The Effect of the Number of Rotations of the Saw Cylinder on the Quality Indicators of the Seed

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ABSTRACT

The article presents the results of the effect of the number of revolutions on the seed parameters, using improved constructions of saw cylinders instead of metal brush cylinders from the main working parts of the 1LB linter without the grate, which implements the first stage of the two-stage dehairing technology of cotton seed.

Keywords:	Saw, cylinder, metal brush, linter without grate, amount of lint removal, mechanical damage to seed, number of revolutions.

Introduction

The number of rotations of the metal brush cylinders of the 4SOM, OS-01, OS and 1LB linters without grates from the seed depilation machines is set as 1095, 975, 730 and 760 rpm [1], the upper drum of the "УЧДМ" delinter is set at 730 and the lower drum is set at 960 rpm [2], but the saws change the constructions of intermediate gaskets. The influence of the number of revolutions of the cylinder has not been studied.

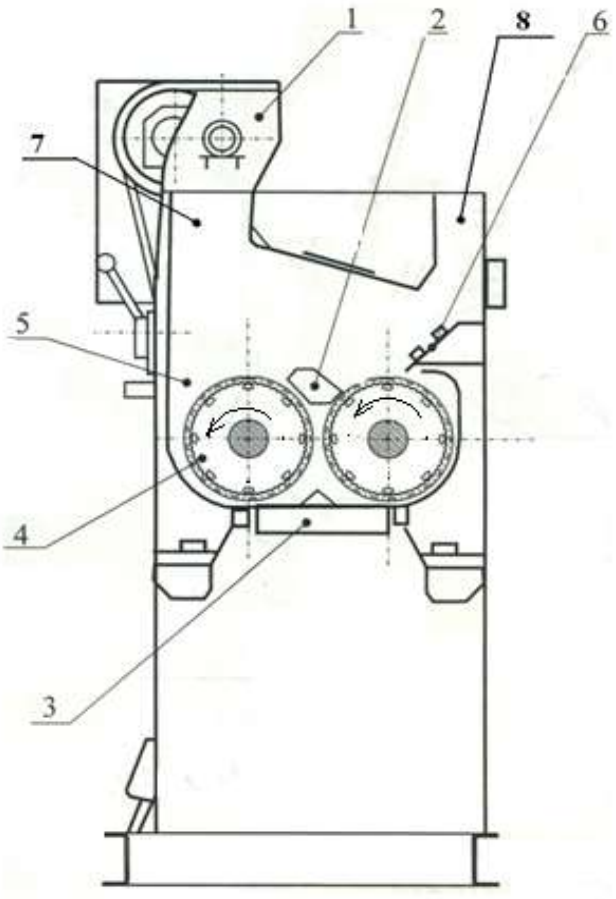
Saw cylinders were assembled for a 1LB colossal linter to study the effect of the number of cylinder revolutions on the corrugated surface of the saw spacer on seed hair removal and changes in machine performance (Figure 1).

Figure 1. Assembled saw cylinder for 1LB colossal linter.

Due to the satisfactory results of the preliminary experiments, the diameter of the spacers of the saw was set to 255 mm, the pitch of the wavy surface to 13 mm, and the angle of rotation of the waves to 300.

The collected saw cylinders were installed on the first 1LB linter without grate in the line of the depilation system in the seed preparation workshop of the "Uychi cotton ginning" enterprise according to the scheme in Fig. 2.

In the experiment, Namangan-77, 1st generation selection variety, seeds with initial seed moisture of 8.0%, hairiness of 9.0%, mechanical damage of 3.7%, and dirtiness of 0.3% were used. Experiments were performed for 60 minutes, and samples were collected for analysis every 20 minutes. The performance of the unit was adjusted by the provider, and it was installed at a distance by opening the seed release slot of the machine.



Supplier 1; 2-upper drawer; 3-lower drawer; 4-saw cylinder; 5- working chamber; 6-fixing blade; 7-fluff discharge pipe; 8-outside air intake pipe.

Figure 2. Scheme of installation of saw cylinders on a 1LB columnless linter.

From the analysis in the above sections, the number of revolutions of the metal brush cylinders of the de-pilling machines is given to be different, to check this on the saw cylinder, the following pulleys were prepared Fig. 3. The number of revolutions of saw cylinders was checked in the range from 700 to 1000 rpm. Because the nature of the saw is such that it can split the seed with its teeth. The results of the experiment are presented in Table 1 below.

Figure 3. Pulleys taken for the experiment.

Table 1
Results of depilation of seed on a machine with a saw cylinder

The number of revolutions of the saw cylinder, rev/min	Initial seed		Seed after 1LB linter		Feathering %	Increase in mechanical damage, %	Productivity, kg/h
	Hairiness, %	Mechanical damage, %	Hairiness, %	Mechanical damage, %			
700	9.0	3.7	3.8	4.0	5.2	0.3	660
850	9.0	3.7	4.2	4.5	4.8	0.8	670
1000	9.0	3.7	5.4	4.9	3.6	1.2	690

As can be seen from Table 1 above, the mechanical damage of the seed increased from 0.3% to 1.2% when the rotation speed of the saw cylinder was increased from 700 to 1000 rpm. Feathering decreased from 5.2% to 4.2%. This indicates that the contact of the saw teeth with the sawdust decreases with the increase in the rotation speed of the cylinder. We see that the productivity increases as the saw cylinder rotation speed increases, but we see a decrease in the amount of hair removal from the high productivity, which leads to a decrease in the productivity of the machines in the second stage dehairing process and an increase in the mechanical damage of the seed.

Conclusions

So, by increasing the number of revolutions of the saw cylinder, it is seen that productivity increases up to 10-30 kg/h, the degree of mechanical damage to the seed increases by 0.8-1.2%, and the amount of hair removal decreases, which showed that it is not advisable to increase the number of revolutions of the saw cylinder excessively.

References

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