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SYNTHETIC TANNING MATERIAL

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This invention relates to synthetic tans and more particularly to synthetic tans of the sulfonated diarylmethane type and to processes of tanning employing them.

In the past synthetic tanning agents prepared, for example by sulfonation of aromatic compounds such as naphthalene, phenol, etc., and especially tans obtained by condensing these sulfonated compounds with formaldehyde to form diarylmethanes have achieved a considerable success for tanning of leather and particularly combination with other tans such as vegetable and mineral tans. The effectiveness of the synthetic tanning agent is in large part due to its penetrating power in the form of semi-colloidal solutions. It also has a power of solubilizing natural tannings and phlobaphenes. The synthetic tanning agents are usually employed in an acid condition and difficulties are sometimes encountered due to the tendency of the acid to coagulate the proteins of the leather before the tanning agent has had a chance to penetrate sufficiently. According to the present invention the penetrating power of the syntans is increased and their solubilizing action enhanced by mixing them with soluble carbohydrates such as the various kinds of sugars. The action appears to depend on the carbohydrate solubility and various sugars may be used although for commercial purposes normally the cheapest sugar sucrose is used, but other soluble carbohydrates such as dextrose may be employed wherever they are available at an attractive price. The improvement obtained by the addition of carbohydrates is quite remarkable especially when used with natural tans having large amounts of phlobaphenes. It is difficult to determine just exactly why this great increase in effectiveness takes place. Since the particular carbohydrate does not appear to be of great importance, I believe that at least one factor in the improved results obtained with the present product depends on the protective action of the carbohydrate on the proteins of the leather, preventing their premature coagulation by the acid of the syntan. It is possible that other factors are also involved and it should be understood that the invention is in no sense limited to the above theory of action which is presented merely as a probable explanation of the complex action which takes place in the tanning of leather with synthetic tans of the present invention.

The present invention should in no sense be confused with syntans in which sulfonated compounds are condensed with carbohydrates such as cellulose and in which the carbohydrate forms a part of the sulfonated syntan molecule. Such tanning agents have been proposed but while they have certain advantages they do not give the penetration and solubilizing action of the tans of the present invention where the soluble carbohydrate is present as such are not combined in the syntan molecule. The results obtained by means of the present invention are therefore quite different and for most purposes markedly superior to those obtained by syntans in which cellulose has been included in the syntan molecule, and the present invention therefore does not include syntans in which the carbohydrate is chemically combined but is limited to those in which the carbohydrate is mixed with the syntan in solution. Naturally, of course, the solution which is a mixture cannot be investigated in all its details and it is, of course, possible that the carbohydrate may form some colloidal union with the syntan molecule. This is unlikely from the known lack of high reactivity of the carbohydrates but even if such a combination may in some places take place it is of very different nature from any combination in which the carbohydrate is actually chemically condensed into the syntan molecule as the results are markedly different.

The present invention is applicable to any of the known syntans. I find, however, that it is particularly effective with syntans of the sulfonated diarylmethane type and particularly sulfonated dinaphthylmethane type.

When the present invention is used the syntan with its high penetrating and solubilizing action permits the use of cheap natural tans such as quebracho, chestnut, and others, without obtaining a leather of excessive color. Syntans associated with carbohydrates of the present invention are also effective as an after bleach for chrome tanned leather, the action being partly a mechanical removal of deposited impurities and partly a reaction with chromium compounds to form white products.

The action on the pelt of the syntans of the present invention is gentle. There is no tendency to heavy swelling and premature surface tanning so noticeable with syntans of the sulfonic acid type which do not have soluble carbohydrates associated with them and the disintegration of the cellular structure of the hide is practically eliminated.

By reason of the high solvent power, the syntans of the present invention greatly increase the uniformity and speed of tanning with natural

tanning agents and the leather obtained frequently shows a markedly enhanced tensile strength.

Another advantage of the syntans of the present invention lies in their relative insensitiveness to light. Many sulfonated syntans, particularly of the phenolic type, produce a leather which darkens rapidly when exposed to ultraviolet rays. Even leather tanned with the best of the commercially known sulfonated dinaphthylmethane syntans, shows considerable darkening although materially less than in the case of phenolic syntans. Leathers tanned with syntans of the present invention on the contrary darken very slightly if at all when exposed either to sunlight or to artificial ultraviolet light. The influence of the carbohydrate solution is very marked and the permanent light color of the leather obtained is an important advantage of the present invention.

Many syntans tend to form heavily colored precipitates with iron. Syntans of the present invention, particularly those which do not contain phenolic compounds, are entirely free from such effects and the sulfonated dinaphthylmethane syntans of the present invention give no colored reaction with iron compounds usually present as impurities. This is an important feature of the present invention because it permits the tanner to operate without using excessive care in avoiding the contact of the tanning liquors with any iron.

The invention will be described in greater detail in connection with the following specific examples.

Example I

A sulfodinaphthyl methane tan is prepared by sulfonating naphthalene and condensing the product with formaldehyde. Any known procedures for obtaining this compound may be used such as for example described in U. S. Patent No. 1,336,759 to Schmidt, or the light-colored product described in Example I of my copending application Serial No. 715,164, filed March 12, 1934. The tan thus produced is admixed with approximately 50 pounds of sugar per thousand pounds of solution and 40 pounds of a suitable salt may be added, for example, sodium chloride; or if the syntan is prepared by condensing a sodium naphthalene sulfonate after acidification with sulfuric acid the sodium sulfate produced may replace the corresponding amount of salt. The tan is adjusted to acidity of about pH 1.3, the acidification being preferably effected by means of an organic acid such as formic or maleic acid in order to prevent the presence of undue quantities of strong mineral acid.

The syntan may then be used in tanning, for example, by mixing 15 parts of sumac extract, 6 parts of the syntan, and 4½ parts of salt with enough water to make up 150 parts by volume. When this solution is used for tanning 20 to 25 parts by weight of sheep skin skivers by tumbling for 2 hours, washing in running water and drying on a board, grain side up, a very light colored, practically white leather is obtained with no substantial disintegration of cellular structure of the hide and the color is materially lighter and less sensitive to light than leather tanned with a standard commercial disulfodinaphthylmethane syntan.

Example II

Syntan is prepared as described in Example I and 3 parts by volume are diluted with 100 parts of water and used to bleach chrome tanned goat skins, the amount of leather being about 20 to 25 parts by weight for each part by weight of syntan. The leather is tumbled for 1 hr. in the solution, washed in running water and dried on a board, grain side up. The leather shows a greater bleaching than the same leather treated with the same concentration of similar commercial syntan. The skins show no corrosive action or deterioration of the leather, and on the contrary the grain of leather is improved.

Example III

A syntan is prepared by sulfonated phenol, condensing with formaldehyde, admixing an amount of sugar and salt corresponding to Example I and adjusting to proper acidity. When used to tan sheep skin with sumac in the same proportions as described in Example I, a very light leather is obtained, considerably lighter than a standard commercial dioxydisulfodiphenylmethane. The leather also shows less corrosive effect and practically no disintegration of the cell structure of the leather. The leather also shows greater resistance to darkening with ultraviolet light and less sensitiveness to iron.

What I claim is:

1. A tanning agent comprising a syntan of the sulfonic acid type and a soluble carbohydrate mixed therewith.

2. A tanning agent comprising a syntan of the diarylmethane sulfonic acid type admixed with a soluble carbohydrate.

3. A tanning agent comprising a syntan of the dinaphthylmethane disulfonic acid type admixed with a soluble carbohydrate.

4. A method of tanning leather which comprises subjecting the leather to a tanning solution containing a syntan of the sulfonic acid type and a soluble carbohydrate.

5. A method of tanning leather which comprises subjecting the leather to a tanning liquor containing a syntan of the sulfonated diarylmethane type and a soluble carbohydrate.

6. A method of tanning leather which comprises subjecting the leather to the action of a tanning liquor containing a syntan of the dinaphthylmethane disulfonic acid type and a soluble carbohydrate.

7. A method of tanning leather which comprises subjecting the leather to a tanning liquor containing a vegetable tanning agent, a syntan and a soluble carbohydrate.

8. A method of tanning leather which comprises subjecting the leather to a tanning liquor containing a vegetable tanning agent, a syntan of the sulfonic acid type and a soluble carbohydrate.

9. A method of tanning leather which comprises subjecting the leather to a tanning liquor containing a vegetable tanning agent, a syntan of the diarylmethane sulfonic acid type, and a soluble carbohydrate.

10. A method of tanning leather which comprises subjecting the leather to a tanning liquor containing a vegetable tanning agent, a syntan of the dinaphthylmethane disulfonic acid type and a soluble carbohydrate.

11. A method of bleaching chrome tanned leather which comprises subjecting the leather to the action of an aqueous solution containing a syntan and a soluble carbohydrate.

12. A method of bleaching chrome tanned leather which comprises subjecting the leather to the action of a water solution containing a

syntan of the sulfonic acid type and a soluble carbohydrate.

13. A method of bleaching chrome tanned leather which comprises subjecting the leather to a water solution containing a syntan of the diarylmethane sulfonic acid type and a soluble carbohydrate.

14. A method of bleaching chrome tanned leather which comprises subjecting it to a water solution containing a syntan of the dinaphthylmethane disulfonic acid type and a soluble carbohydrate.

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