

## Morphology Characterization of Cotton Fibers

### Image Analysis Report 135

#### Sample Description

A slide with two similar cross sections of the same specimen of cotton fibers.

#### Purpose of Analysis

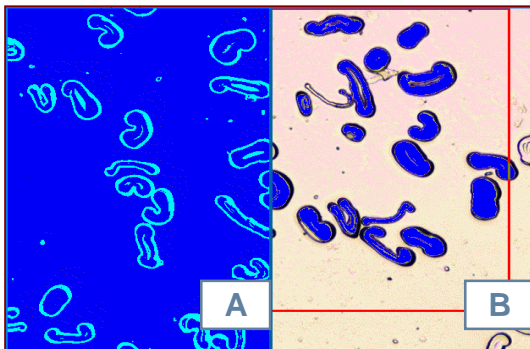
Demonstrate the ability of the Clemex image analyzer to discriminate cross sections of cotton fibers (without lumens) and analyze their surface and shape.



**Figure 1:** Original image (400X, 0.3342  $\mu\text{m}/\text{pixel}$ ).

#### Procedure

Several binary transformations were necessary to obtain a satisfactory representation of the cotton fibers without lumens and to remove artifacts. Zone, Boolean, Transfer, Invert and Fill binary instructions were used in this routine

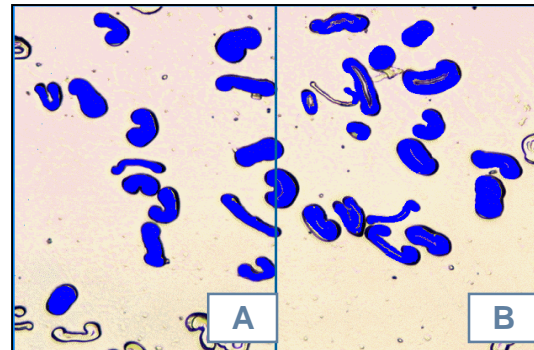


**Figure 2:** a) Cottons and background in blue and outlines, holes and scratches in cyan. b) Rough detection of whole cotton (transfer).

The main difficulty of this application was to fill the small holes and scratches without removing the lumens. Most of the overlapping objects were separated or discarded. However, despite all the precautions some remained overlapping.

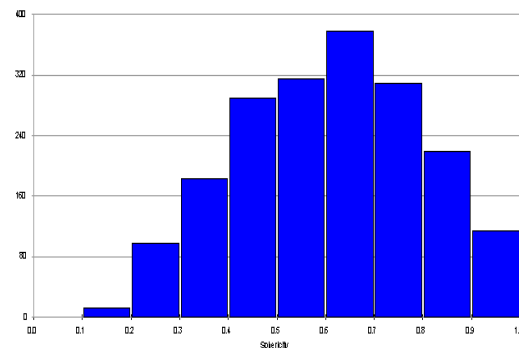
#### Procedure (continued)

A Guard Frame was applied to eliminate all incomplete objects at the edges of each field. Objects that were eliminated were analyzed in the subsequent field since the stage moves in guard frame size steps.



**Figure 3:** a) Cotton fibers are Thickened to fill scratches and holes (Closing & Fill). b) Modified cyan bitplane (Fig. 2a) is combined (Boolean) with a corrected version of the blue bitplane (Fig. 3a) to obtain the final measuring plane.

#### Results Summary



**Figure 3:** Sphericity distribution of fibers after lumens were removed (100 fields: 1915 objects)

#### Equipment

##### Image Analysis

**System:**

Clemex Vision PE

**Camera:**

Sony XC 77CE, B/W

**Microscope:**

Nikon Optiphot-2 (2, 5.0, 10, 20, 40, 100X) with transmitted light

**Stage:**

Motorized marzhauser ek8b-s1 (100 x 75 mm) with auto focus drive