Bale Marker Evaluation Study

Agricultural & Dyeing Research
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Background:

After cotton is formed into a bale module in the field, the module is given an identification mark. The bale marker must be resistant to water in the event of rain. The cotton is then transported to a gin and the marked cotton is separated and mixed. Mixing spreads small specs of the bale marker throughout many bales of cotton. These bales are taken to a mill and are further blended and mixed before spun into yarn and manufactured into fabric.

Mills are dissatisfied with a new product currently promoted for bale marking is not removable from cotton in the scour/bleach processes, creating a permanent contaminant in cotton fabric.

Objective:

In this study, three different types of bale markers will be evaluated to determine which markers are removable during scour and bleach processes. These markers are:

1. Brand-A-Bale
2. Econo-Mark
3. Sta-Mark

Experimental Approach:

Greige 100% cotton single jersey fabric was cut and sprayed with one of the bale markers. Five pieces of greige fabric were sprayed with one of the bale markers to create a good size dot of each marker. The sprayed fabrics were dried at 250°F for ten minutes in a Despatch oven. The color of each spot was measured using a spectrophotometer and photographed with a digital camera.

To determine if the mark could be removed, a sample of all three sprayed fabrics was subjected to the following preparation baths:

1. Mild Scour using Soda Ash
2. Caustic Scour using Sodium Hydroxide
3. Dye Base Bleach
4. Finish White Bleach

After each procedure, the sprayed fabrics were measured and photographed again for comparison.

Spray Evaluation

All of the bale markers sprayed differently onto the fabric. The Econo-Mark and Sta-Mark were aerosol spray cans and the Brand-a-Bale was poured into a water spray bottle. Each fabric was sprayed flat on a table covered with plastic. The marker was sprayed at least 12 inches above the fabric and held in place for about three seconds to create a large spot in the middle of the greige fabric.

Brand-a-Bale

- Difficult to spray because marker was not in an aerosol container
- High overspray
- Sprayed very finely like a mist
- Wide area of coverage made it impossible for writing
- High penetration through the fabric
- Much dripping when hung to dry
- Sprayed area resembled black ink
- Sprayed area was blotted and allowed extra time to dry

Econo-Mark

- Easiest marker to spray
- Less overspray
- Concentrated spray stream
- Easy to use for writing
- Low penetration through the fabric
- Did not drip when hung to dry
- Sprayed area resembled black charcoal

Sta-Mark

- Easy to spray
- Medium Overspray
- Sprayed very finely
- Wide area of coverage made it impossible for writing
- Medium penetration through fabric
- Some drip occurred when hung to dry
- Sprayed area resembled gray charcoal

Drying

All sprayed fabrics were placed in a Despatch oven to dry at 250°F for ten minutes. No more than three fabrics were placed in the oven to prevent fabrics from adhering to one another. The sprayed area of all the dried fabrics was very stiff. Some fabrics were coarse to the touch due to surface fibers coated with the marker.

Controls

Figure 1: Sprayed fabric controls after drying
(Left to Right: Brand-a-Bale, Econo-Mark, Sta-Mark)

Mild Scour Results

Figure 2: Sprayed fabric after mild scour using soda ash
(Left to Right: Brand-a-Bale, Econo-Mark, Sta-Mark)

Caustic Scour Results

Figure 3: Sprayed fabric after caustic scour
(Left to Right: Brand-a-Bale, Econo-Mark, Sta-Mark)

Dye Bleach

Figure 4: Sprayed fabric after dye based bleach
(Left to Right: Brand-a-Bale, Econo-Mark, Sta-Mark)

Finish White Bleach

Figure 5: Sprayed fabric after finish white bleach
(Left to Right: Brand-a-Bale, Econo-Mark, Sta-Mark)

Conclusions

After subjecting sprayed fabric pieces of each bale marker to mild scour, caustic scour, dye based bleach, and finish white bleach, the only bale marker that could not be removed by either process was Econo-Mark. Brand-a-Bale marker was effectively removed by only the bleaching processes. Sta-Mark was the easiest bale marker to remove because the majority of the stain was removed with scouring and was completely removed with bleaching.