

IMPACT OF STICKINESS ON YARN QUALITY

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Abstract

Cotton stickiness caused by excess sugars on the lint is a very serious problem for the textile industry - cotton growers, cotton ginners and spinners. During the transformation process from fiber to yarn of the contaminated cotton fibers, i.e. opening, carding, drawing, roving and spinning, the machinery is contaminated to different degrees depending on the processes involved and the locations within the machines. This affects the efficiency as well as the quality of the products obtained.

Previous research demonstrated that, among the sugars involved in cotton stickiness, trehalulose was probably the cause of the worst problems in processing. Thus, the effect of trehalulose throughout the spinning process was investigated for both conventional and compact ring spinning.

Twelve mixes, obtained by mixing sticky cotton with non-sticky cottons, were processed through our short staple spinning line. In addition to the trehalulose content (HPLC determination), H2SD (High Speed Stickiness Detector) readings were obtained. The twelve mixes ranged from 0.013% of the fiber weight to 0.2043% of the fiber weight of trehalulose (HPLC determination) and from 2.5 to 26.4 sticky spots with the H2SD. Among the mixes, some had high H2SD readings and low trehalulose content while others had high H2SD readings and high trehalulose content.

For this set of cottons, there was no correlation between H2SD readings and trehalulose content. Previous work done on 150 bales showed the same lack of correlation, especially in the low-to-moderate H2SD stickiness range. There was a marked evolution of the H2SD readings along the processing line and a strong interaction with the type of contaminant (aphis honeydew vs. white fly honeydew) while there was only a slight evolution of the trehalulose content. It seems that some sticky spots, depending on the sugar composition, are broken into smaller particles in the opening line.

There was no correlation between ends down and HVI (High Volume Instrument) fiber properties for this set of cotton. The mixes with high H2SD readings and low trehalulose content had no more ends down than mixes with low H2SD readings. Mixes with high H2SD readings and high trehalulose content had excessive ends down or could not be processed. Cotton stickiness had a significant detrimental effect on both yarn evenness and yarn hairiness, even for the moderate levels of stickiness tested, but had no effect on yarn tenacity and CSP (Count Strength Product). Trehalulose was a better predictor of processing problems than H2SD. Compact spinning handled moderate stickiness better than conventional spinning, for both spinning performance and yarn quality.