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# ALIEN PROPERTY CUSTODIAN

## PROCESS OF TREATING FIBROUS MATERIALS, MORE PARTICULARLY BAST FIBRES

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The invention relates to the treatment of fibrous materials, particularly to the production of bast fibres, such as flax, hemp, jute and the like.

It is known that the breaking up of such vegetable materials may be promoted by a treatment with chemical substances of different kinds, e. g. acids or alkalis or alkaline salts such as phosphates, which substances are also used in the chemical retting of flax. It has also been proposed to carry out the breaking up process by applying hydrogen peroxide. By means of this treatment with chemicals the xyloid constituents are attacked in such a way as to be more easily removed in the subsequent mechanical treatment.

According to the invention it is possible to obtain a very good breaking up of the above mentioned raw materials by treating the same in a bath containing hydrogen peroxide together with urea and a buffer substance. It has been found that with the aid of a bath composed in this manner the xyloid constituents may be easily detached from the fibres so that they may be completely removed by a simple mechanical treatment.

If hydrogen peroxide alone is applied, the xyloid constituents will be attacked by the same, but since hydrogen peroxide will decompose very rapidly the results are not satisfactory. The addition of urea, however, exerts a stabilizing influence on the hydrogen peroxide, at least it has been found that the peroxide will decompose much less rapidly while the action on the substances to be removed is far stronger.

The function of the buffer materials most likely resides in that they combine with the acids produced by the oxidation, so that there will be no considerable increase of the acidity.

The urea moreover forms a reserve of ammonia in the form of a compound having a non-alkaline reaction, which compound slowly decomposes; the ammonia produced thereby will replace the ammonia which is formed by the dissociation of the ammonium salts and evaporates from the solution.

The above explanation of the mechanism of the breaking up process is, however, only to be considered as a hypothesis and it is by no means excluded that the effect produced by the combination of substances used according to the present invention is to be ascribed to entirely different causes.

Suitable buffer materials are e. g. phosphates. It is advantageous to employ ammonium phosphate, since because of the lower alkalinity of this salt it will be possible to use a higher phosphate concentration for the same rate of reaction than when using alkali phosphates, while moreover the presence of phosphate is favorable for the reaction. It is sometimes advantageous to use together with the phosphates still other salts having an alkaline reaction, e. g. ammonium carbonate.

The treatment is generally carried out at elevated temperatures, e. g. temperatures of about 90° C.

The duration of the treatment depends on the raw material, the chemicals used and the concentration and temperature of the bath. As a rule a treatment of one and a half hours will be sufficient for obtaining the desired results. If a starting material requires a vigorous treatment, one may either prolong the treatment or raise the concentration and/or the temperature of the bath.

The treatment generally is carried out at atmospheric pressure; it is also possible, however, to work in vacuo or under pressure, this latter particularly if it should be desired to carry out the treatment at temperatures above 100° C.

In order to carry out the process according to the invention one may prepare a bath containing hydrogen peroxide, urea and a buffer substance, immerse the material to be treated in the same and slowly raise the temperature up to the range of temperatures required for the breaking up process. The period before this temperature is attained mainly serves for impregnating the fibrous material with the solution.

It is also possible, however, to impregnate the raw material with one of the above mentioned substances and then place it into a bath containing the other substances.

The material treated according to the invention will contain the xyloid constituents in such a form as to be easily removed by mechanical means. According to the intensity of the chemical treatment either white or light yellow, strong, glossy fibres will be obtained.

In some cases, e. g. when the material still has a greenish tint, it will be advisable to apply an after-treatment for the removal of the remaining coloring substances. This may be effected by processes known for this purpose, e. g. bleaching by the action of the light or by treatment with alcohols or ketones, such as acetone.

The process described above has the great advantage, particularly if ammonium phosphate together with urea, is used as the buffer substance, that the waste bath, which cannot be regenerated

without a great deal of trouble, may be employed at once as a fertilizer or for biological purposes. The cost of the breaking up treatment is greatly reduced thereby and in many cases the process will only be economically possible when the used chemicals are utilized in this way.

The invention will be explained with the aid of the following example without, however, limiting the scope of the invention. Thereby

100 kgs. of flax are immersed in 1600 liters of a bath which contains 0.5% of hydrogen peroxide, 0.5% of ammonium phosphate, 1% of urea and if desired 0.5–1% of ammonium carbonate, calculated on the liquid. In the beginning the temperature of the bath is about 50° C. and during the treatment it is raised to 80–100° C. During the first part of the treatment principally the material will be bleached while the retting process substantially occurs after raising the temperature. The duration of the treatment is from one to one and a half hours.

The broken up fibrous material is now rinsed with hot water to which a little acid is added. Preferably a reducing acid such as hydrogen sulphide is used for this purpose.

After this treatment the xyloid constituents will have become entirely detached from the fibers, so that they may easily be removed by further mechanical treatment of the flax.

The hydrogen peroxide may be added to the bath as such; it may also be electrolytically formed in the bath, in which case the urea will stabilize the hydrogen peroxide thus formed. The urea, if desired, may be formed from ammonia and carbon dioxide, whereby a mixture of urea and ammonia carbonate is produced.

The invention is of importance in the first place in the treatment of bast fibers, such as flax, hemp, jute, ramie and the like. The process, however, has also particular advantages for the manufacture of leaf fibers which up to the present have been produced by a kind of a retting process such as sisal, New-Zealand hemp and Mauritius-hemp.

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