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COTTONSEED DELINTING BY FLASH SURFACE BURNING TECHNIQUE

A Thesis
Presented to the Graduate School
Faculty of Agriculture, Alexandria University
in Partial Fulfillment of the Requirement for the Degree of

DOCTOR OF PHILOSOPHY

in

Agricultural Engineering

by

Hussien Ahmed Ahmed Elsoury

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DEDICATED

TO

My Parents,
My Brothers & Sisters
My Wife,
My Daughter

FARAH

And My Son

FADI

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ABSTRACT

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COTTONSEED DELINTING BY FLASH SURFACE BURNING TECHNIQUE.

Advisors' Committee : Prof. Dr. M. A. Sabbah,
Prof. Dr. S. N. Soliman And Prof. Dr. M. M. Naeem

The presence of short lint (fuzz) on cottonseed surface causes many problems in seed preparation, handling, storing, processing and planting. This fuzz causes particular losses in several fields when cottonseed is used.

The main objectives of the present work was to design, and construct a flash surface burning (FSB) system using thermal effect.

In order to reach this objective, the factors affecting the thermal delinting were studied; such as the effect of flue gas temperature, cottonseed flow rate, reactor height and cooling method on the quality of the delinted seed under laboratory conditions for Egyptian cottonseed variety (Giza 70).

The model solution of the best alternative reactor design parameters and seed flow rate which achieve the recommended limiting factors, revealed that 773 ^{o}K flue gas temperature, 3 m reactor

height, 6 cm reactor diameter and 20 Kg/hr cottonseed flow rate as the best suitable model solution.

The FSB system was designed and constructed of four basic units: feeding unit, scattering unit, thermal reactor unit, and measuring and controlling unit of cottonseed falling time. Each unit was tested, calibrated and adjusted to acheive its operational function.

The operational parameters of the system (cottonseed flow rate, flue gas temperature, reactor height and cooling method) were studied in order to obtain the best operational conditions for the Egyptian long stable cottonseed variety (Giza 70). Ninety treatments with three replicates were conducted.

A linear regression analysis was applied to obtain the quality criteria as a function of the operational parameters.

The optimum operational treatment was obtained at 873 ^{o}K flue gas temperature, 3 m reactor height and 10 Kg/hr cottonseed flow rate with natural air cooling method as the optimum treatment.

This system has an important application in the field of cottonseed production and preparation.

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