

Zschimmer & Schwarz Group

GREEN CHEMISTRY FOR SUSTAINABLE LEATHER PRODUCTION

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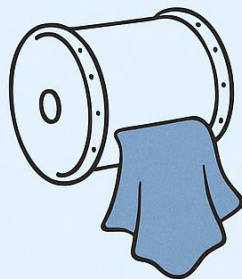
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Background and introduction – the challenge on chrome and GDA

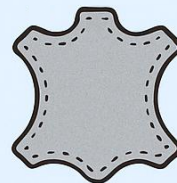
- ▶ Chrome tanning and glutardialdehyde well established but with challenges
- ▶ Market still demands sustainable alternatives in line with performance, environmental and cost requirements
- ▶ Several alternatives have been developed in the last years

CHROME TANNING



- Cr(VI)-Oxidation
- Regulation on discharge
- Consumer perception
- Bio-degradability

GLUTARALDEHYDE TANNING



Toxic and sensitizing



Specific odor and handling challenges



Limited hydrothermal stability



Search of alternatives in the market ongoing

- ▶ Several alternatives from the chemical industry available with partial weaknesses
 - Poor storage stability
 - Challenges on wetting back
 - Inconsistent leather quality
 - Fluctuating physical properties (softness, tear resistance)
 - Disadvantage in cost

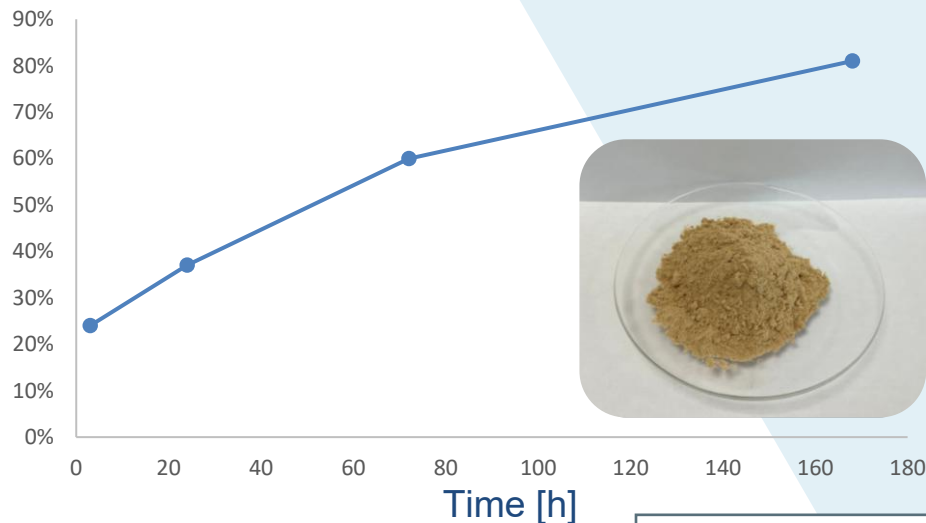
→ New alternatives still being evaluated



New development as alternative to GDA and chrome

- ▶ Powder product: ~100 % active matter
- ▶ 85 % renewable (DIN EN 16785-2)
- ▶ Organic mixture:
Free of metals, aldehydes, bisphenols, and other harmful substances
- ▶ Good biodegradability
- ▶ Easy user-friendly application
 - High solubility
 - No lumping
 - Good penetration into leather

Biodegradability – OECD 301 F



COD: 1076 mg/g
BOD5: 213 mg/g



Easy production process even without re-tanning

Tanning				
Quantity	Product	C°	Time	pH
75 %	Pickle (bovine), 8° Bé	25		2.9
0.5 %	PRE-FATLIQUOR		20 min.	
10 %	NEW TANNING AGENT		60	
10 %	NEW TANNING AGENT		90	
0.5 %	Sodium bicarbonate		30	3.5
1 %	Sodium bicarbonate		30	4.7
Over night, interval 3 min / 0.5 h			30	4.1
Next morning: Drain the float, horse up, sam, shave to 1.3 mm				

Fatliquoring and dyeing				
Quantity	Product	C°	Time	pH
100 %	Water	35		
0.5 %	Sodium formate		15	4.3
2 %	Dye		60	
100 %	Water	45	10	
12 %	FATLIQUOR 1			
3 %	FATLIQUOR 2		90	
1 %	Formic acid, 75 % (1:5)		20	
1.5 %	Formic acid, 75 % (1:5)		30	3.6
Wash, horse up, set out, vacuum dry 1 min. 45 °C				

No re-tannage required - Up to two 2 days faster process



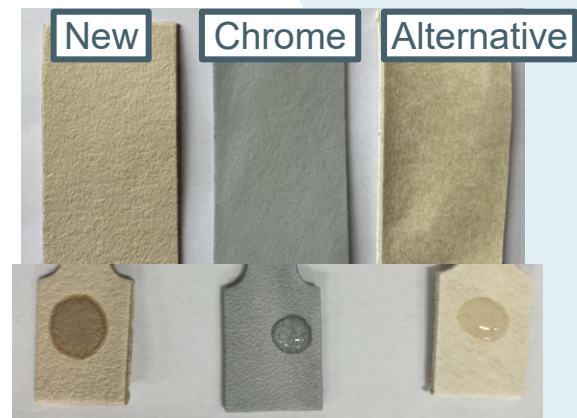
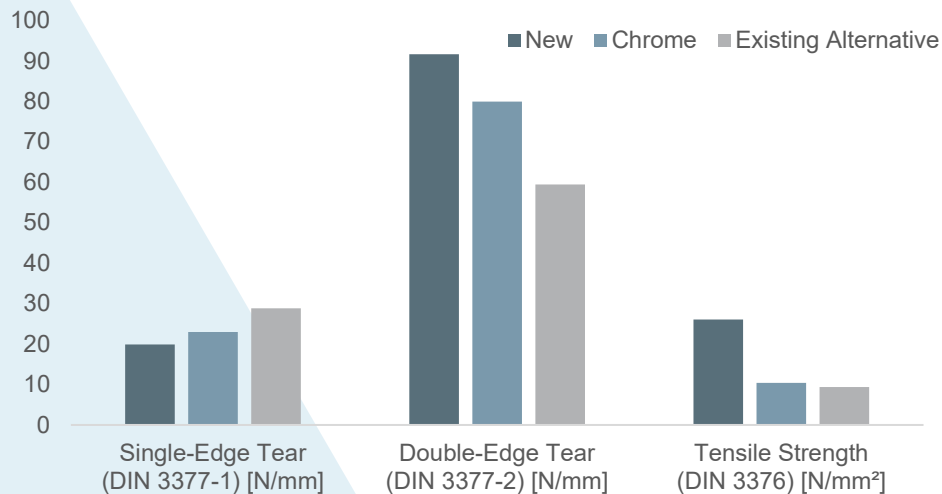
Very good physical properties in crust performance

Parameter	New system
Shrinkage temperature	75 °C
Bisphenol A/F/S	Absent
Heat yellowing 120 °C / 6 h	4
Heat yellowing 100 °C / 5 d	3.5
Sun test 72 h	3
Fogging grav.	0.9 mg
Fogging refl.	89 %

- ▶ Excellent sammying and shaving properties
- ▶ Good fastness values
- ▶ Low fogging
- ▶ Strong stabilization: soft leathers possible without re-tannage



Good tanning properties compared to existing alternatives



Water drop rewetting test (after 10 seconds)

Parameter	New	Chrome	Existing alternative
Shrinkage temperature	75	84	65
Shrinkage [%]	1.22	5.5	4

- ▶ 1 h tanning process no after-treatment (no dye, no fatliquor, no fixation)
- ▶ Great re-wetting behavior



Versatile tanning product: Summary and outlook

► New tanning system developed

- Consistent leather quality for bovine / sheep / goat
- Suitable for all current leather articles
- Good physical properties incl. light / heat resistance
- Depending on article no re-tanning required (up to 2 days time saving)
- Seamless integration into existing tannery workflows
- Good storage stability (stable after several months)
- Good wetting back behavior of dried crust

► Learn more with us about the new system

► We remain committed to ongoing innovation & sustainability



Thank you for your kind attention.

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