EFFECT OF THE DOMESTIC DESIGNED EXTRACTOR-FEEDER ON COTTON FIBER PROPERTIES

HOSSAM H. H. EL-FEKY

Cotton Research Institute, ARC, Giza

(Manuscript received 3 July 2008)

Abstract

Equipment such as feeders has commonly been referred to as extracting machineries. Extractors provide the capability of removing foreign matter from seed cotton prior to ginning and are therefore considered as essential units of a cotton gin's seed cotton cleaning system. Thus, the objective of this study is to investigate the impact of the domestic designed extractor-feeder on fiber properties. Therefore, the seed cotton of the combinations between five cotton varieties (Giza 70, Giza 89, Giza 80, Giza 83, and Giza 90) and four seed cotton grades (G, FGF/G, FGF, and GF/FGF) were fed to the gin stand by the domestic feeder, fixed at the favorable setting. The results obtained indicate that using the extractor-feeder increased the uniformity index and fiber brightness from 84.4%, 59.1% to 85.2%, 60.1%, respectively, lowered short fiber percentage and fiber yellowness from 24.0%, 12.3%, to 17.5%, 11.8%, respectively, but did not affect the lint percentage or the 2.5% fiber span length as compared to the control treatment. The improvement in lint grade as a result of feeding the seed cotton to the gin stand by the extractor-feeder ranged from 13.2 % for Giza 80 to 22.8 % for Giza 89 with a mean of 17.1 %, and ranged from 4.5 % for Good grade to 35.7 % for the GF/FGF one, while it ranged from 2.5 % to 6.4 % for the control treatment. However, the extractor-feeder removed about 34.8 % of the trash imbedded in the seed cottons involved in the study. Also, low grades exhibited higher improvements in lint grade than high ones as a result of using the extractor-feeder.

Thus, it could be concluded that using the extractor feeder with the round-racks screen, 0.7 rpm feeding rate and 142 rpm cleaning speed resulted in satisfactory improvements in fiber properties for the whole Egyptian cotton varieties and grades, under study.

INTRODUCTION

Hand feeding methods was originally employed for all types of gin stands, and is still employed. Early in the twentieth century spiked drum-type feeders were installed in saw and roller gins. They provided a uniform supply of seed cotton that could be controlled by the speed of the drum. About 1920, as ginning machinery began to modernize, the feeders rapidly changed to extractor types. The primary function of the extractor-feeder is to feed seed cotton to the gin stand uniformly at controllable rates, with extracting and cleaning as a secondary function. Uniform, controlled cotton flow into the extractor-feeder increases its cleaning efficiency and also, helps in opening and fluffing the seed cotton for more effective ginning. The feed rate of seed cotton is controlled by the speed of two star-shaped feed rollers located at the top of the feeder, directly under the distributor hopper. Many modern extractor-feeders enhance fine trash removal by also employing cleaning cylinders similar to those in inclined cleaners. Choosing the degree of gin cleaning is a compromise between fiber trash content and fiber quality. The best ginning practice is simply to use the minimum machinery for particular cotton to achieve the optimum market grade. Eweida (1997) found that no significant differences were found in lint grade, lint color, fiber length parameters, non-lint content or micronaire reading due to the effect of the feeding method to the gin stand with seed cotton. Studies wherein all seed cotton cleaners prior to the extractor-feeder bypassed have indicated that the extractor-feeder removed 70% of the hulls, 15% of the motes, and 40% of the remaining trash components and has an overall cleaning efficiency of about 40% for machine-picked cotton (Anthony et al. 2001). El-Awady et al. (2002) found that the extractor-feeder machine did not affect the ginning outturn, fiber length parameters, fiber elongation, fiber strength, and micronaire reading.

Thus, the objective of this study is to evaluate the effect of the domestic designed extractor-feeder on fiber properties of some cotton varieties and grades.

MATERIALS AND METHODS

This study was carried out to investigate the effect of the designed extractor-feeder (Fig. 1) on fiber properties. Thus, five cotton varieties and four seed cotton grades of three replications were involved. Screen type used was the round-racks one with 47.30 % spacing area. The cleaning cylinder speed was 142 rpm (1.49 m/s). The feeding rate was 0.7 rpm (73.24 kg/h/m). The reciprocating knife gin stand of McCarthy, 40-inch roller gin was used (Fig. 1). The cotton varieties used in the experiment were Giza 80, Giza 83, Giza 90, Giza 89 and Giza 70 obtained from the 2006 growing season, while the seed cotton grades were G, FGF/G, FGF, and GF/FGF.

The ginning performance was carried out in 2007 at the Cotton Ginning Research Division (CGRD), Cotton Research Institute (CRI), Agricultural Research Center (ARC). A bulk sample for each seed-cotton variety was taken at random and elaborately mixed. For each treatment, three replications each of 5 kg of seed cotton were fed to the extractor-feeder during ginning. Lint percentage (%) was calculated for each lot by dividing the weight of the ginned lint by the initial seed cotton weight. The waste removed (%) by the extractor-feeder was collected, weighed, and evaluated to determine the amount of trash wasted by the extractor-feeder. The improvement in lint grade as a result of using the extractor-feeder was determined and calculated according to the following equation:

$$\text{Improvement in lint grade} = \frac{\text{lint grade index - seed cotton grade index}}{\text{seed cotton grade index}}$$

Fiber properties were tested at the Cotton Technology Research Division (CTRD), CRI, ARC, under standard atmospheric conditions of (65 % $\pm$ 2) relative humidity and (70° F $\pm$ 2, 21.1°C $\pm$ 1) temperature degree. Seed cotton and lint grade were determined by qualified lint classers. Lint color (reflectance Rd% and yellowness +b) was measured by using the "Nickerson Hunter cotton colorimeter" according to ASTM designation D-2253-67 (1984). The digital fibrograph 630 instrument was operated according to ASTM (D-1447-67) to estimate the fiber length parameters [fiber span length 2.5% (mm), uniformity index (%), and short fiber index (%)]. Percentage of non-lint content was measured by "microdust and trash analyzer [MDTA3]" according to ASTM (D-2812-95).

A factorial analysis of variance, in a completely randomized design was conducted and the differences between means were tested by Duncan's new multiple range test according to (SAS, 1996).

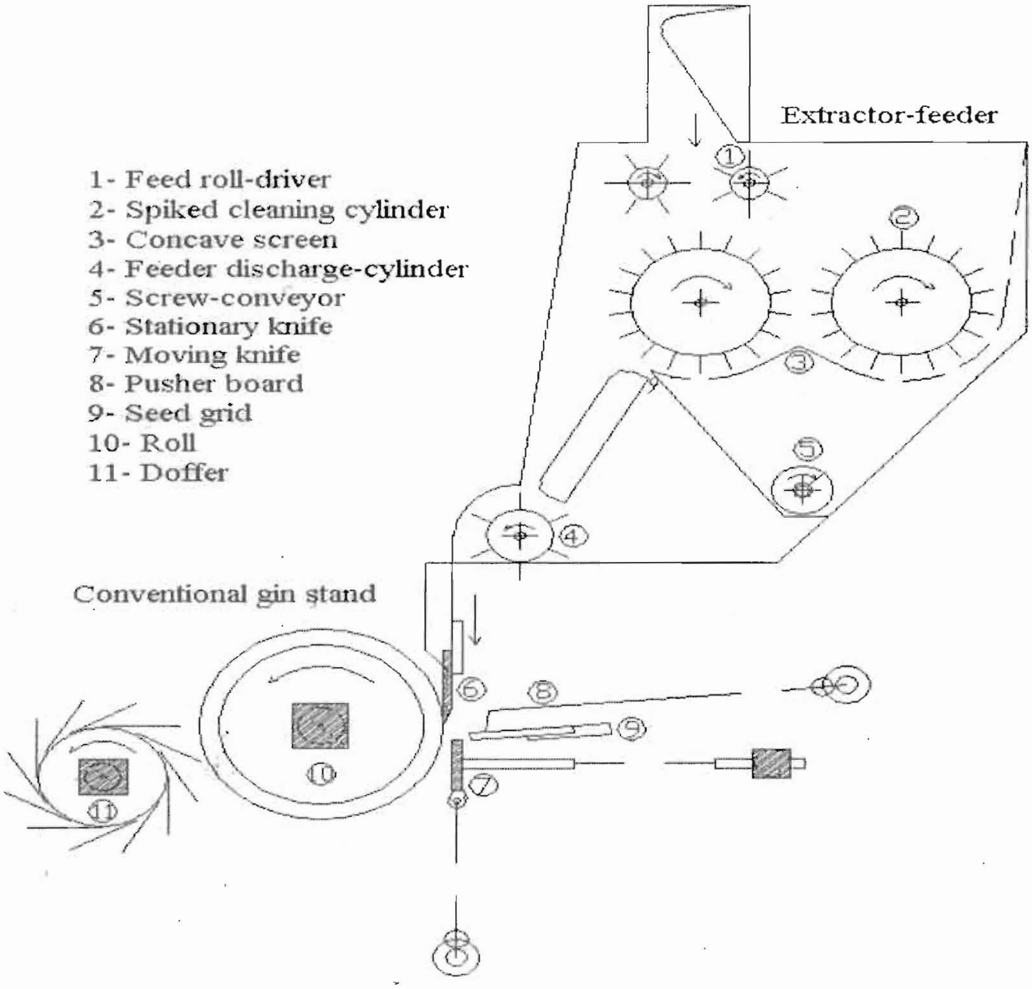

Fig. 1. The domestic designed extractor-feeder installed on the gin stand.

RESULTS AND DISCUSSION

The present investigation was undertaken to study the effect of the domestic designed extractor-feeder on fiber properties of some cotton varieties and grades.

1. Effect of the extractor-feeder on lint percentage, trash content, and lint grade:

Lint percentage:

From the data recorded in tables 1, 2 and 3, it is shown that, no significant difference was found in lint percentage as a result of handling seed cotton by the extractor-feeder as compared to the control treatment (without using the extractor-feeder). The highest lint percentage was obtained (37.6%) in Giza 80 variety, while the lowest one was obtained (33.0%) in Giza 83 variety. The highest lint percentage was obtained (37.5%) in Good grade, while the lowest one was obtained (33.4%) in GF/FGF grade. Lint percentage (LP) of cotton varieties under study (Fig. 2) was found to be a function of seed cotton grade (g). The following linear regression equations adequately describe this relationship:

$LP_{G80} = 0.34g + 25.83$ $R^2 = 0.92$

$LP_{G83} = 0.38g + 20.09$ $R^2 = 0.80$

$LP_{G90} = 0.40g + 19.40$ $R^2 = 0.97$

$LP_{G89} = 0.25g + 28.35$ $R^2 = 0.89$

$LP_{G70} = 0.24g + 28.14$ $R^2 = 0.99$

Figure 2 illustrates that as the seed cotton grades improved, the lint percentage increased. This result could be explained by the fact that lower grades contain higher percentages of trash and non-fluffy (defective) locks, which drop down through the concave screen during handling seed cotton by the extractor-feeder, consequently, lint percentage decreased. However, the nominate extractor-feeder removed about 34.8 % of trash imbedded in the cotton varieties and grades under study. Trash wastage (TW) of studied cotton varieties (Fig. 3) was found to be a function of seed cotton grade (g). The following linear regression equations adequately describe this relationship:

$TW_{G80} = -0.43g + 19.05$ $R^2 = 0.84$

$TW_{G83} = -0.27g + 13.13$ $R^2 = 0.99$

$TW_{G90} = -0.40g + 19.41$ $R^2 = 0.92$

$TW_{G89} = -0.32g + 13.79$ $R^2 = 0.98$

$TW_{G70} = -0.47g + 18.87$ $R^2 = 0.99$

Figure 3 illustrates that as the seed cotton grade improved, the trash wastage decreased. That mean the percentages of removed trash from low grades were higher than those removed from high grades. This result could be explained by the fact that as the seed cotton trash content decreased (grade improved) the trash wastage gradually decreased. But it could be conclude that the percentage of extracted trash depending on a mount of trash and the nature of trash if it's easy or difficult to extract.

Thus, it could be concluded that using the extractor-feeder did not affect the lint percentage (%).

Non-lint content:

The values of non-lint content percent did not show any significant difference as a result of using the extractor-feeder as compared to the control treatment. The highest non-lint content was obtained (13.9%) in Giza 80 variety, while the lowest one was obtained (4.0%) in Giza 89 variety. The highest non-lint content was obtained (11.8%) in GF/FGF grade, while the lowest one was obtained (3.5%) in Good grade. However, the nominate extractor-feeder significantly lowered trash content of the all cotton varieties and grades under study. That means the cotton variety Giza 89 showed the highest response to handling by the extractor-feeder. Non-lint content (NLC) of studied cotton varieties (Fig. 4) was found to be a function of seed cotton grade (g). The following linear regression equations adequately describe this relationship:

$$NLC_{G80} = -1.39g + 61.02 \qquad R^2 = 0.95$$
$$NLC_{G83} = -0.87x + 38.23 \qquad R^2 = 0.92$$
$$NLC_{G90} = -0.31x + 16.15 \qquad R^2 = 0.96$$
$$NLC_{G89} = -0.30x + 13.88 \qquad R^2 = 0.86$$
$$NLC_{G70} = -0.46x + 22 \qquad R^2 = 0.78$$

Figure 4 illustrates that as the seed cotton grade improved, the non-lint content decreased. Also, the results indicated that the grades had significant effect on non-lint content, whatever the cotton variety was. It could be conclude that the extractor feeder more effective in removing trash from low grades than the high grades. However, the low grades showed more response than the high grades to handling by the extractor-feeder.

Thus, it could be concluded that using the extractor-feeder did not affect the non-lint content (%).

Lint grade:

The results of lint grade as a result of handling seed cotton by the extractor-feeder obtained that the extractor-feeder significantly improved the lint grade as compared to the control treatment. Using the extractor feeder increased the lint grade index from 35.4 (control) to 39.8. Within the cotton varieties, the results showed that no significant difference was found in lint grade as a result of using the extractor-feeder for handling seed cotton. That means the all cotton varieties under study have the same response to handling by the extractor-feeder. The highest lint grade was obtained (41.4) in Good grade, while the lowest one was obtained (33.9) in GF/FGF grade. Also, the results indicated that as the seed cotton grade improved, the lint grade increased. This increase in lint grade could be attributed to the effective of the extractor-feeder in opening seed cotton to small locks for more thorough trash extraction. The improvement in lint grade (ILG) of studied cotton varieties (Fig. 5) was found to be a function of seed cotton grade (g). The following linear regression equations adequately describe this relationship:

$ILG_{G80} = -1.95g + 80.76$ $R^2 = 0.93$

$ILG_{G83} = -2.23g + 91.76$ $R^2 = 0.99$

$ILG_{G90} = -2.30g + 95.81$ $R^2 = 0.99$

$ILG_{G89} = -3.20g + 133.56$ $R^2 = 0.97$

$ILG_{G70} = -3.38g + 135.21$ $R^2 = 0.98$

Figure 5 illustrates that as the seed cotton grade improved, the improvement in lint grade decreased. However, the improvement in lint grade as a result of feeding the seed cotton to the gin stand by the extractor-feeder ranged from 13.2 % for Giza 80 to 22.8 % for Giza 89 with a mean of 17.1 %, and ranged from 4.5 % for Good grade to 35.7 % for the GF/FGF one, while it ranged from 2.5 % to 6.4 % for the control treatment.

Thus, it could be concluded that using the extractor-feeder improved the lint grade.

2. Effect of the extractor-feeder on fiber properties:

2.1. Fiber length parameter:

2.5 % span length:

The results of 2.5 % span length of the cultivars involved in the study did not show any significant difference as a result of handling seed cotton by the extractor-feeder as compared to the control treatment (Tables 1, 2, and 3). The highest 2.5 % span length was obtained (34.2 mm) in Giza 70 variety, while the lowest one was obtained (29.2 mm) in Giza 90 variety. The highest 2.5 % span length was obtained (32.2 mm) in Good grade, while the lowest one was obtained (29.9 mm) in GF/FGF grade. The results indicated that as the seed cotton grade improved, the 2.5 % span length increased. This reverses the efficiency of the extractor-feeder in preserving fiber length and improving the cotton grade, hence the 2.5 % span length improved. In this connection, it should be mentioned that machine moving parts may be damage the fiber, in terms of fiber breakage during processing. Fiber breakage might happen to such an extent that the length of cotton fibers materially reduced. The uniformity index correspondingly decreased and the short fiber index increased. However, the long-staple cotton varieties more endurance than the extra-long staple cotton varieties to the mechanical action.

Thus, it could be concluded that using the extractor-feeder did not affect the 2.5 % span length.

Uniformity index:

From tables 1, 2, and 3 it could be seen that in all studied varieties there was a general tendency of increase in uniformity index as a result of handling seed cotton by the extractor-feeder as compared to the control treatment. Using the extractor feeder increased the uniformity index from 84.4% (control) to 85.2%. The highest uniformity index was obtained (87.1%) in Giza 70 variety, while the lowest one was obtained (81.9%) in Giza 83 variety. The highest uniformity index was obtained (87.2%) in Good grade, while the lowest one was obtained (81.9%) in GF/FGF grade. However, the results indicated that as the seed cotton grade improved, the uniformity percentage increased. The increase in uniformity percentage could be probably, ascribed to the removal of unopened immature seed cotton locks during seed cotton cleaning by the extractor-feeder.

Thus, it could be concluded that using the extractor-feeder improved the uniformity index (%).

Short fiber index:

On average, the values of short fiber percentage tended to decrease due to using the extractor-feeder as compared to the control treatment (Table 1, 2, and 3). Using the extractor feeder decreased the short fiber percentage from 24.0% (control) to 17.5%. The highest short fiber percentage was obtained (23.6%) in Giza 83 variety, while the lowest one was obtained (17.6%) in Giza 70 variety. The highest short fiber percentage was obtained (23.9%) in GF/FGF grade, while the lowest one was obtained (18.1%) in Good grade. Short fiber index (SFI) of studied cotton varieties (Fig. 6) was found to be a function of seed cotton grade (g). The following linear regression equations adequately describe this relationship:

$$SFI_{G80} = -0.49g + 33.29 \qquad R^2 = 0.90$$

$$SFI_{G83} = -0.69g + 43.86 \qquad R^2 = 0.98$$

$$SFI_{G90} = -0.28g + 27.17 \qquad R^2 = 0.91$$

$$SFI_{G89} = -0.61g + 39.04 \qquad R^2 = 0.70$$

$$SFI_{G70} = -0.23x + 22.06 \qquad R^2 = 0.97$$

Figure 6 illustrates that as the seed cotton grade improved, the short fiber percentage decreased. A possible explanation for the decrease in short fiber percentage could be probably, ascribed to the removal of trash and unopened immature seed cotton locks during seed cotton cleaning by the extractor-feeder.

Thus, it could be concluded that using the extractor-feeder decreased the short fiber percentage (%).

2.2. Lint color:

Fiber brightness:

It is apparent that cotton brilliance expressed in terms of reflectance percentage (Rd %) tend to increase progressively due to handling the seed cotton by the extractor-feeder as compared to the control treatment (Tables 1, 2, and 3). Using the extractor feeder increased the reflectance percentage from 59.1% (control) to 60.1%. The highest reflectance percentage was obtained (68.7%) in Giza 89 variety, while the lowest one was obtained (54.5%) in Giza 80 variety. The highest reflectance percentage was obtained (64.6%) in Good grade, while the lowest one was obtained (55.1%) in GF/FGF grade. The decrease in color brilliance is most likely attributed to that low grades have greater content of trash and other contaminations than higher grades however, that the presence of trash causes the cotton to lose its brightness and brilliance. However, the increase in percent of reflectance due to using the extractor-feeder could be ascribed to the removal of a pronounced amount of trash resulting consequently, in higher clean grades. It is worthy to mention that Lord (1961) stated that brilliance changes materially from the highest to the lowest grade largely because of the alteration in trash content.

Thus, it could be concluded that using the extractor-feeder improved the reflectance percentage (%).

Fiber yellowness:

The values of fiber yellowness (+b) as a result of handling seed cotton by the extractor-feeder are shown in table 1, 2, and 3. However, the nominate extractor-feeder significantly lowered fiber yellowness for the studied cotton varieties and grades as compared to the control treatment. Using the extractor feeder decreased the fiber yellowness from 12.3% (control) to 11.8%. The highest fiber yellowness was obtained (13.5%) in Giza 80 variety, while the lowest one was obtained (9.7%) in Giza 89 variety. The highest fiber yellowness was obtained (12.4%) in GF/FGF grade, while the lowest one was obtained (11.7%) in Good grade. Also, the results indicated that as the seed cotton grade improved, the yellowness decreased. This decrease may be due to the extractor-feeder getting rid of a considerable proportion of foreign matter mixed with fibers, that led to decreased non-lint content and so the fiber yellowness decreased.

Thus, it could be concluded that using the extractor-feeder decreased the fiber yellowness (+b).

Thus, it could be concluded that using the domestic designed extractor feeder with the round-racks screen, 0.7 rpm feeding rate and 142 rpm cleaning speed resulted in improving the lint grade, fiber uniformity ratio and fiber brightness besides, decreasing the short fiber content and fiber yellowness, while it did not affect the lint percentage or the 2.5 % fiber span length. However, using the extractor feeder decreased the non-lint content but the rate of decrease did not reach the significance.

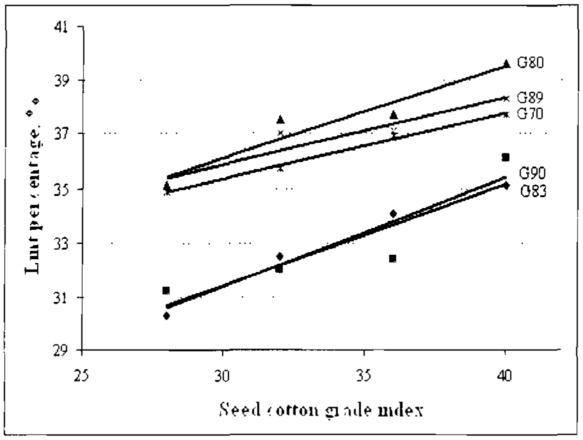

Fig. 2: Relationship between lint percentage and seed cotton grade.

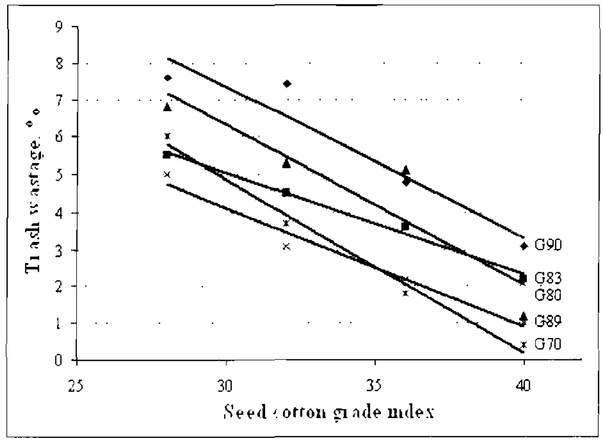

Fig. 3: Relationship between trash wastage and seed cotton grade.

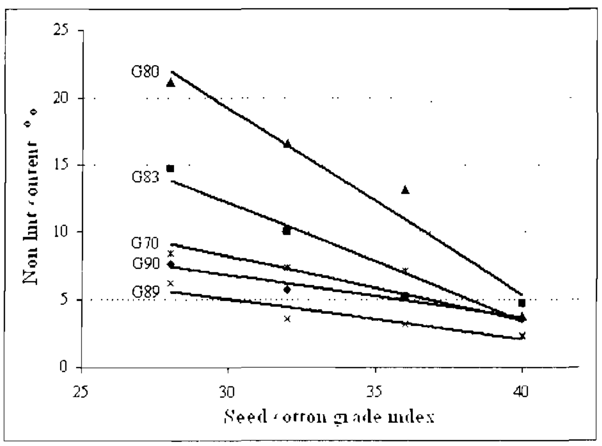

Fig. 4: Relationship between non-lint content and seed cotton grade.

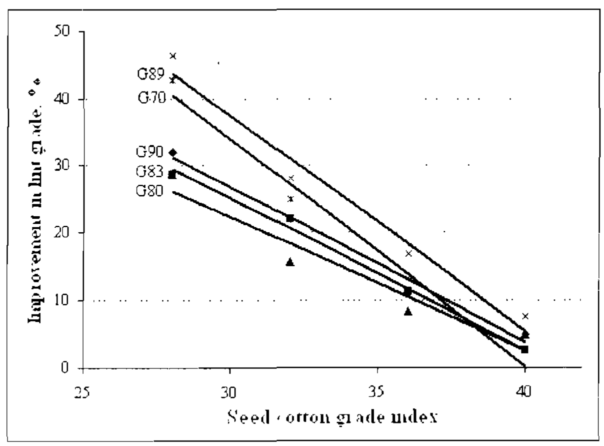

Fig. 5: Relationship between the improvement in lint grade and seed cotton grade.

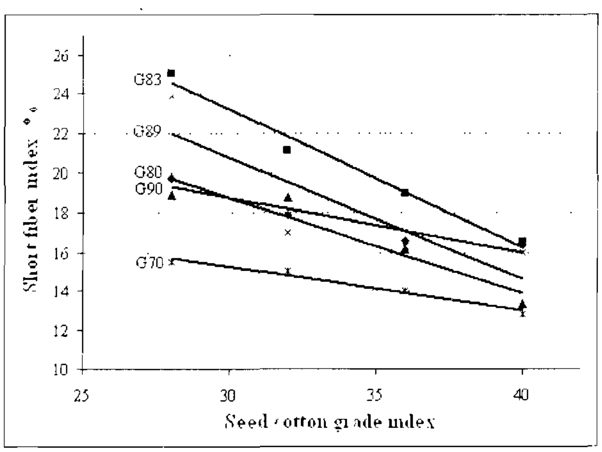

Fig. 6: The relationship between short fiber index and seed cotton grade.

Table 1. Fiber properties as affected by the nominate extractor-feeder for some Egyptian cotton varieties and grades.

Treatment		Lint percentage (%)	Lint grade index	Non-lint content (%)	Fiber length parameter			Lint color	
					2.5% S.L. (mm)	Uniformity index (%)	Short fiber index (%)	Rd %	+b
Extractor feeder	0*	35.5a	35.4b	7.9a	31.2a	84.4b	24.0a	59.1b	12.3a
	1	35.3a	39.8a	7.6a	31.5a	85.2a	17.5b	60.1a	11.8b
Variety	G70	36.4b	37.9a	6.4bc	34.2a	87.1a	17.6d	60.5b	11.3d
	G89	37.0b	38.5a	4.0c	31.4b	83.9c	21.7b	68.7a	9.7e
	G80	37.6a	37.0a	13.9a	30.9b	85.6b	20.0c	54.5d	13.5a
	G83	33.0c	37.1a	8.8b	31.0b	81.9d	23.6a	57.9c	13.0b
	G90	33.1c	37.4a	5.7c	29.2c	85.3b	20.9bc	56.5c	12.7c
Grade	G	37.5a	41.4a	3.5c	32.2a	87.2a	18.1d	64.6a	11.7d
	FGF/G	35.8b	38.6b	6.9b	31.9ab	85.8b	19.5c	60.9b	12.0c
	FGF	35.1c	36.4c	8.8b	31.4b	84.3c	21.5b	57.9c	12.2b
	GF/FGF	33.4d	33.9d	11.8a	29.9c	81.9d	23.9a	55.1d	12.4a
	Mean	35.4	37.6	7.8	31.3	84.8	20.7	59.6	12.1

*0: without using the extractor-feeder 1: using the extractor-feeder

Table 2. Mean values of fiber properties for some Egyptian cotton varieties and grades as affected by the nominate extractor-feeder.

Variety	Seed cotton grade	Lint percentage (%)	lint grade index	Non-lint content (%)	Fiber length parameter			Lint color	
					2.5 % span length (mm)	Uniformity index (%)	Short fiber index (%)	Rd %	+b
Giza 70	40	37.7	41	2.3	34.9	88.9	12.8	68.0	10.6
	36	36.9	40	7.1	34.9	87.8	14.0	62.6	10.8
	32	35.7	40	7.3	34.6	86.8	15.0	57.5	11.1
	28	34.9	40	8.4	32.9	86.6	15.5	56.0	11.8
	Mean	36.3	40.3	6.3	34.3	87.5	14.3	61.0	11.1
Giza 89	40	38.3	43	2.4	32.6	86.4	16.0	74.3	8.8
	36	37.1	42	3.2	32.6	86.0	16.3	69.2	9.5
	32	37.0	41	3.6	32.3	85.4	17.0	68.1	9.8
	28	35.0	41	6.2	28.6	79.6	23.9	65.0	9.8
	Mean	37.5	41.8	13.7	31.0	86.1	16.8	55.0	13.3
Giza 80	40	39.6	42	3.8	32.4	89.5	13.3	60.8	13.1
	36	37.7	39	13.1	31.3	86.2	16.2	56.4	13.2
	32	37.5	37	16.6	30.5	84.4	18.8	54.5	13.3
	28	35.1	36	21.2	29.7	84.1	18.9	48.1	13.4
	Mean	37.5	38.5	13.7	31.0	86.1	16.8	55.0	13.3
Giza 83	40	36.1	41	4.7	31.9	86.1	16.5	62.7	12.3
	36	32.4	40	5.2	31.6	84.1	19.0	60.5	12.8
	32	32.0	39	10.0	31.1	81.6	21.1	56.2	12.9
	28	31.2	36	14.7	30.0	77.5	25.0	54.1	12.9
	Mean	32.9	39	8.7	31.2	82.3	20.4	58.4	12.7
Giza 90	40	35.1	42	3.6	29.5	86.9	16.4	59.9	12.2
	36	34.1	40	5.2	29.5	86.7	16.6	58.1	12.2
	32	32.5	39	5.7	29.3	85.6	17.9	55.4	12.6
	28	30.3	37	7.6	28.8	83.6	19.7	54.7	12.8
	Mean	33.0	39.5	5.5	29.3	85.7	17.7	57.0	12.5

Table 3. Mean values of fiber properties for some Egyptian cotton varieties and grades without using the nominate extractor-feeder.

Variety	Seed cotton grade	Lint percentage (%)	lint grade index	Non-lint content (%)	Fiber length parameter			Lint color	
					2.5 % span length (mm)	Uniformity index (%)	Short fiber index (%)	Rd %	+b
Giza 70	40	37.9	41	2.6	34.7	88.1	19	67	11.1
	36	37.1	37	7.4	34.7	87	20.2	61.6	11.3
	32	35.9	34	7.6	34.4	86	21.2	56.6	11.7
	28	35.1	30	8.8	32.6	85.7	22.7	55	12.3
Mean		36.5	35.5	6.6	34.1	86.7	20.8	60.1	11.6
Giza 89	40	38.5	41	2.7	32.4	85.6	22.2	73.3	9.3
	36	37.4	37	3.5	32.4	85.2	22.5	68.2	10
	32	37.2	33	4	32	84.5	25.2	67.1	10.3
	28	35.2	30	6.5	28.3	78.8	30.1	64.1	10.4
Mean		37.1	35.3	4.2	31.3	83.5	25.0	68.2	10.0
Giza 80	40	39.8	41	4.1	32.2	88.7	19.5	59.8	13.6
	36	37.9	37	13.4	31.1	85.4	22.4	55.4	13.7
	32	37.7	34	17	30.2	83.6	25	53.6	13.9
	28	35.3	30	21.6	29.5	83.2	26.1	47.2	13.9
Mean		37.7	35.5	14.0	30.8	85.2	23.3	54.0	13.8
Giza 83	40	36.3	41	5	31.7	85.3	22.7	61.7	12.8
	36	32.7	37	5.5	31.4	83.3	25.2	59.5	13.3
	32	32.2	34	10.4	30.9	80.7	28.3	55.2	13.4
	28	31.4	29	15.1	29.7	76.6	31.2	53.2	13.5
Mean		33.2	35.3	9.0	30.9	81.5	26.9	57.4	13.3
Giza 90	40	35.4	41	3.9	29.3	86.1	22.6	58.9	12.7
	36	34.3	37	5.5	29.3	85.9	22.8	57.1	12.7
	32	32.8	33	6.1	29	84.7	25.1	54.5	13.2
	28	30.5	30	8	28.6	82.8	25.9	53.7	13.3
Mean		33.3	35.3	5.9	29.1	84.9 .	24.1	56.1	13.0

REFERENCES

1. Anthony, W.S., D.V. Doorn, E. Edwards, T.J. Pearson, I. Malloum, U. Kechagia, I. Ozdemir, and D. Nyoni. 2001. Impact of Ginning on Fiber Quality: The Best Ginning Practices. The 60th Plenary Meeting of the International Cotton Advisory Committee (ICAC), September 16-21, 2001, in Victoria Falls, Zimbabwe, and publication by the ICAC, Washington, DC, Attachment II to SC-N-455, June 25, 2001
2. ASTM. 1984. D-2253-67, D-1447-67 and D-2812-95. Philadelphia, Pa.: U.S.A.
3. El-Awady, M.N., M.M. Youssef, A.G. El-Kabany, and H.E. El-Feky. 2002. Designing new seed-cotton feeder for reciprocating-knife gin stand. The 10th Annual Conf. of the Misr Society of Agric. Eng., "Development of Agricultural-Engineering Technologies in the Arab and Islamic World", 16-17 Oct., 2002: 103-114
4. Eweida, M.A. 1997. Cotton ginning efficiency as affected with the method of feeding the gin stand with seed cotton. Egyptian J. App. Sc., 12 (11): 203-208.
5. Lord, E. 1961. Manual of cotton spinning. Part 1: The characteristics of row cotton. Butterworths and Co., Manchester.
6. SAS User's Guide. 1996. Statistics Ver. 5. Cary, N.C.: SAS Institute, Inc. :433–506.

تأثير المغذي-المنظف (المصنع محليا) على صفات جودة تيلة القطن

حسام الدين الحسيني حامد الفقي

معهد بحوث القطن – مركز البحوث الزراعية – الجيزة

عادة ما يشار إلى الآلة المغذية للحلاجة بالقطن الزهر بأنها مغذية منظفة لما تقدمه من تخليص القطن الزهر من المواد الغريبة قبل عملية فصل الشعر عن البذرة ولما تمثله كجزء هام في نظام تنظيف القطن الزهر بالمحلج. لهذا أجري هذا البحث لدراسة تأثير المغذي-المنظف (السابق الإشارة إليه) على صفات جودة التيلة لبعض أصناف ورتب القطن المصري. وقد استخدم لهذه الدراسة ٥ أصناف هي: جيزة ٧٠، جيزة ٨٩، جيزة ٨٠، جيزة ٨٣، جيزة ٩٠، كما استخدم من كل صنف ٤ رتب هي: جود، فولي جود فير/جود، فولي جود فير، جود فير/ فولي جود فير.

وقد أوضحت النتائج أن استخدام المغذي–المنظف المزود بالغربال ذو القضبان المستديرة وسرعة التغذية ٠,٧ لفة/دقيقة وسرعة التنظيف ١٤٢ لفة/دقيقة (أفضل التصميمات التي أمكن التوصل إليها في بحوث سابقة)، قد أدى إلى تحسن نسبة الانتظام ودرجة اللمعان من ٨٤,٤٪، ٥٩,١٪ إلى ٨٥,٢٪، ٦٠,١٪ على الترتيب، وخفض نسبة الشعيرات القصيرة ودرجة اصفرار الشعر من ٢٤٪، ١٢,٣٪ إلى ١٧,٥٪، ١١,٨٪ على الترتيب، إلا أنه لم يؤثر على أي من نسبة النتيلة أو طول التيلة مقارنة بمعاملة عدم استخدام المغذي. كما أن التحسن في رتب الشعر نتيجة لاستخدام المغذي–المنظف تراوح بين ١٣,٢٪ لصنف جيزة ٨٠، و٢٢,٨٪ لصنف جيزة ٨٩ بمتوسط ١٨٪ وتراوح بين ٤,٥٪ لرتبة جود، و٣٥,٧٪ لرتبة جف/فجف. كما وجد أن المغذي–المنظف يخلص القطن الزهر تقريبا من ٣٤,٨٪ مما به من مواد غريبة. كما أظهرت رتب القطن الزهر المنخفضة استجابة أكثر للتحسن نتيجة للتداول بواسطة المغذي-المنظف عن رتب القطن الزهر العالية.

لهذا يمكن القول إنه باستخدام المغذي-المنظف (السابق الإشارة إليه) المزود بالغربال ذو القضبان المستديرة وسرعة التغذية ٠,٧ لفة/دقيقة وسرعة التنظيف ١٤٢ لفة/دقيقة، قد أدى إلى الحصول على أفضل النتائج بالنسبة لصفات جودة القطن مقارنة بعدم استخدامه.