Microbial Census and Evidence for a Direct Temporal Effect of Bale Moisture with Color Grade during Six Months of Storage

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As part of an ongoing investigation, a corroborative study was conducted to follow changes in fiber quality, moisture content, and microbial population in cotton bales with high moisture contents for approximately 1-, 2- and 6-mo storage periods. The target moisture contents were 6% (control/ambient moisture content), 8%, 10%, and 12%. The high target moisture content bales (12%) lost moisture after 6 mo of storage, while bales at the three other moisture levels retained the same moisture content. The distribution of moisture, however, was not uniform in the treatment bales. Uneven distribution, or spottiness, increased with increased moisture treatment. Microbial populations did not change during the 1 and 2 mo of storage, which occurred during the colder winter months. The greatest microbial changes associated with moisture content occurred during the 6 mo of storage, which included warmer spring and summer months. Observations on fiber quality associated with moisture content directly linked color degradation to bale moisture content. Moisture was directly correlated with decreases in reflectance and increases in yellowness. The effect of moisture on yellowness and reflectance increased with exposure (storage duration), and the higher moisture treatments were associated with the greatest decreases in reflectance and increases in yellowness.

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