

SUSCEPTIBILITY OF INDIAN LEATHER FOR FUNGAL ATTACK

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Fungi play an important role in the degradation of leather and service leather goods. In the present study 20 types of Indian tanned leathers have been tested for their resistance/susceptibility against mycobial attack. 9 common species i.e. *Aspergillus niger*, *A. flavus*, *A. fumigatus*, *A. nidulans*, *A. terreus*, *A. sulphureus*, *Penicillium cyaneum*, *Paecilomyces varioti* and *Mucor* sp. were isolated from various types of leather samples. E. I. tanned (goats & cows) and pure vegetable upper leathers were found highly susceptible and supported very good fungal growth. Vegetable chrome, full chrome B, and blue chrome tanned (buffalo) were relatively resistant and chrome tanned split (cows) leather was found most resistant.

Leather is a biological product and is of great economic use. In spite of the rapid development in technological aspects of the leather industry in India, the microbial hazards are not being given adequate attention. Even the best possible quality of leather can be attacked by micro-organisms¹. Various conditions, such as high moisture content of leather and temperature, may favour the growth of different micro-organisms which cause deterioration². The process of microbial deterioration involves a succession of attack by different kinds of micro-organisms. Among various types of leathers, vegetable tanned is generally assumed to be most susceptible to fungal attack than chrome tanned leather, but recently, leather goods exported by India have deteriorated by fungal attack.

Therefore, it was thought desirable to test the susceptibility of variously tanned leathers, prior to its use in manufacture of finished products. In the present studies various types of indigenous leathers viz. chrome retanned, full chrome, pure vegetable (upper), vegetable chrome, full chrome (light), semichrome, full chrome, A,B,C,D vegetable tanned (sole), East India (E.I.) tanned (goats) E.I. tanned (cows), zug grain chrome upper (cows), chrome tanned (upper) cows, chrome tanned split leather (cow), blue chrome tanned (buffalo), full chrome upper (cows), chrome tanned (vegetable-synthetic) goats, vegetable retanned (buffalo) were selected to test their resistance against mycobial degradation.

The different types of leather samples were obtained from various tanneries viz., Wasan & Co. (Tanneries) Bodla, Dayalbagh Co-operative Chrome Leather Tanneries Ltd., Dayalbagh and Institutes viz. Govt. Leather Institute, Nunihai and U.P. State Leather Development & Marketing Corpn. Ltd., Hing Ki Mandi, Agra. Samples were stored in sterilized polythene bags and brought to the research laboratory for further studies.

The resistance against fungal attack was studied by the Tropic room exposure test² at high relative humidity (85%) and Mildew susceptibility test² methods. Fungi growing on them were isolated using standard mycological methods and identified.

RESULTS AND DISCUSSIONS

In the above studies 9 most common and frequent species were recorded Table 1. A perusal of the results reveal that *Aspergillus niger*, *A. flavus* and *A. fumigatus* were most frequent and common. The variable number of fungal species was noted on different types of leathers. Maximum species were found on E.I. tanned goats and cows and pure vegetable upper leathers. Vegetable chrome, full chrome B and blue chrome tanned (buffalo) were relatively more resistant. The chrome tanned split cow's leather was found most resistant and did not support the fungal growth.

Aspergillus nidulans was recorded from E.I. tanned (goats), E.I. tanned (cows), *A. sulphureus* from E.I. tanned (goats), zug grain chrome upper (cows), and *A. terreus* from E.I. tanned (goats), E.I. tanned (cows) and zug grain chrome (upper) leathers only. Similarly, *Paecilomyces varioti* was isolated from pure vegetable (upper), full chrome upper (cows) *Penicillium cyaneum* found growing on chrome retanned, full chrome, pure vegetable (upper), semi chrome, full chrome C, E.I. tanned (cows), chrome tanned upper (cows), chrome tanned (Veg. synth.) goats, and *Mucor* Sp. from full chrome D and vegetable sole leathers. These results clearly indicate that indigenous leathers commonly used for making leather goods are highly susceptible to fungal attack.

TABLE I
FUNGAL GROWTH ON DIFFERENT TYPES OF LEATHER SAMPLES

Leather types	Mycorganisms									Total species
	<i>A. niger</i>	<i>A. flavus</i>	<i>A. fumigatus</i>	<i>A. nidulans</i>	<i>A. sulphureus</i>	<i>A. terreus</i>	<i>P. cyanum</i>	<i>Pae. varioti</i>	<i>Mucor</i> Sp.	
Chrome retanned	—	+	+	—	—	—	+	—	—	3
Full chrome	+	+	+	—	—	—	+	—	—	4
Pure vegetable (upper)	+	+	+	—	—	—	+	+	—	5
Vegetable chrome	+	+	—	—	—	—	—	—	—	2
Full chrome (light)	+	+	+	—	—	—	—	—	—	3
Semi chrome	—	+	+	—	—	—	+	—	—	3
Full chrome A	+	+	+	—	—	—	—	—	—	3
Full chrome B	—	+	+	—	—	—	—	—	—	2
Full chrome C	+	+	+	—	—	—	+	—	—	4
Full chrome D	+	+	+	—	—	—	—	—	+	4
Vegetable tanned (sole)	+	+	+	—	—	—	—	—	+	4
E. I. tanned (goats)	+	+	+	+	+	+	—	—	—	6
E. I. tanned (cows)	+	+	+	+	—	+	+	—	—	6
Zug grain chrome (upper)	—	+	+	—	+	+	—	—	—	4
Chrome tanned (upper) cows	+	+	+	—	—	—	+	—	—	4
Chrome tanned split (cows)	NO GROWTH									
Blue chrome tanned (buffalo)	—	+	+	—	—	—	—	—	—	2
Full chrome upper (cows)	+	+	+	—	—	—	—	+	—	4
Chrome tanned (veg. synth.) goats	—	+	+	—	—	—	+	—	—	3
Vegetable retanned (buffalo)	+	+	+	—	—	—	—	—	—	3

'+' Fungal growth
'—' No fungal growth

A-Aspergillus
P-Penicillium
Pae-Paecilomyces

Literature on the subject also indicate that the deterioration of various kinds of leather has been brought about by fungi and bacteria. Leather goods used in tropical climate are generally deteriorated by large number of fungi i.e., *Aspergillus*, *Penicillium* *Paecilomyces* species³. Similarly *Aspergillus niger*, *A. flavus*, *A. fumigatus*, *Penicillium* Sp. and *Paecilomyces* Sp. were isolated from various service leather goods⁴. It is obvious from the present studies that similar species of *Aspergillus*, *Penicillium* and *Paecilomyces* were frequent and largely encountered on most of the leathers. Thus there is a need for improvement in the preservative quality of leather to check its deterioration.

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