

CHROMING OF PELT UNHAIRD USING SODIUM ALUMINATE

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Lime free unhairing of hide [1] using sodium aluminate instead of lime allows a significant decrease of ammonia salts consumption required for a qualitative neutralization [2] of the unhaird pelt. Due to the different properties of the pelt unhaird using sodium aluminate comparing with conventionally produced one, a necessity to investigate pickling and chroming processes peculiarities has arisen.

Salted cowhide after soaking and washing was cut into pieces 5x10 cm and experimental series were prepared from these pieces. The unhairing and neutralization-bating of the unhaird samples were carried out as follows:

- unhairing-opening up of derma (% from fresh hide mass): H₂O 100%, temperature 20–22°C, NaAlO₂ 2%, Na₂S(100%) 1.5%, 2 hours run continuously, NaOH – 0.5%, 2 hours run continuously, later 5 min. every 3 hours, total duration 24 hours.
- neutralization-bating (% from the unhaird pelt mass): (stage B) H₂O 40%, temperature 34–36°C, (NH₄)₂SO₄ 2%, 1 hour run continuously; (stage A) H₂O 100%, enzyme preparation *OROPON ON2 (TFL, Switzerland)* 0.15%, 1 hour run continuously (experimental process).

The control neutralization adding extra (NH₄)₂SO₄ 1.5% into the stage B (conventional deliming-bating) was carried out as well and indexes of the pelt were established (Table 1).

Table 1 – Indexes of pelt after neutralization-bating process

Index	Control process	Experimental process
PH of solution after process	8.76	9.04
PH of pelt after process	8.96	9.12
Shrinkage temperature of neutralized-bated pelt, °C	65.3	65.2
Amount of removed collagenous proteins during process, g/kg of pelt	0.34	0.33

Therefore, the main difference is the pH of pelt after the neutralization: the less amount of used ammonia compounds led to slightly higher pH of the pelt.

The pickling of neutralized-bated (according to experimental method) and washed samples was executed according two variants (% from the unhaird pelt mass): H₂O 40%, temperature 19–21°C, NaCl 5.5%, 15 min. run continuously;

NaHCOO 1% (control) or CH₃COOH 0.5% (experimental), 20 min. run continuously; H₂SO₄ (96%) 0.5%, 15 min. run continuously; H₂SO₄ (96%) 0.5%, 15 min. run continuously; H₂SO₄ (96%) 0.5%, 5 hours run continuously.

The chroming was performed in pickling solution as follows (% from the unhaired pelt mass): *Chromal* ("Alwernia" S.A., Poland) 1.5 % (counting to Cr₂O₃), temperature 19-21°C, duration 12 h, run continuously; (control) *Neutrogene MG-120* (*Codyeco s.p.a.*, Italy) 0.25%, duration 2 h, run continuously; *Neutrogene MG-120* 0.25%, duration 2 h, run continuously; (experimental) *Neutrogene MG-120* 0.25%, duration 2 h, run continuously; *Neutrogene MG-120* 0.25%, duration 1 h, run continuously; *Neutrogene MG-120* 0.25%, duration 1 h, run continuously; later for both variants H₂O 40%, temperature 55°C, duration 1 h, run continuously.

Table 2 – Indexes of chroming process and of chromed pelt

Indexes	Pickling			
	control		experimental	
	Chroming			
	control	experimental	control	experimental
PH of chroming solution after process	4.01	4.73	3.90	4.50
PH of chromed pelt	3.91	4.05	3.58	3.96
Shrinkage temperature, °C	113	111	106	111
Cr ₂ O ₃ amount in chromed pelt, %	4.02	4.15	3.62	3.58
Cr ₂ O ₃ in separate layers, %	upper	4.54	4.66	4.41
	middle	3.52	3.01	3.23
	lower	4.42	5.32	4.17
Cr ₂ O ₃ exhaustion, %	85.2	98.3	76.5	89.4

The highest level of chromium compounds in leather and highest exhaustion of chromium is reached after control pickling and experimental chroming (adding more the material which increases basicity) but the shrinkage temperature is not highest and chromium is not distributed evenly in layers (Table 2). Authors suppose that optimal is to apply the conventional pickling and the conventional chroming for the pelt unhaired using sodium and neutralized using lowered ammonia sulphate amount.

Acknowledgement. Research was carried out according to Research teams' project MIP021/2014 BEKALCE ODA funded by Research Council of Lithuania.

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