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No.CLRI/TAN/NKC/Sathyam/May/2005

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M/s Sathyam Agencies
19C/1, Mukil Complex II Floor
Kumaragurubaran Street
Loturs Agency (TVS) Backside, Sathy Road
ERODE – 638 003.

KIND ATTENTION : Mr.S. MURTY SATHIYARAJU

Sir,

The products submitted by you – viz. the Lime substitute and tanning agent were assessed for their process efficacy and environmental aspects. Enclosed please find herewith our report.

Thanking you,

Yours faithfully


(N.K. CHANDRA BABU)

Encl: as above

**REPORT OF EVALUATION OF AUXILIARIES OF
M/S SATHYAM AGENCIES**

By



**Central Leather Research Institute
Chennai**

REPORT OF EVALUATION OF AUXILIARIES FROM M/S SATHYAM AGENCIES

Preamble

M/s Sathyam Agencies had developed two products for replacing Lime and BCS.

Experiment

Three experiments have been carried out for evaluating the products. The details of the experiments are given below.

Experiment 1: Evaluation of Lime Substitute for Cowhides

Two wetsalted cowhides have been taken. They are desalted.

The hides were cut along the backbone. The left halves were taken for experiment and the corresponding right halves were taken for control.

The desalted hides are washed with 300% water for 10 minutes.

Then the hides were soaked in 300% water for overnight in pit.

Liming of the control case is as follows.

(The raw weight of the control case – two sides – was 8 Kg)

Water 300%

Lime 5%

Sodium Sulfide 3%, Liming was carried out in pit for 1 day. The sides were unhaired. The lime liquor was analysed for pollution load.

Then the sides were relimed as follows.

Water 300%

Lime 5%, Reliming was carried out in pit for 3 days with intermittent handling (twice a day).

Then the sides were fleshed. The fleshed weight was found to be 7 Kg.

Then the sides were relimed as follows.

Water 300%

Lime substitute 1%, Reliming was carried out in pit for 3 days with intermittent handling (twice a day).

Then the sides were fleshed. The fleshed weight was found to be 14 Kg.

The pelts of Control and Experiment were delimed and pickled as follows.

The fleshed pelts were washed in Drum with

Water 150% for 30 minutes

And delimed in Drum with

Water 150%

Ammonium Chloride 1.5% for 45 minutes

and treated with Bate 1% for 30 minutes and the pelts were washed again with 150% water for 20 minutes.

The pelts were pickled in drum with

Water 100%

Salt 10%

Formic acid 1% - for 10 minutes

Sulfuric Acid 1% - 15'+15'+30 minutes

The pH was checked to be 3.0.

The pelts were chrome tanned in 50% volume of the pickle bath,

BCS 4% - 30 minutes

BCS 4% - 30 minutes

+ Water 50% - 40 minutes

+ Sodium formate 1% - 20 minutes

+ Sodium Bicarbonate 1% - 15'+15'+30' minutes.

The pH was checked to be 3.8.

The Wetblue materials were assessed and tested for Chrome content (Layer wise).

The tanning of Control case is given below.

(The pickled weight was noted to be 1.1 kg and the tanning chemicals were offered on the basis of 1.25 times of pickled weight)

Chrome tanning was carried out in 50% volume of the pickle bath,

BCS 4% - 30 minutes

BCS 4% - 30 minutes

+ Water 50% - 40 minutes

+ Sodium formate 1% - 20 minutes

+ Sodium Bicarbonate 1% - 15'+15'+30' minutes.

The pH was checked to be 3.8.

The leather was assessed tested for Shrinkage temperature. The chrome wastewater was analysed for pollution parameters.

The tanning of Experimental case is given below.

(The pickled weight was noted to be 0.92 kg and the tanning chemicals were offered on the basis of 1.25 times of pickled weight)

Chrome tanning was carried out in 50% volume of the pickle bath,

BCS substitute 4% - 30 minutes

BCS substitute 4% - 30 minutes

+ Water 50% - 40 minutes

+ Sodium formate 1% - 20 minutes

+ Sodium Bicarbonate 1% - 15'+15'+30' minutes.

The pH was checked to be 3.8.

The leather was assessed and tested for Shrinkage temperature. The wastewater was analysed for pollution parameters.

Results

The results and observations of each experiment are given below.

Experiment I

The pelt yield in both control and experimental cases has been found to be 88%. The degree of swelling and plumping was found to be better in the case of control. The pelts of the experiment were found to be less slippery. The wetblue leathers were assessed. It was found that the leathers of experimental case were found to be deficient in roundness and tightness compared to control case. Colour of the experimental leathers was more uniform.

The wastewater of liming in both cases had been analysed. The results are presented as Table 1.

Table 1: Characteristics of Liming wastewater

	Characteristics		
	TDS (ppm)	TSS (ppm)	COD (ppm)
Control	22950	18687	24985
Experiment	13293	3872	21862
Reduction	42%	79%	13%

The chrome content of the leathers was also assessed. The leathers were split into three layers and the chrome content of the layers was independently estimated. The results are presented as Table 2.

Table 2: Layer wise Chrome content

	Characteristics				
	Grain	Middle	Flesh	Mean	SD
Control	2.31	2.32	2.34	2.32	0.015
Experiment	2.54	2.20	1.95	2.23	0.296

Experiment 2

The pelt yield in both control and experimental cases has been found to be 88%. The degree of swelling and plumping was found to be better in the case of control. The pelts of the experiment were found to be less slippery. The wetblue leathers were assessed. There was no impairment in quality of wetblue in the case of experiment compared to control.

The chrome content of the leathers were estimated and it was found that the chrome content in the case of experiment is lesser by 24.26% compared to control. The results are presented as Table 3.

Table 3: Chrome content

	Chrome content (% Cr ₂ O ₃)
Control	3.05
Experiment	2.31
Difference	- 24.26%

Experiment 3

In this the variation is accomplished in tanning. Whereas in control case BCS was administered, tanning substitute (auxiliary) was administered in the case of experiment.

The tanned leathers were tested for shrinkage temperature. It was found that the experimental leathers were of the shrinkage temperature lesser than control by 30.48%.

The results are presented as Table 4.

Table 4: Shrinkage Temperature

	Shrinkage Temperature (°C)
Control	105
Experiment	73
Difference	- 30.48%

Conclusion

Conclusively the two products viz. Lime substitute and Tanning agent were evaluated and found that these products have the potency in the respective application avenue. The minor short-comings such as inadequate chrome distribution in the case of Liming auxiliary and inadequate shrinkage temperature in the case of Tanning agent need to be addressed. Further understanding of the chemistry of the products and the reaction mechanism of the products with the pelt shall be pondered closely over and improvements shall be effected.