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Syntans for Versatile Leathers



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Leather Chemicals

- **Chemical input in final value of leather is about 15-25%**
- **The complex physical and chemical interactions in leather making makes the leather chemical research extremely challenging**
- **Leather chemicals are produced by batch or semi-batch processing**
- **A quantum increase in the chemical needs of Indian leather industry is likely**

Classification of Chemicals used in Leather Production

- **Bulk Chemicals** (Needed in Large Volumes, Discharged after performing the role)
 - Lime, sulfide, ammonium salts, NaCl, Formic acid, sulfuric acid, Sodium formate and bicarbonate, NH₃, IPA
- **Performance Chemicals (Tanning & retanning)** – Property Addition
 - BCS, Vegetable Tannins, Dyes, Retanning syntans, Fatliquors
- **Performance Chemicals – (Finishing)**
 - Dyes and Pigments, Binders, Top coats, Waxes, Silicones

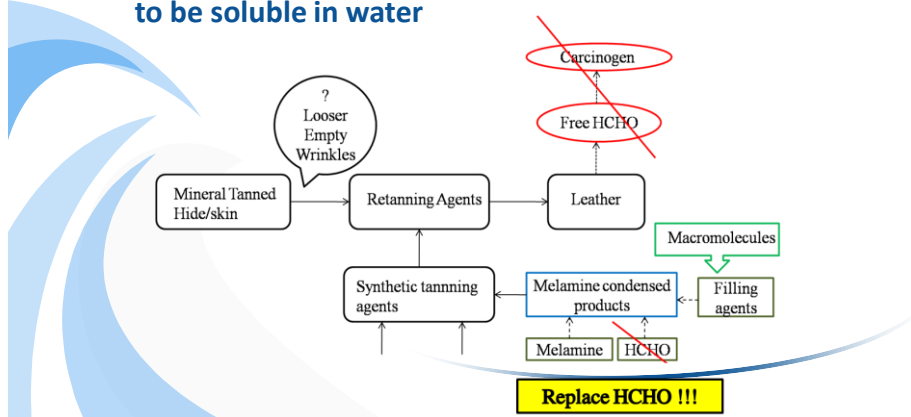
Choice of Performance Chemicals

- Products with high performance & exhaustion Characteristics
- Near zero waste materials – leading to Near Zero Emission methods
- Bio-Treatability criterion
- Alternatives to constrained/Polluting/Toxic materials
- More function with less Offer: Reduction of chemical inputs
- Compliance to eco bans on compounds (Free Formaldehyde, chromium(VI), etc.)

Syntan development strategy

Requisite properties for the replacing compound

- Should have functional groups that can react with the amino groups of melamine
- Melamine-crosslinked product with hydrophilic groups to be soluble in water



Chrome-Melamine Syntan

- Formaldehyde free chrome-melamine syntan
- Green in colour
- Solubility: Good
- pH of 10% solution ~ 5.0
- Active matter: Above 90%
- Cr_2O_3 content: 12-14%
- Photostability: Good
- Application trials: For tanning/rechroming/retanning



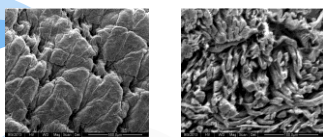
Application Studies



Chrome Tanning Trials

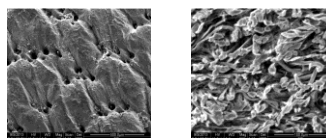
– Pickled Method

- Ts – 114°C
- Cr₂O₃ of leather- 3.25%



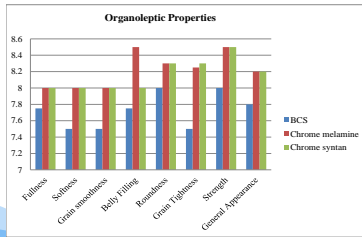
– Pickle-Less Method

- Ts – 112°C
- Cr₂O₃ of leather – 3.75%

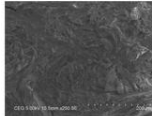
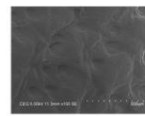
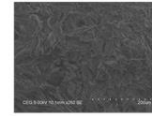
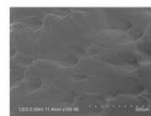
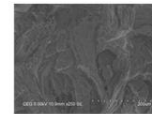
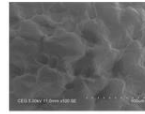


Tanning system	Tensile strength (kg/cm ²)	Tear strength (kg/cm)	Grain crack resistance	
			Load (kg)	Distension (mm)
Pickled Pelt	195± 2	36± 1	26.0±4	8.0±0.3
Pickless	230± 3	39± 2	28.5±1	8.3±0.1
UNIDO Norms	120	20		

Rechroming Trials on Cow Sides



Strength Properties	Commercial chrome syntan	Chrome melamine syntan	Commercial BCS
Tensile Strength (kg/cm ²)	220	210	190
Elongation at break (%)	60	52.4	52.8
Load at grain crack (kg)	38	41	40
Distention at grain crack (mm)	9.1	8.7	8.7



Conclusions

- Filling type syntans - primarily manufactured using formaldehyde condensation intermediates
- Chrome-melamine syntan prepared with formaldehyde free intermediates
- Can be used in different stages of leather processing
- Has multiple functionality like tanning, rechroming and post tanning

Acknowledgement

Supra institutional project STRAIT for the funding under the 12th Five year Plan



Thank You

A decorative graphic for 'Thank You' featuring the words 'Thank You' in a pink, cursive font. The text is surrounded by a green vine with leaves and a pink flower.