feeding system & control morah-control spreader feeding system)

MATERIAL AND METHODLOGY

One Jute Spreader machine is chosen for the study along with a specific processing line consists of inter spreader, breaker card, finisher card, four drawing stages and spinning machine. Four individual studies are done through the same machinery line. The four different studies are as follows:

1.Normal morah-Normal feeding
2.Normal morah-Control feeding
3.Control morah-Normal feeding
4. Control morah-Control feeding

The Spreader machine and the other processing machinery are kept same for all studies. A particular quality of raw jute quality (as given in table-1) processed through same identified machinery up to spinning and only morah weight and feeding are varied according to the requirement. All 4 processes given above have repeated for three times to ensure the results.

The studies are decided to be performed for Hessian 9.0 lb/spindle quality of yarn. The processes were performed at Bally Jute Company Ltd., at Bally , Howrah.

Controlling Morah Weight-
Standard morah weight of jute morah is 1200 g in the mill. Hence 1200±200 g range is fixed for our control morah weight experiments.
To control the weight of morah produces by morah makers, a weight scale of 5 Kg kept near the mora preparation barrow. Each and every morah are weighted and kept into the barrow if it is under specified range.
Controlling Morah Feeding at Spreader Machine-
After each 1.5 ft distance 1200 g standard morah are fed to the spreader table. Now in mill normal process the feeding of morah are not uniform as it depends on the capacity of feeder at Spreader. But in case of morah weight system jute morah are fed under strict supervision so that each morah can be fed at proper line and distance.

Raw Jute Batch used for the experiments are given below: Table 1

Sl. No.	Jute Quality	Weight % in the batch
1	BTR	50 %
2	LOWER ASSAM 6	25 %
3	DESI 5	25 %

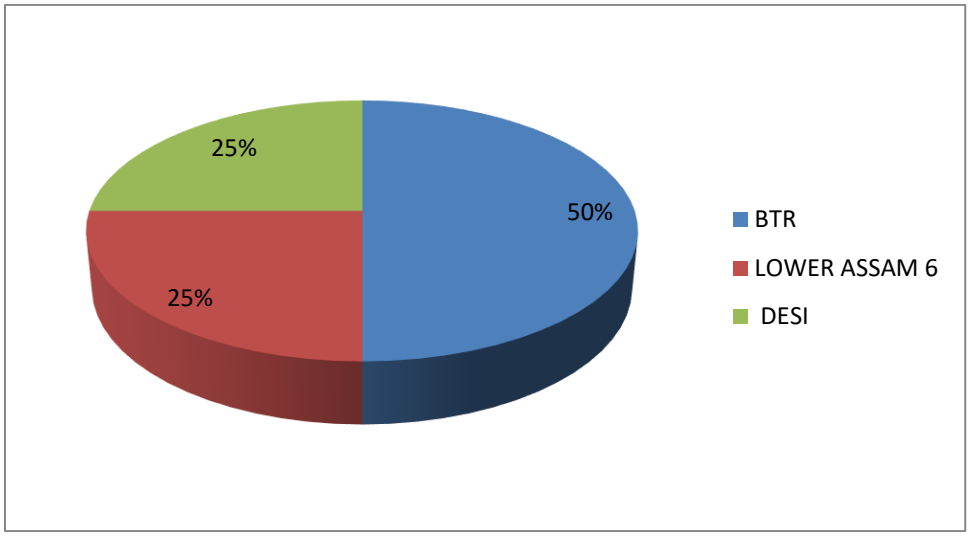


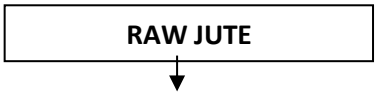
Fig.-1 Percentage of Different Raw Jute Used in The Batch

The raw jute quality is kept uniform during all experiments to reduce any variation dueto raw fibre.

Details of machinery are given below: Table 2

Sl. No.	Name of the machine	Make	Specification	Draft applied	Doubling Applied	Converted Sliver Wt (at 16 % MR) at delivery
1	SREADER	GOLDEN		10		29.89 Kg/100 m
2	SREADER INTER	GOLDEN		6.6	7	29.89 Kg/100 m
3	BREAKER CARD	JF2	3 PAIR	17.29	6	10.37 Kg/100 m
4	FINISHER CARD	FLCB	4 AND HALF PAIR	13.5	11	7.46 Kg/100 m
5	FIRST DRAWING	LAGAN	Screw Gill	3.6	2:1	4.06 Kg/100 m
6	SECOND DRAWING	LAGAN	Screw Gill	6.8	4:1	2.34 Kg/100 m
7	INTER DRAWING	LAGAN	Screw Gill	6.0	6:1	2.34 Kg/100 m
8	FINISHER DRAWING	LAGAN	Screw Gill	8.35	2:1	5.61 Kg/1000 m
9	SPINNING	TUMBLER	Apron Draft ,4¼" pitch,110 SPINDLE	17.67	---	0.33 Kg/100 0m

PROCESS PROJECT FLOW CHART
The processing of jute fibre follows as per the flow line given below. This line kept unaltered and same for all four studies:



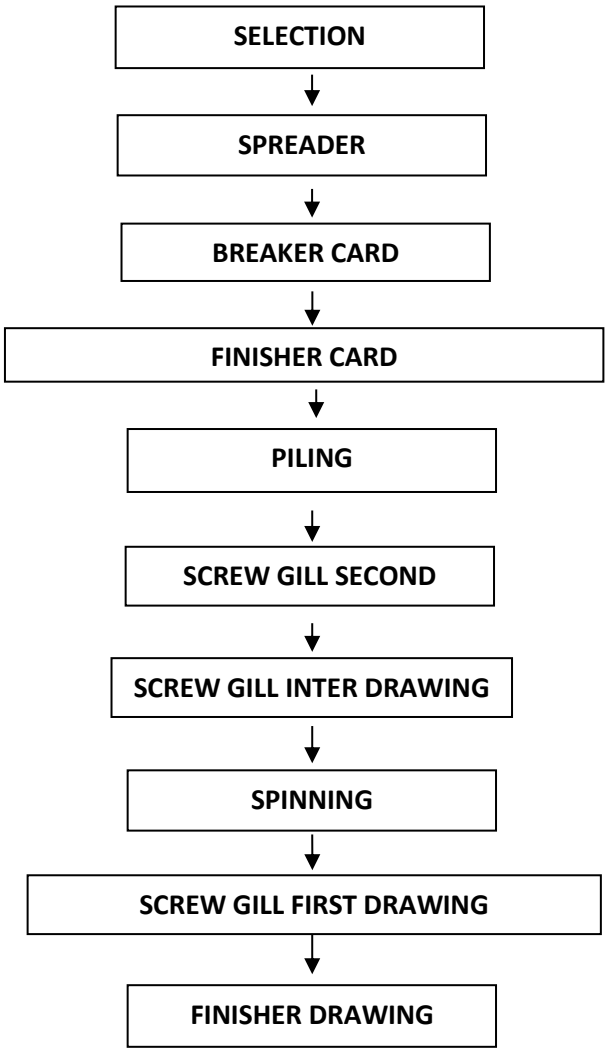


Fig.-2 Process Flow Chart

RESULTS AND DISCUSSION

In the study data taken in each stage starting from morah weight to yarn parameters are given in this section (Table 3 to Table 9). Each process repeated thrice to ensure the quality produces by certain process. Standard deviation (SD) and Coefficient of Variation (CV), range of sliver weight or yarn grist are also calculated for each process to understand the quality of sliver and yarn produced by each process.

Graphical representations (Fig.3 to Fig.9) are also added for clear understanding of quality produced by different processes.

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Table -3 ,Morah Weight Summary

PARAMETER	STD	Normal morah & Normal feeding			AVG.	Normal morah & control feeding			AVG	Morah & Normal feeding			A E
		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3	
AVG. MORAH WT.(g)	**1250**	1227	1186	1276	**1229.67**	1130	1287	1305	**1240.67**	1190	1184.98	1187	**1**
CV%	**FEEDING RATE=10/min**	20.01	10.62	17.51		14.76	16.35	12.23		9.93	10.42	9.91	
RANGE.(g)		700-2000	1000-1400	900-1900		650-1500	800-1800	1000-1500		1000-1400	1000-1400	1000-1400	
MR%		12.74	12.55	12.69	**12.66**	16.81	11.93	12.69	**13.81**	14.5	13.89	12.99	**1**
MR % RANGE		9.5-18.5	12.0-13.0	11.5-13.0		15-19	10-14	10-14		12-17	12-18	11-14	

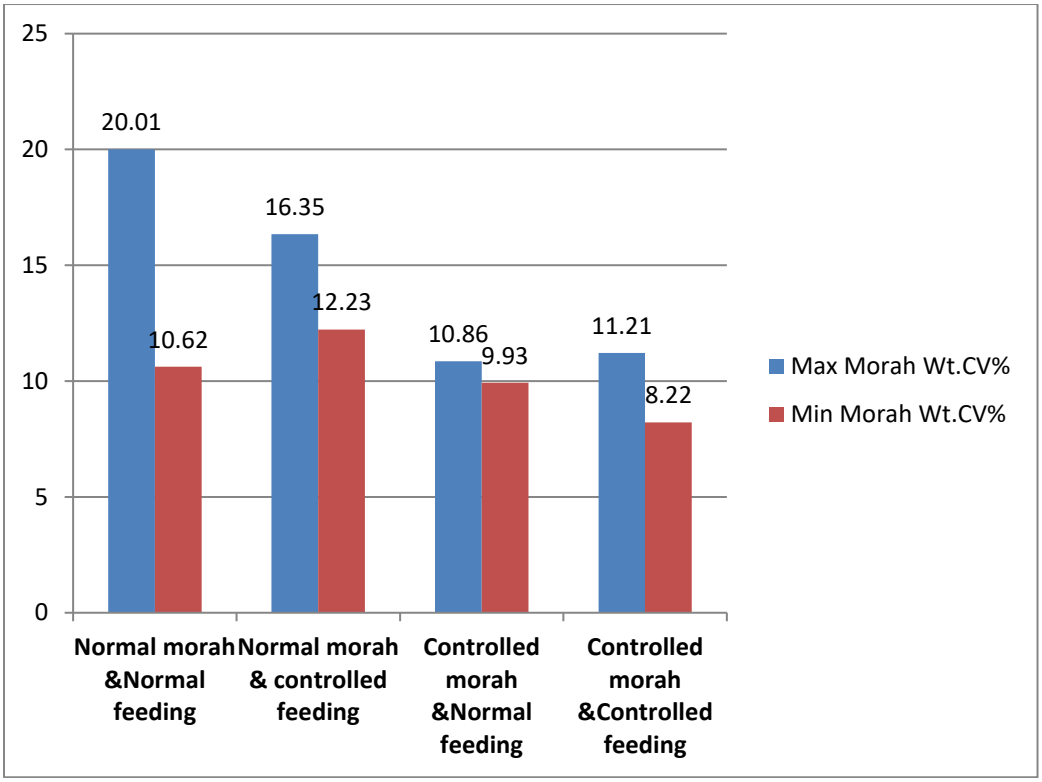

Fig.3, Max. and Min Morah Weight (g) Range of different Processes

It is observed from Fig. 3 ,that the range of CV % of the 4 different processes (i.e. Normal Morah Normal Feeding Process, Normal Morah Control Feeding, Control Morah Normal Feeding, Control Morah Control Feeding) are as follows respectively -10.62 to 20.01, 12.23 to 16.35, 9.93 to 10.86 and 8.22 to 11.21.It is clearly observed that the CV % is much better in case of Control Morah Control Feeding Process.

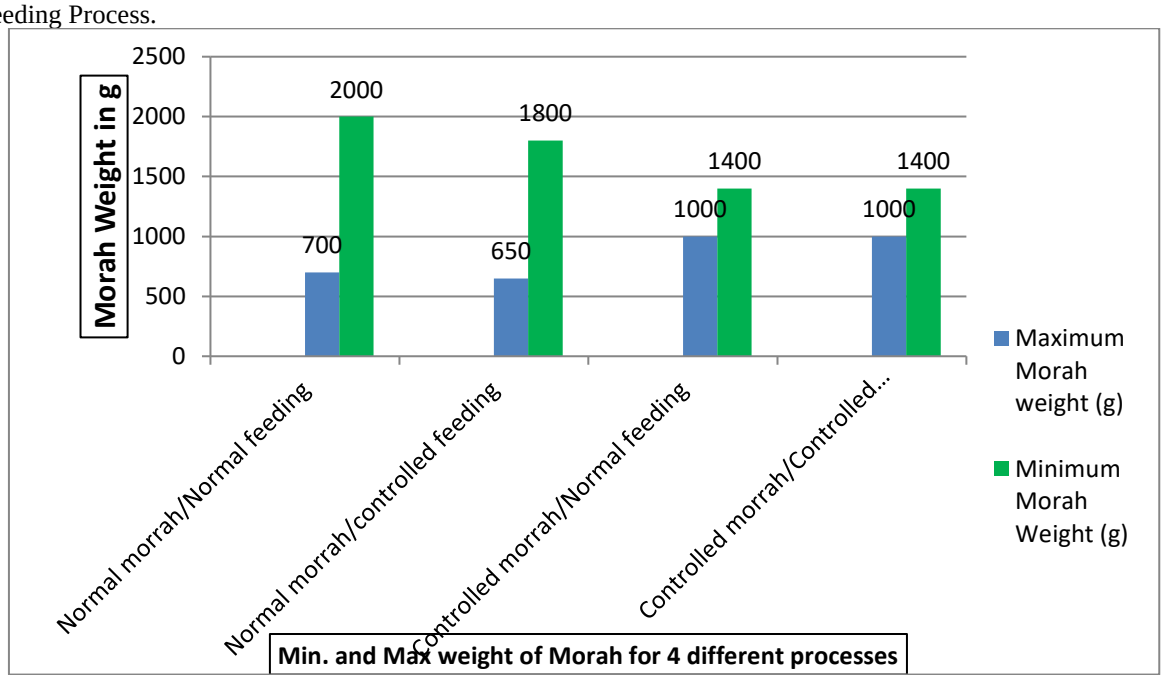

Fig.-4, Max. and Min Individual Morah Weight Variation of different Processes

It is observed from Fig.4 and table -3, that with respect to the standard morah weight1200 g**,** variation of individual morah weight are well control in case of Control morah Normal Feeding and Control morah Control Feeding Process as weight of each morah control during study in comparison to normal morah weight used in mill.

Table -4, % Variation in Average Morah Weight over Standard 1200 g

Normal morah/Normal feeding		Normal morah/control feeding		Control morah/Normal feeding		Control morah/Control feeding	
% Heavy	*% Light*	*% Heavy*	*% Light*	*% Heavy*	*% Light*	*% Heavy*	*% Light*
+66.67 %	-41.67 %	+50.00 %	-45.83 %	+16.67	-16.67 %	+16.67 %	*-16.67 %*

Table - 5,Sliver Details Weight (Spreader to Finisher Card)

PARAMETER	Normal morah/Normal feeding			AVG.	Normal morah/ feeding			AVG.	Control morah/Normal feeding			AVG.	Control morah/Control feeding			AVG.
	EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3	
SPDR AVG.SL.WT. (kg/100m)	27.45	28.56	26.89	**27.63**	26.01	28.56	28.4	**26.94**	27.11	25.29	27.4	**27.37**	27.45	28.56	26.88	**28.51**
RANGE	19.83-36.90	21.73-36.88	15.49-34.65		24.36-32.01	21.73-36.88	20.8-34.75		20.72-35.02	15.74-29.48	22.2-31.24		19.83-36.90	21.73-36.88	15.49-34.64	
CV%	22.58	18.1	27.72		12.76	18.1	16.70		19.36	15.79	10.96		22.58	18.10	27.71	
MR%	36.9	33.9	37.2	**36.00**	33.2	33.90	38.95	**36.48**	35.2	37.7	36.8	**36.57**	36.90	33.90	37.20	**38.90**
MR % RANGE	28-50	30-35	30-40		28-40	30-35	38-39		24-40	30-40	35-38		39-42	35-48	35-35	
INT.SPDR, SL.WT. (kg/100m)	25.39	28.08	31.42	**28.36**	24.92	28.08	26.27	**26.82**	26.41	24.25	27.72	**25.94**	32.13	31.38	28.71	**30.73**
RANGE	20.81-32.31	24.03-35.99	23.61-37.89		18.87-33.23	24.03-72.53	20.12-33.83		44.02-68.40	36.14-64.71	46.06-65.21		24.81-36.74	27.61-34.51	23.95-30.89	
CV%	14.83	14.91	18.94		15.59	14.91	15.80		12.34	18.99	12.32		12.47	7.63	9.26	
MR %	42.3	32.5	27.1		33.0	32.5	36.15		32.7	38.9	35.6		34.0	38.70	32.0	
RANGE	33-50	30-35	25-30		25-40	30-35	30-40		30-38	38-40	35-37		30-40	36-40	32	
B.CARD SL.WT (kg/100m).	9.05	7.75	9.73	**8.84**	8.5	9.15	10.94	**9.53**	8.87	6.99	9.44	**8.44**	9.12	9.08	8.94	**9.05**
RANGE	7.41-11.12	6.44-9.88	9.17-10.68		13.52-10.25	6.79-12.14	8.85-12.25		6.53-10.46	6.13-8.07	7.53-11.69		7.99-10.49	7.52-11.39	7.82-10.49	
CV%	10.53	14.55	4.62		14.92	18.88	10.03		11.91	10.41	11.28		8.00	14.11	8.37	
MR%	28	28.9	31.96	**29.62**	23.7	22.2	25.3	**24.00**	19.63	38	30.4	**31.93**	27	32.8	28.1	**29.30**

RANGE	26-30	26-32	29.8-35		22-26	19-25	24-26		26-30	36-40	29-32		22-32	30-35	26-30	
F.CARD SL.WT. (kg/100m)	7.35	6.05	6.92	**6.77**	6.73	7.12	7.06	**6.97**	7.32	6.71	7.25	**7.09**	7.23	7.23	7.42	**6.96**
RANGE	6.87-7.89	5.73-6.51	6.19-7.40		6.04-7.36	5.68-8.27	6.66-7.41		6.82-7.86	6.20-732	6.79-8.13		6.64-7.61	6.52-7.71	6.15-8.10	
CV%	3.79	4.32	5.71		7.01	11.83	3.63		4.44	4.79	5.11		3.82	5.35	7.21	
MR%	24.1	28.9	20.59	**24.53**	22	18.2	25.9	**22.03**	22	25.5	20.3	**22.60**	27.2	30.1	26.8	**27.97**
MR% RANGE	23-26	28-30	19.5-22.0		21-23	17.5-19	25-28		21-25	24-27	19-21.5		26-30	29-32	25-30	

Table 6 (1st Drawing to Finisher Drawing)

AMETER	**Normal morah/Normal feeding-1**			**AVG.**	**Normal morah/control feeding-1**			**AVG.**	**Control morah/Normal feeding-1**			**AVG.**	**Control morah/Control feeding-1**		
	EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3
T., 1 RG. 00m)	3.57	3.3	3.68	**3.47**	3.23	4.46	3.64	**3.78**	3.32	3.14	2.86	**3.11**	3.59	3.69	4.05
GE	3.31-3.81	2.82-3.54	3.32-3.85		2.72-3.73	3.84-4.72	3.43-3.93		2.29-3.59	2.84-3.51	2.56-3.07		3.20-3.83	3.42-4.04	3.51-4.37
	4.60	6.64	4.73		10.45	6.21	4.32		6.7	5.54	5.9		5.94	5.57	6.52
	23.4	25.2	18.6	**22.40**	20.9	16.5	25.5	**21.00**	22	23.7	18.25	**20.98**	23.6	25	24.3
GE	22-25	24-26	17.5-19.5		20-22	15-17.5	24-27		21.5-23.5	22-25	17.5-19		23-25	23-26	23-26
T. , 2 RG 00m).	2.08	1.84	2.17	**2.03**	2.09	2.5	2.16	**2.24**	2.1	1.9	1.69	**1.9**	2.22	2.14	2.39
GE	1.92-2.42	1.61-2.04	1.86-2.36		1.98-2.15	2.35-2.70	1.99-2.42		1.97-2.23	1.71-2.01	1.43-1.84		2.13-2.38	2.09-2.21	2.21-2.66
	6.58	6.78	7.42		2.48	4.19	5.55		3.96	4.91	6.6		**3.67**	**1.73**	5.59
	22.9	22.7	17.45	**21.02**	17.9	15.85	22.9	**18.88**	21.05	23.4	18.2	**20.80**	21.6	23.7	22.8
GE	20-25	22-25	17.5-18.5		16-19	14.5-17	21-25		17.5-23	22-25	17.5-19		21-23	23-25	21-24
T. , RG. 00m)	2.09	1.17	2.25	**2.02**	2.07	2.5	2.25	**2.27**	2.11	1.88	1.71	**1.9**	2.23	2.2	2.35
GE	1.94-2.26	1.46-1.87	2.15-2.38		1.82-2.30	2.38-2.60	2.12-2.28		1.93-2.20	1.80-1.96	1.65-1.76		2.16-2.32	2.13-2.31	2.20-2.50
	4.29	8.61	2.75		7.96	2.75	2.89		4.40	3.78	3.50		2.03	3.07	4.1
	20.2	21.00	17.5	**19.53**	19.80	17.60	18.8	**19.15**	20.10	19.95	17.75	**19.23**	20.25	21.3	21.3
GE	19-22	20-22	17-18		19-21	17-18.5	17.5-20.5		19.5-21	19-21	17-18.5		19-21	19.5-22.5	20-23
T. RG. 400 yds)	124.83	162.8	162.32		145.97	62.8	185.07		139.44	162.8	170.89		149.81	162.8	172.46

T. RG. 00m)	5.2	4.5	5.12	**4.88**	5.28	6.18	5.71	**5.73**	5.32	5.63	5.71	**5.55**	5.5	5.46	5.62
GE	4.38-5.53	4.30-4.71	4.64-5.60		5.03-5.5	5.7-6.38	5.58-5.86		5.16-5.51	5.53-5.71	5.50-5.89		5.16-5.79	5.31-5.63	5.28-5.94
	7.34	3.44	6.23		2.94	4.22	1.56		2.02	1.34	2.32		3.13	2.12	3.62
	17.2	18	20.60	**18.58**	12	17	18.87	**15.96**	16.95	20.55	19.8	**19.02**	17.6	21.3	21
GE	16.5-18	17.5-18.5	18.5-22.5		11-13.5	17-17	18-20		16.5-18	20-21	19-20.5		17-18	20-22	21-21

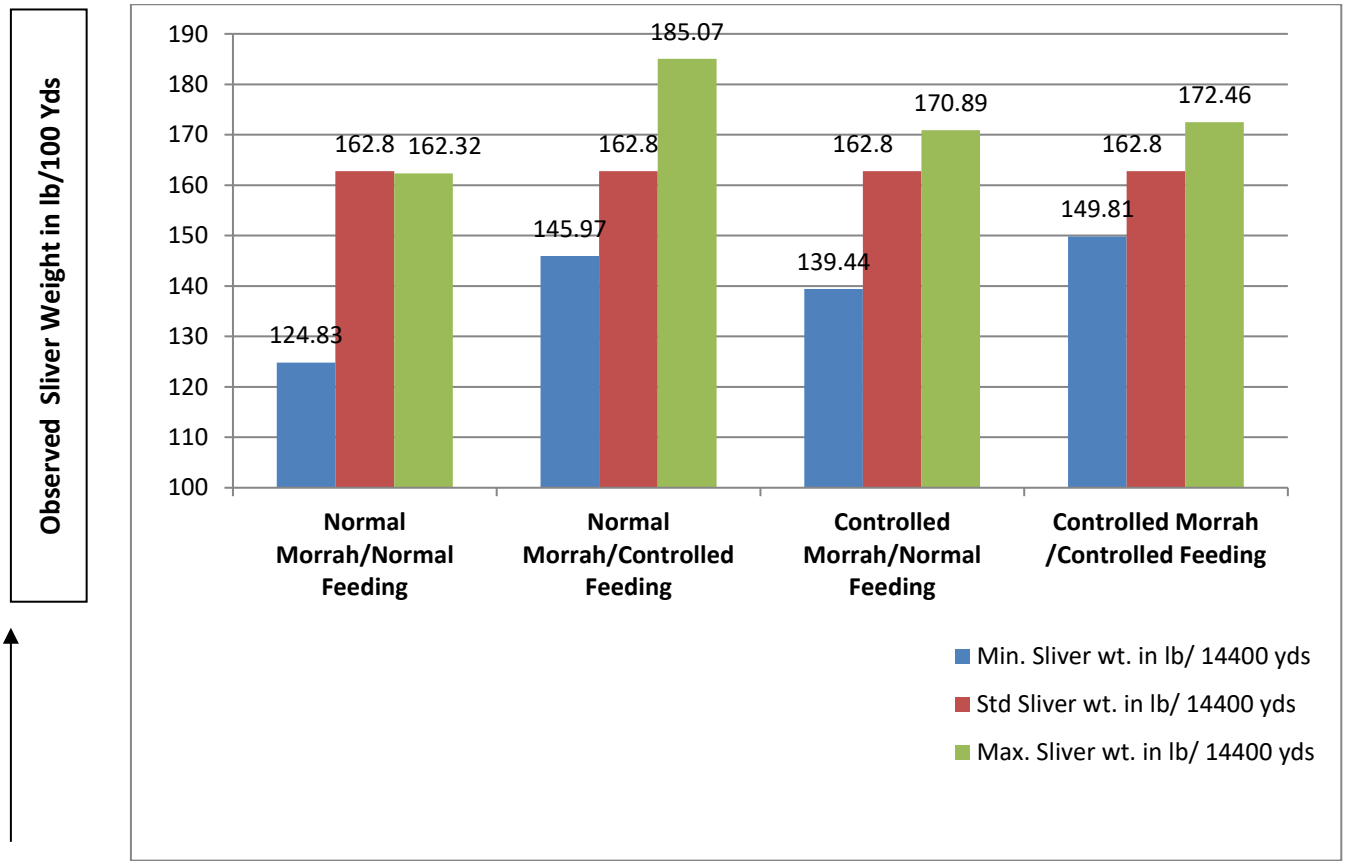

Fig.-5, Min. & Max. (Range) Individual Finisher Drawing Sliver Weight(in lb/ 14400 yds) observed for Different processes
It is observed from Fig. 5 and Table 6, that the range of Finisher Drawing Sliver Weight in lb/ 14400 yds for Different processes (i.e. Normal Morah Normal Feeding Process, Normal Morah Control Feeding, Control Morah Normal Feeding, Control Morah Control Feeding) are as follows respectively -124.83 to 162.32, 145.97 to 185.07,139.44 to 170.89 and 149.81 to 172.46. It is clearly observed that the Sliver Weight is much better in case of Control Morah Control Feeding Process. The mill **standard finisher drawing sliver weight is162.78 lb/ 14400 yds** and control morah control feeding system sliver weight in all three experiments showing nearer to the standard.

Table -7, % Variation in Average Sliver Weight 162.8 lbs./14400 yds.
It is observed from Fig.5 and table -6, with respect to the standard Sliver Weight162.8 lbs./14400 yds., variation of individual Sliver weight in lbs is well controlled in case of Control morah Control Feeding Process.

Table -8, Yarn Parameters Details (For 9.0lb/ Spyndle)

	Normal morah/Normal feeding			**AVG.**	**Normal morah/control feeding**			**AVG.**	**Control morah/Normal feeding**			**AVG.**	**Control morah/ feeding**	
	EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2	Exp-3		EXP-1	Exp-2
d)	321.4	257.7	319.4	**299.4**	316.3	359.0	325.6	**333.5**	318.0	277.0	263.9	**286.3**	336.9	294.9
d e 0	9.33	7.48	9.27	**8.69**	9.18	10.42	9.45	**9.68**	9.23	8.04	7.66	**8.31**	9.78	8.56
	2.28	2.3	3.89	**Range-2.28-3.89**	4.73	2.88	3.17	**Range-2.88-4.73**	2.67	4.32	6.48	**Range-2.67-6.48**	2.07	3.12
t	332.8	266.0	330.0	**309.6**	348.6	372.1	338.3	**353.0**	331.1	295.6	295.6	**307.4**	351.0	305.9
t	310.05	245.97	292.83	**245.97**	294.55	339.68	309.02	**294.55**	304.19	250.45	240.81	**240.81**	330.03	275.60
	8.2	6.08	7.91	**7.40**	7.7	9.25	8.09	**8.35**	8.34	6.97	6.45	**7.25**	8.47	8.21
	3.72	2.76	3.59	**3.36**	3.49	4.20	3.67	**3.79**	3.78	3.16	2.93	**3.29**	3.84	3.73
	15.66	12.29	17.38	**12.29-17.38**	17.17	16.65	18.33	**16.65-18.33**	17.4	18.08	18.42	**17.4-18.42**	16.76	16.32
n	4.81	3.54	5.54	**5.54**	4.99	5.54	5.35	**5.54**	4.72	4.63	3.99	**4.72**	5.17	5.44
n	2.36	2.27	2.27	**2.27**	2.63	2.81	2.36	**2.36**	2.36	2.27	2.09	**2.09**	2.36	2.27
	11.57	10.71	11.24	11.22	11.03	11.70	11.27	11.36	11.89	11.41	11.10	11.49	11.40	12.65
	87.89	81.28	85.27	**84.81**	83.88	88.77	85.61	**86.09**	90.36	86.69	84.17	**87.07**	86.61	95.91

Normal morah/Normal feeding		**Normal morah/control feeding**		**Control morah/Normal feeding**		**Control morah/Control feeding**	
Heavy(lbs.)	***Light(lbs.)***	***Heavy(lbs.)***	***Light(lbs.)***	***Heavy(lbs.)***	***Light(lbs.)***	***Heavy(lbs.)***	***Light(lbs.)***
-0.48	-37.97	+22.27	-16.83	+8.09	-23.36	+9.66	*-12.99*

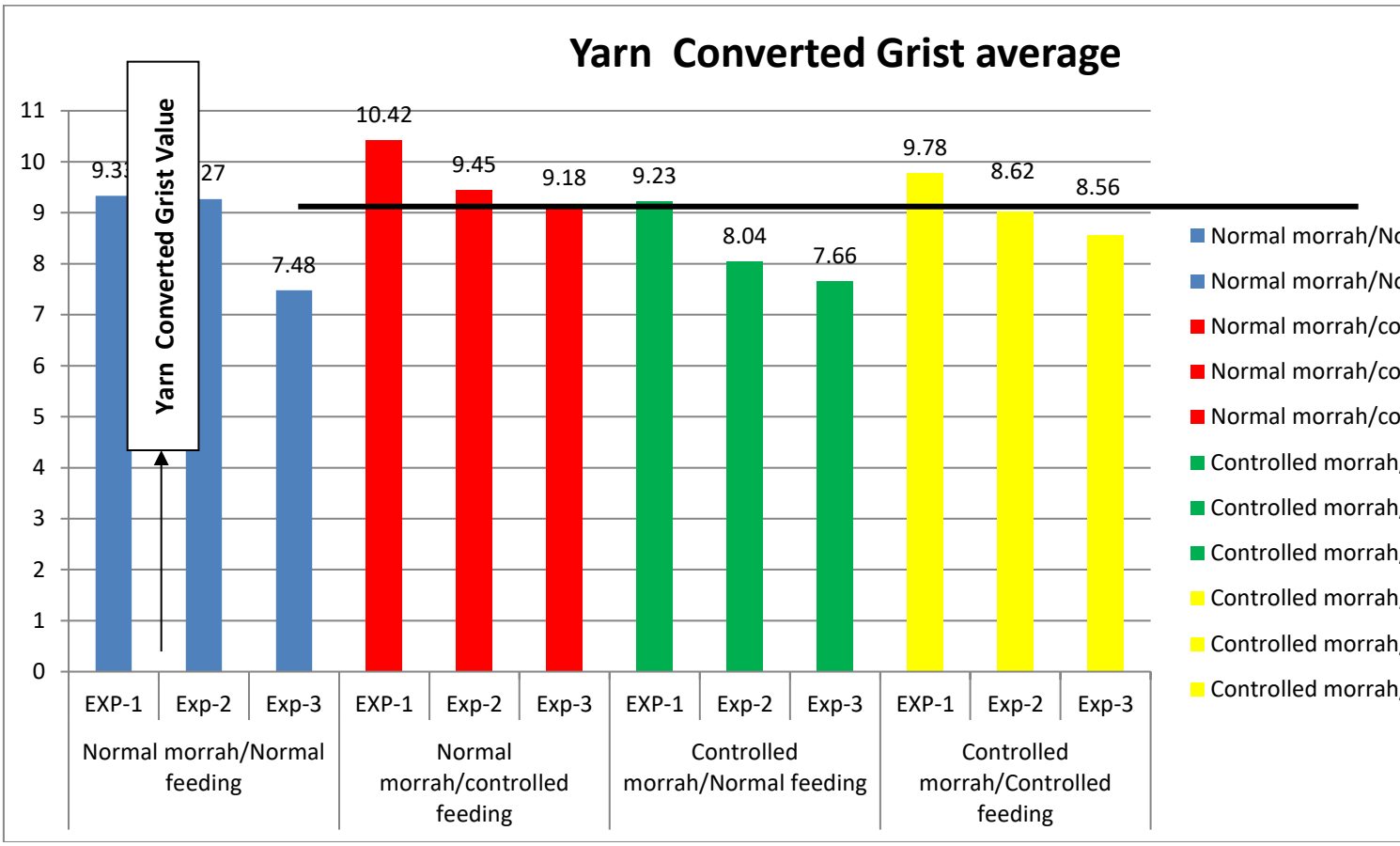

Fig.6, Observed Average Yarn Grist (Converted at 16 % MR) Variation for Different Processes (in Comparison to Standard 9 lb Grist)

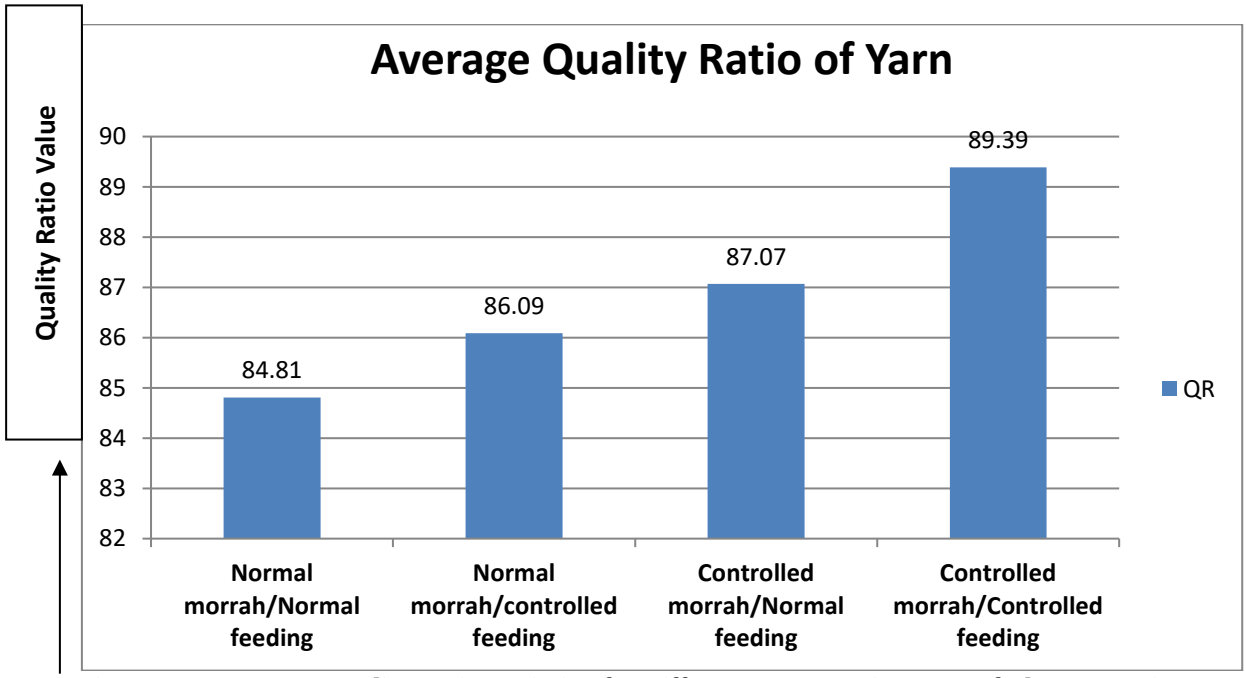

Fig.-7, Average Yarn Quality Ratio Variation for Different Processes (Average of Three Experiments of Each Process)

It is observed from table no. 6, Fig.6 & 7, that in comparison to **standard yarn grist 9 lb,** average yarn grist variation in different process is control best in case of Control morah control feeding process**.** In other process average yarn grist obtained from 7.48 to 10.42, which are not desirable in comparison to standard 9 lb/ spindle yarn.

Significance test result:

There is significant difference in yarn Quality Ratio in both at 1 % and 5 % level of significance between Normal morah – Normal Feeding system and & Controlled Morah Control Feeding system.

Table -9, Jute Yarn Evenness Details

Sl no.	Parameters	Normal Morah/Normal Feeding			Average	Normal Morah/Control Feeding			Average	Control Morah/Normal Feeding			Average	Control Morah/Control Feeding			Average
1	**Um%**	21.09	19.65	20.68	**20.47**	22.28	20.51	21.02	**21.27**	19.7	21.1	21.92	**20.91**	20.49	19.23	20.55	**20.09**
2	**CVm%**	27.56	26.06	26.75	**26.79**	29.14	26.93	27.47	**27.85**	25.92	27.93	28.98	**27.61**	28.02	25.36	26.55	**26.64**
3	**CVm(1m)%**	11.96	12.22	10.27	**11.48**	15.39	10.3	12.08	**12.59**	9.33	10.42	13.04	**10.93**	10.39	11.11	11.46	**10.99**
4	**CVm(3m)%**	8.59	8.71	7.01	**8.10**	12.91	8.01	7.83	**9.58**	6.64	7.01	8.89	**7.51**	5.74	7.93	8.82	**7.50**
5	**Thin/km(-30)%**	5160	4540	4440	**4713**	4630	4420	4570	**4540**	4530	5070	4910	**4837**	4740	4060	4910	**4570**
6	**(-40)%**	2480	1870	2280	**2210**	2300	2070	2200	**2190**	2160	2460	2740	**2453**	2270	1830	2190	**2097**
7	**(-50)%**	920	510	770	**733**	770	600	660	**677**	560	930	1050	**847**	710	520	720	**650**
8	**(-60)%**	220	60	170	**150**	150	100	140	**130**	100	210	320	**210**	170	80	120	**123**
9	**Thick/km(+35)%**	2390	1860	2390	**2213**	2060	2260	2360	**2227**	1860	2230	2360	**2150**	1980	1920	2190	**2030**
10	**(+50)%**	1070	840	1050	**987**	950	1140	1100	**1063**	850	1060	1160	**1023**	940	760	920	**873**
11	**(+70)%**	370	360	380	**370**	420	410	410	**413**	270	380	430	**360**	410	320	320	**350**
12	**(+100)%**	60	160	80	**100**	120	150	130	**133**	60	120	150	**110**	140	90	90	**107**
13	**Neps/km(+140)%**	500	470	510	**493**	440	620	550	**537**	370	560	590	**507**	480	390	520	**463**
14	**(+200)%**	120	240	150	**170**	170	160	160	**163**	130	160	180	**157**	200	120	110	**143**
15	**(+280)%**	30	90	20	**47**	30	50	60	**46**	50	20	70	**47**	50	60	20	**43**

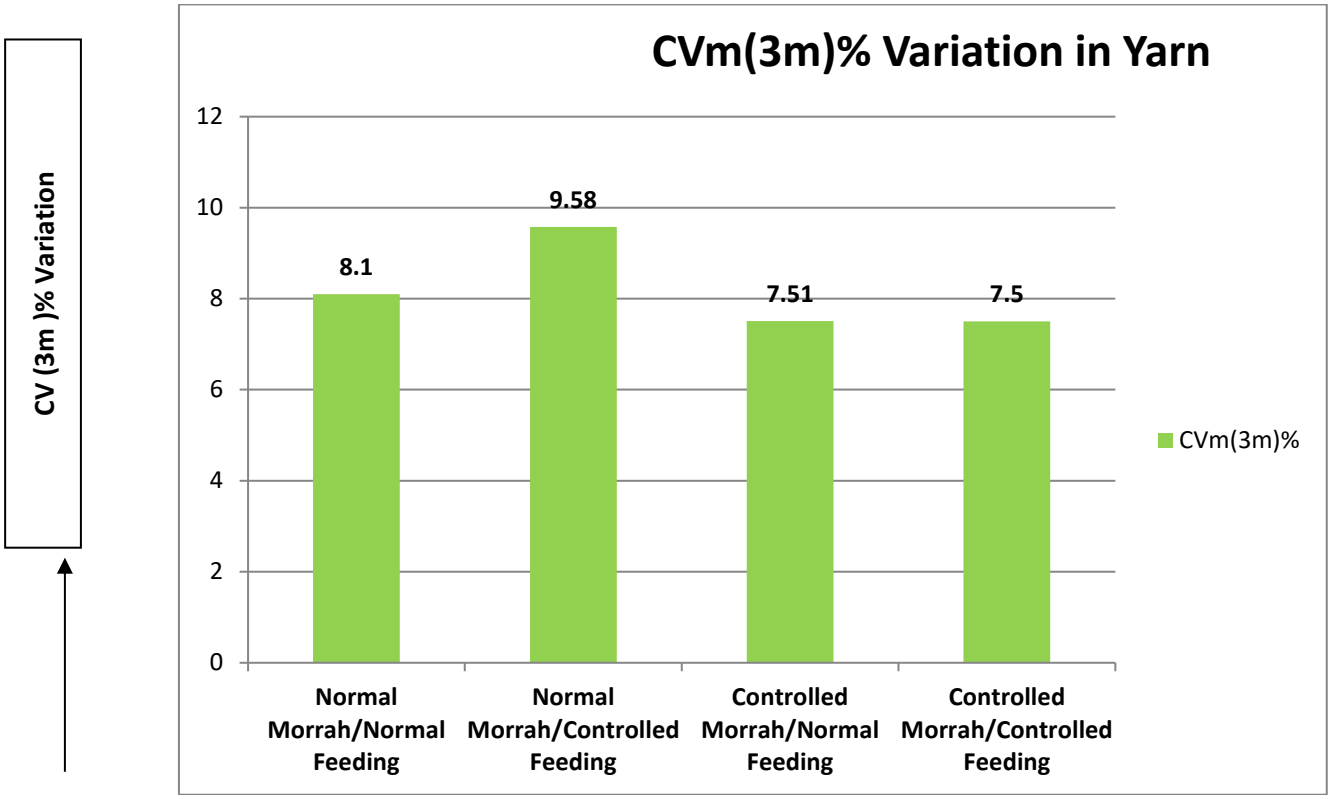

Fig.-8, CVm (3m)Data for Different Processes

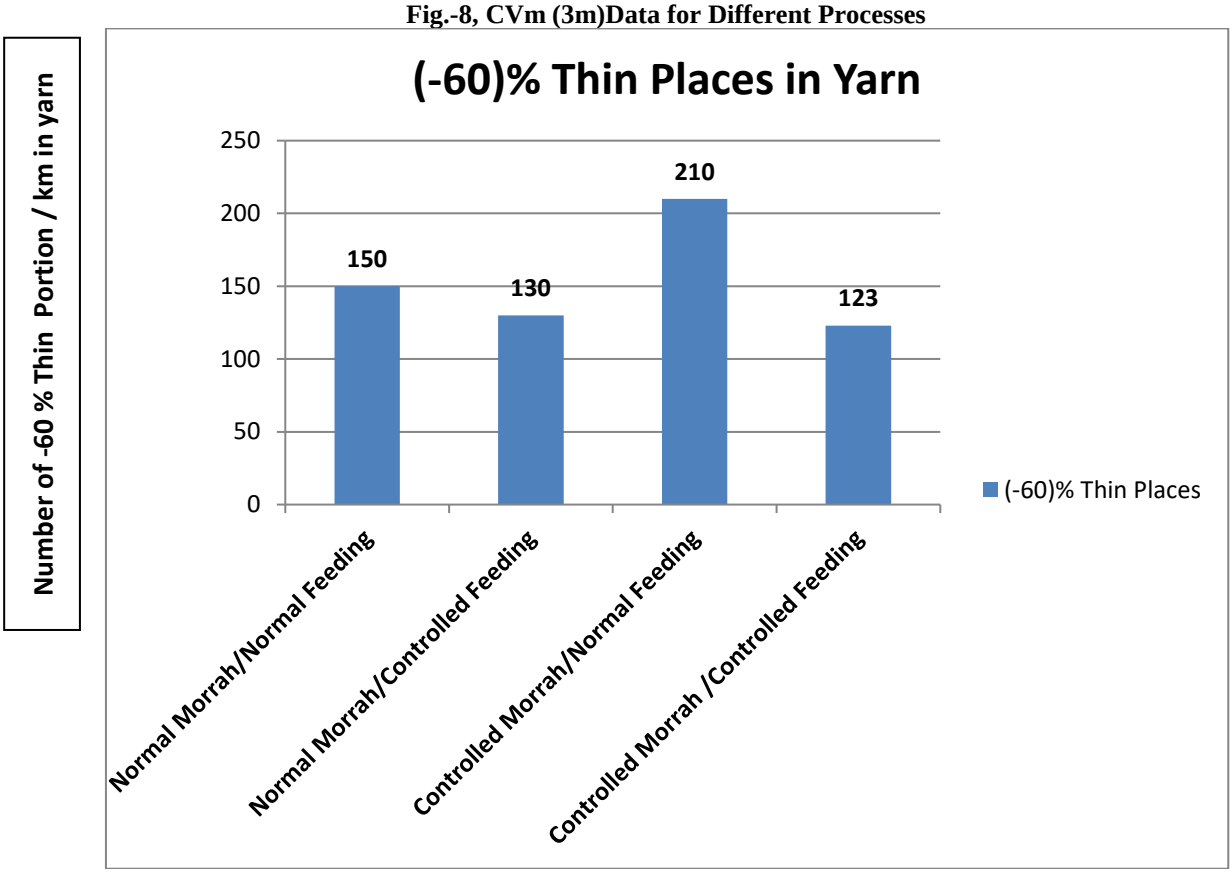

Fig.-9, Average number of - 60 % Thin Places for Different Processes

From Table 9 and Fig. 8 to 9 , it is observed that there is a trend for lower number of thick – thin places in the yarns produced by Control morah control feeding process in comparison to other three processes.

CONCLUSION

In the above study, it is clearly observed that if the morah weight is control by the mill within ± 200 g and the spreader feeding is done in control way (i.e. the jute morah should be fed at a fixed interval or after certain distance on spreader table), it affects the yarn quality a lot. By following the process, mill can reduce the yarn weight variation as well as mill well achieve better quality ratio (around 5 % higher). Not only that, there is a chance of improvement in the jute yarn evenness.

Significance test of quality ratio values obtained during study shows that, the increase in quality ratio in Control Morah Control feeding process is significant. This study results open the scope of further research on development of mechanical attachments or process to control morah weight and spreader feeding system at jute mills to improve the yarn quality.

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Table – 10: Table for Glossary

Sl. No.		
1	**Yds**	Yards
2	**Avg.**	Average
3	**MR**	Moisture Regain
4	**Exp.**	Experiment
5	**CV**	Coefficient of Variation
6	**Fig.**	Figure
7	**Obs.**	Observed
7	**Sl.No**	Serial number
8	**Max.**	Maximum
9	**Corr.**	Corrected
10	**Wt.**	Weight
11	**SL.WT**	Sliver Weight
12	**Std**	Standard
13	**Min.**	Minimum
14	**lb**	Pound
15	**QR**	Quality Ratio, QR= Avg. Yarn Strength in lbX 100/ Avg. Yarn Grist
16	**Grist**	Weight of 14400 yds yarn in lb, Yarn grist X 34.45= Yarn Count in Tex
17	**CVm %**	Yarn coefficient of mass variation
18	**ft**	Feet
19	**g.**	gram
20	**Kg.**	Kilogram
21	**DP**	Draft Pinion
22	**DC**	Draft Change Pinion
23	**DRAFT**	Attenuation/ Unit Length
24	**BTR**	Bangladesh Tossa Rejection
25	**SD**	Standard Deviation $\sigma = \sqrt{(\sum(x - \bar{x})^2 / n)}$, **where n** = total number of observations.
26	**CV%**	CO-Efficient of Variation CV%=(S.D.x100)/Average.
27	**MR%**	Moisture Regain
28	**DRG**	Drawing