A NEW WAY OF CALCULATING LENGTH UNIFORMITY OF COTTON USING THE HVI FIBROGRAM Md Abu Sayeed Christopher Turner Eric F Hequet Texas Tech University Lubbock, TX

Abstract

Knowledge of within-sample variation in cotton fiber length is essential in predicting yarn quality. High Volume Instrument (HVI) is the most commonly used tool to characterize the within-sample variation in fiber length. Fiber length measurement with the HVI is based on the fibrogram principle. Currently, the HVI uses two approximate points from the fibrogram; the 1.8% span length for upper half mean length (UHML) and the 7.8% span length for mean length (ML). The uniformity index is then calculated as the ratio of ML to UHML expressed as a percentage. These two span lengths represent the longest fibers within a sample, i.e., the shorter fibers are not considered during the measurement of UI%. As an alternative, we propose calculating the uniformity of a sample by considering the whole fibrogram. First, we calculate the area under the measured fibrogram curve. Second, we calculate the area of a hypothetical mono-length fibrogram with a length equal to the maximum length of the fibers. Finally, a new uniformity is calculated as the ratio of the measure of uniformity on 60 commercial-like samples for which regular HVI properties, fibrogram, and yarn quality parameters were measured. We then used partial least squares regression to generate yarn prediction models. The results obtained show that the newly calculated uniformity is as good or better than the traditional UI% measurement to predict yarn quality.