

An Easy Method of the Determination of Raw and Bleached Cotton in Textiles

By W. SIEBER

To the writer's knowledge, there are two methods chiefly used to determine if fabrics contain raw or bleached cotton or both. One method is based on the fact that bleached cotton dyes pink with Congo-red or Benzo purpurine in a cold dye bath, whereas raw cotton does not. The other method is based on the difference in the wetting-out properties of raw and bleached cotton. Bleached cotton is supposed to sink when put in water, raw cotton to stay on the surface. Regardless of the fact that even with pure bleached or pure raw cotton the results with these methods are not absolutely clear, these methods of analyzing fail completely when mixtures of bleached and raw cotton are to be tested.

It is possible to determine the presence of bleached cotton in mixed fabrics by dyeing the sample with certain Basic-dyestuffs without using mordants. So far observations show that it is the Triphenyl-methan-dyestuffs which under certain conditions have the property to dye bleached and raw cotton in different depths. Victoria Blue B has been found especially suited for this purpose. Fuchsin is somewhat

less suitable. Malachit-green on the other hand shows a less marked difference. The different behavior of Victoria Blue perhaps may be explained because it is an Imid-base and highly molecular as containing a Naphthylamine rest. It is also known that Vic-

toria-Blue may be easily fixed with Chrome-oxide-mordants. Methylene-Blue, Safranin, Rhodamine stain raw as well as bleached cotton about in the same manner, so that the dyeings directly obtained by these colors are unsuitable for this kind of determination.

Victoria Blue in an aqueous solution dyes raw cotton deeply, but bleached cotton but very lightly. The process is very simple: 0.1 g. according to the amount of material to be tested, (hard twisted yarn should be untwisted or better still plucked into fiber form) of the material is dyed at a boil with 10cc distilled water and 3% Victoria Blue, figured on the weight of the fiber, for $\frac{1}{2}$ to 1 hour, washed cold with distilled

water until the wash water shows but a faint blue tint, then boiled with distilled water ($\frac{1}{2}$ to 1 minute), again washed in cold water till the water is only very faintly blue and then dried. When the material contains mixtures of bleached and raw cotton, the depth of shade differs according to the amount of bleached and raw fiber present. The dyestuff is only partially exhausted and the dye-bath remains colored.

If the material consists of raw cotton only, relatively little color remains in the dye-bath, as compared with that which is left in case there is bleached cotton. With mixtures of raw and bleached cotton fiber, the remaining dye-bath differs after the dyeing

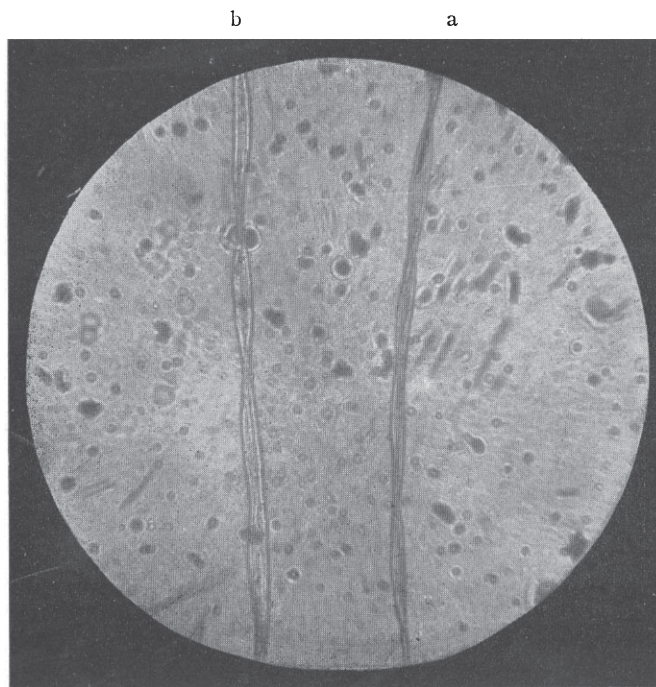


Fig. 1. Cotton fibers: a, unbleached, deeply colored; b, bleached, slightly tinted.

in the depth of color according to the amount of raw and bleached cotton, and that exactly corresponds with the amount of raw and bleached fiber, so that through a colorimetric comparison of the remaining dye-bath it is also possible to determine the percentage. By the same method the result of dyeings may be controlled.

Seen under the microscope, the raw cotton fibers appear differently, according to their state of ripeness, but always to a great extent deeply colored (Fig. 1), while of the bleached fibers the fiber substance proper is but very lightly or not at all tinted. The lumen of the bleached fiber sometimes appears slightly dyed, though in a far lesser degree than the raw fibers. The raw fibers, however, without exception, appear deeply dyed throughout the whole fiber (Figs. 2 & 3). Flax and ramie give similar results. The differences with ramie are especially noticeable.

Whether the deep dyeing of the raw fiber is caused through protoplasmic substances, through fiber oils or cotton wax, or through all three can not

be decided as yet. It may be expected, however, that the described dyeing method will produce valuable disclosures exactly showing the degree to which the fiber is

bleached as well as the chemical structure of the raw and bleached fibers.

If it is desired to start immediately with microscopical observations, the sample can be dyed cold in the usual way directly upon the object carrier with a 1% aqueous solution of Victoria - Blue (Victoria - Blue dissolved in distilled water). After the surplus dyestuff has been removed and the preparation washed with distilled water—it is practical to dye and wash the preparation covered with the glass plate—the raw cotton fibers gradually appear different—especially in proportion to the state of ripeness of the fiber and the extent of non-fiber substances—deeply dyed and always much darker than the bleached cotton fibers. These appear only tinted, especially the fiber lumen, but also parts which are not wholly cleaned. The fiber substance of the bleached fiber itself (the cellulose) is either not at all or only very faintly dyed.

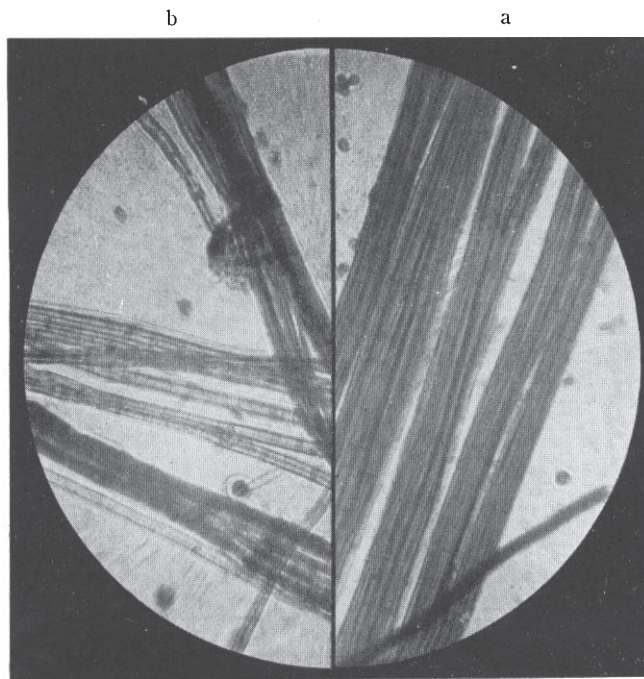


Fig. 2. Ramie fibers: a, unbleached, deeply colored; b, bleached, slightly tinted.

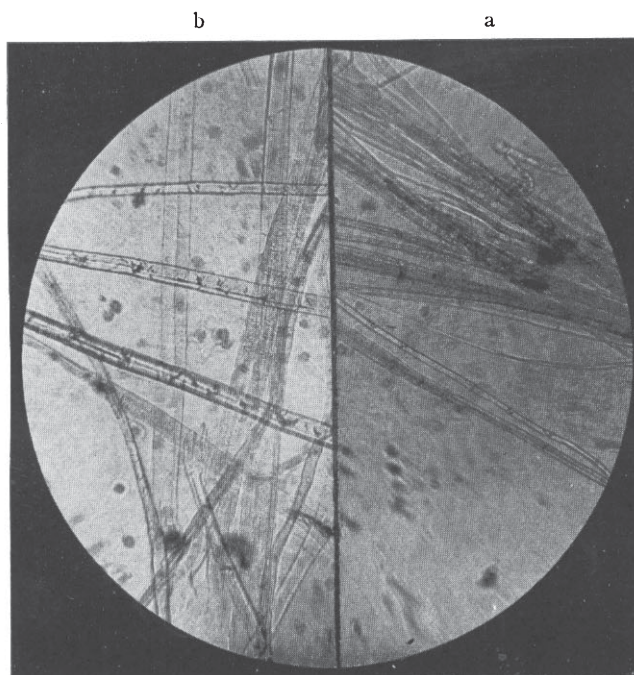


Fig. 3. Flax fibers: a, unbleached, deeply colored; b, bleached, slightly tinted.