Performance Evaluation of Two Different Seed Cotton Trash Extractors

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Abstract: The aim of the present study is to evaluate and compare the performance of two different seed cotton trash extractors, namely: locally manufactured seed cotton trash extractor (i.e., cleaner) and Russian type extractor model YIIX-I, 5T. The performance of the two extractors was evaluated in terms of the fiber physical properties, including fiber length, mm (2.5 and 50% span fiber lengths); fiber length uniformity ratio, lint color (color reflectance and color yellowness) and seed cotton grade. The extractors were evaluated at four saw drum speeds (7.06, 8.63, 10.20 and 12.56 m/s), four feed rates (10, 12.5, 15 and 17.5 kg/min) and three fiber cotton moisture contents (11.2, 9.8, 7.9%). The results showed that the increase of saw drum speeds, within the range of values included in this study, was found to decrease 2.5 and 50% span fiber length and increase the color reflectance, yellowness and seed cotton grade. At all levels of drum speeds and fiber moisture contents in both extractors, the span fiber length of 2.5 and 50% and the uniformity ratio were found to be proportional to the feed rate. However, the maximum color reflectance, color yellowness and seed cotton grade could be achieved at feed rat of 10 kg/min in both extractors and all values of moisture contents and drum speeds. The fiber moisture content had high significant effects on fiber span length, uniformity ratio, color reflectance and seed cotton grad. However, the fiber moisture content was found to be proportional to fiber span length and uniformity ratio and inversely proportional to color reflectance and seed grad cotton. A higher seed cotton grade was recorded with the local as mooched extractor than the Russian type.

Key words: Seed cotton trash extractor · Seed cotton grade · Fiber span length · Color reflectance and seed cotton grad

INTRODUCTION

The Egyptian cotton still meet a strong demand in the marketplace. The manual harvesting of the extra-long staple cotton achieve higher grade of seed cotton from the view point of containing foreign materials. High cost of manual harvesting will force farmers toward mechanical harvesting sooner or later. Seed cotton mechanically harvested contains substantial quantities of trash material such as: stems, leaves, hulls and bracts which must be removed in the early stages before ginning. A pre-cleaning extractor is used for this purpose. The cylinder-type cleaners are generally employed for removing leaf material and other fine particles, while burs and sticks cleaners were employed for removing of the large trash [1]. The cylinder cleaner consists of six or seven revolving spiked cylinders that rotate at 400 to 500 rpm. The centrifugal force created by saw cylinders rotating at 300 to 400 rpm sling off foreign materials while the fiber is held by the saw [2]. The modern burs and stick extractors are based on sling-off principle of trash removal and utilize large-diameter saw cylinders and grid bars to extract trash from seed cotton by a combination of centrifugal and impact forces. The current systems are normally composed of two extractor type in the cleaning system and extractor feeder in front of the gin stand.

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