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ART OF DECORTICATING AND PREPARING FOR SPINNING THE SUPPLE FIBRE OF FIBROUS PLANTS

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My present invention relates to the art of treating entirely by chemical means and decorticating the fundamental fibres of fibrous plants such as Boehmeria Nivea (tennissesima), generally known as Rameh or China grass and similar fibrous plants, by means of a process, consisting of preliminary chemical treatment and final chemical treatment (which I call Friscoson-process), as described in the following details of operation. These are separated into 8 treatments, lettered from A to H., the first seven items A to G being the preliminary treatment and the last item H. the final treatment. The material to be treated is the bark, which has been stripped from the stem or main-stem of the plant. In all treatments the proportion is one part by weight of bark to 20 parts of liquid.

Treatment A

The raw material is boiled for several hours at boiling point in a solution containing lye and a chemical, having an intensifying action on the lye. For instance I have been uniformly successful when boiling from 2 to 4 hours in a solution of 10 to 15 cc Natronlye of 36 degrees Bé. per liter of water, to which I added 1 to 2 grams of Igepon T. S. as intensifyer. After this treatment the material must be thoroughly rinsed with clean water.

Treatment B

To remove all residue of the lye solution, my process involves the washing in a weak acid solution at a temperature, slightly higher than normal. I have for instance found that the concentration of 3 cc hydrochloric acid per liter of water at a temperature of 40 to 50 degrees gives a satisfactory bath to neutralize the lye, but this must be followed by a thorough rinsing with clean water.

Treatment C

This stage is for the removal of coloring matter and offers thus a preliminary bleaching process. The bleaching is obtained by the use of a reducing agent in conjunction with an alkali, which combination provides a light bleaching action. The chemicals must be removed by thorough rinsing with water. In practice I have obtained the desired results by boiling from 1 to 2 hours in a solution of 2 to 3 grams Hydrosulphite plus 2 grams of calcinated soda per liter of water.

Treatment D

After process C. it is very important and necessary to remove every trace of hydrosulphite and calcinated soda, for which purpose my process requires washing in a very weak acid solution, followed by washing in clean water. In practice I have employed for this stage a solution of 1 cc sulphuric acid per liter of water.

Treatment E

Complete or final bleaching.—To obtain this the material must be washed for several hours in a bleaching medium and then washed in clean water. In practice I have found that a solution of 3 grams of chlorid of calcium per liter of water gives the required bleaching in from 2 to 3 hours.

Treatment F

While the washing with clean water in treatment E removes the chlorid of lye solution roughly, it is necessary to complete the neutralizing by washing in a weak acid solution and again rinsing very thoroughly in clean water. In practice I have found that a solution of 1 cc sulphuric acid per liter of water achieves the purpose of this treatment.

Treatment G

Dechlorinating.—In order to remove any traces of chlorid of calcium, still remaining, as well as the odour of the fore-going treatment, the material is soaked until free from both the chlorid and the odour in a neutralizing solution. In practice I have found it sufficient to soak for from 15 to 30 minutes in a hydrosulphite solution of 1 cc per liter of water. Hereafter the material is again rinsed in cold water.

Treatment H

Final treatment.—After the above treatments the fibre is thoroughly decorticated and is seen floating in the bath of clean water, so that if desired one might count the individual fibres. It is, however, without further treatment impossible to avoid that when this fibre is dried, it packs into bundles of solid masses of fibre. In my experience and knowledge all other processes for preparing fibre for spinning, employ mechanical means to separate the fibres; considerable force has to be employed, with whatever mechanical means are adopted and the result is a serious injury, weakening, breaking and consequent deterioration of the staple to be spun. It was my object to find a chemical process, which would remove the impurities, still adhering to the fibre, which cause the fibres on drying to become a solid mass.

The process I have discovered does this in an

entirely satisfactory manner. Commonly such a process would be called degumming, i. e. removing the materials, which cause the fibres to stick together. They are not strictly speaking, gums, but gelatinous substances, which must be removed. For this purpose I treat the fibre to a dressing or desliming process by dipping it for several hours in a suitable desliming medium, followed by a clean washing to remove all traces of the chemicals and in case there are any resinous materials present, I then wash in a solution containing ether, to dissolve the rosin, after which all ether and other chemicals are thoroughly washed out and the fibres dried in the usual way, being then without any further mechanical process in a perfect condition for spinning. The search for a suitable chemical to dress, degum or deslime the fibre was very extensive, but I was able to discover a suitable solvent and in practice the most entirely satisfactory process was arrived at, by dipping the fibre for at least 3 hours successively in a solution of at least 3 grams of Diastoran G per liter of water, at a temperature not higher than 50 degrees Celsius, followed by rinsing in water. If necessary the fibre is immediately dipped for from 15 minutes to 1 hour in a liquid containing ether, such as spiritus, which operation may be performed cold or warmed.

Explanatory description

The preliminary treatment as described in the operating process above under A to G, which has been worked out from my own experience and research, so as to develop my own process, is new. Although the chemicals named may be known and used in other processes, they have never been used for the purpose for which I invented my process nor am I limited to these chemicals, but I have obtained the best results with them.

At the end of this stage one sees in the bath (if the treatment has been correct and expert) the whole complex of fibres entirely white with a fine gloss and dissected, so that if desired, it would be possible to count each fibre separately. The process is, however, at this stage by no means complete and the objective, the decortication and exposure of the elementary fibres by chemical means has not yet been obtained, because after the washing and during the drying of the bundle of fibres, these again close up to a compact bundle, which can only be separated by means of force instruments, whereby much breakage of the staple and defects in the same occur, which spoil the material. This proves that the bundle of fibres have not yet been freed from certain injurious and deleterious contents, which are the cause of preventing the clean fundamental fibre from being individually exposed in an undamaged and unweakened condition.

Many attempts have been made to separate the bundle of fibres, which has now become a more or less compact mass again by mechanical means. It is obvious that in doing so, the fibres will be damaged, i. e. weakened and more particularly broken, so that the shorter staple is produced. As the successful spinning of these fibres requires a uniform fibre with maximum staple length, I have completed the general decorticating process by a further chemical process in which the fibres, before they are dried and become gummed together are freed from the last remnants of residual matter and when dried after this treatment are in a supple flexible state, ready for spinning and of such nature that the spinning process has a uniform normal course, while for convenience this process is called degumming. The materials removed are not entirely gums and vary according to the fibres being treated. My main invention is the removal by chemical means of these substances, foreign to the fibre and the use of ether is not always required, except when there is a residue of resinous matter, which my process has not entirely removed.

The chemical used, Diastoran G, has given the most satisfactory results, but my process would work equally well with other chemicals, having the same general chemical action. I consider the avoidance of all mechanical treatments and the replacement thereof by purely chemical treatment as of the greatest importance.

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