

# Further handle modification of bio-polished fabrics

*Effect of formulated polysiloxanes on the feel and handle of bio-polished cotton and blended fabrics.*

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Cellulase enzyme treatment of cellulosic textiles is performed with the objective of achieving a durable improvement in handle and feel. Although considerable data is available on enzyme-treated cellulosic fabrics, hardly any information is available on the effects of subsequent polymeric finishes. This article details the effect of three polymeric finishes - one conventional aminosilicone emulsion and two modified polysiloxanes - on cellulase-treated cotton, polyester/cotton and polyester/viscose blended fabrics using the Kawabata Evaluation System (KES).

Three fabrics - cotton (50s x 50s - 136 x 80), polyester/cotton (65/35) and polyester/viscose (65/35) blended, scoured, bleached - were 'bio-polished' with cellulase enzyme (Cellusoft L, Novo-Nordisk) at a concentration of 0.5% w/w at pH 5.5 and temperature of 52°C for 45 min. in a jet dyeing machine. Subsequently, the fabrics were padded with 50 g/l conventional aminosilicone or two modified polysiloxanes - 12 g/l Sarafinish 162 (Conc.) or 12 g/l Supercone 4000 (Sarex Overseas - India)

- dried and cured at 150°C for 45 sec in case of cotton and 180°C for 30 sec for blended fabrics. Final finished fabrics were evaluated on KES<sub>2</sub>.

Bio-polishing brought a considerable improvement in Primary Hand Values (PHV). Subsequent chemical finishing brought a further improvement in PHV for all three finishes. Differences between the chemical treatments were comparatively small.

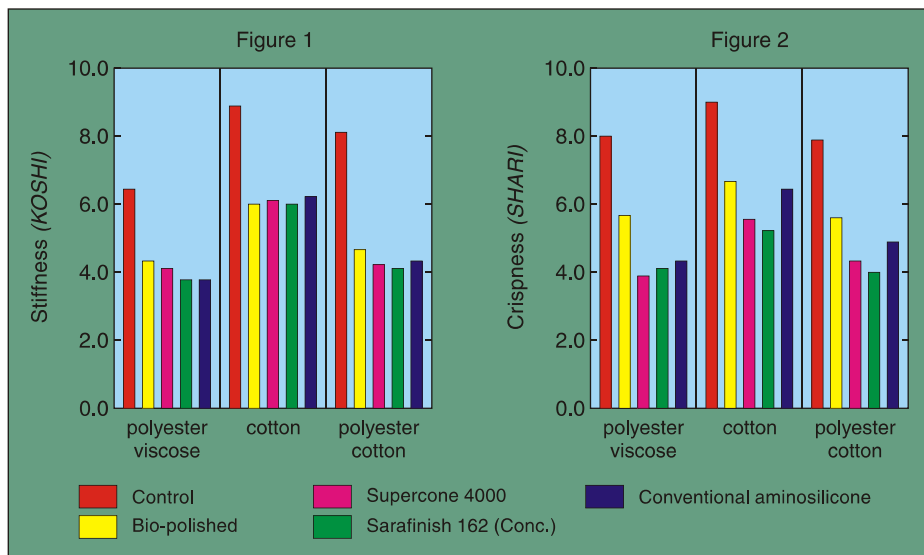
Sarafinish 162 (Conc.) give minimum stiffness (KOSHI) to the treated fabrics, particularly the cotton and polyester/cotton types. In case of polyester/viscose fabrics, no significant differences were observed between the three finishes (Figure 1).

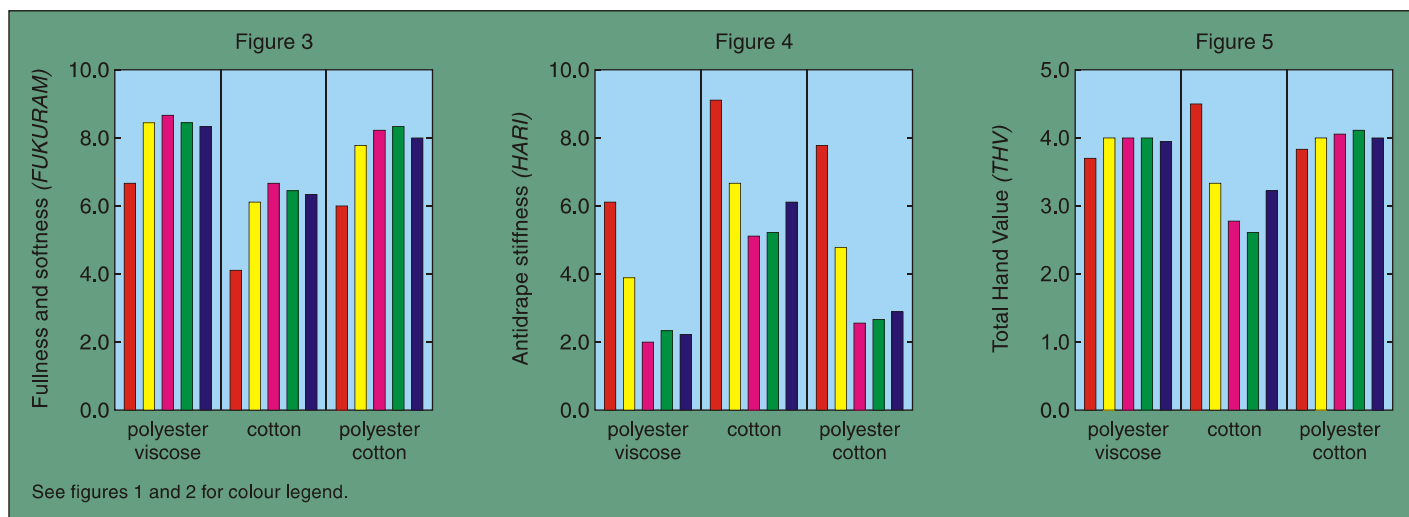
In case of crispness (SHARI), Supercone 4000 and Sarafinish 162 (Conc.) imparted lower crispness than the conventional aminosilicone treatment. There was no significant difference here between the two modified polysiloxanes. Conventional aminosilicone treatment imparted higher crispness, particularly to cotton and polyester/cotton blends (Figure 2).

Sarafinish 162 (Conc.) imparted maximum fullness and softness (FUKURAMI), particularly to cotton and polyester/cotton blends, followed by Supercone 4000 and then the conventional aminosilicone emulsion. In the case of polyester/viscose fabrics no significant differences were observed between the three treatments (Figure 3).

The highest drapability, lowest antidrape stiffness (HARI) on cotton and polyester/cotton fabrics (Figure 4) was produced by Supercone 4000 and Sarafinish 162 (Conc.).

As expected, bio-polishing with cellulase enzyme resulted in a substantial improvement in PHVs and THVs for all fabrics. In case of cotton, Total Hand Value (THV) increased due to the bio-polishing treatment - from 3.3





for control to 3.52. It appears that further improvement by subsequent chemical finishing is difficult, particularly given the major improvement already achieved. Nevertheless, formulated polysiloxanes performed much better than conventional aminosilicone treatment.

Application of Sarafinish 162 (Conc.) or Supercone 4000 brought further substantial improvement - 3.69 and 3.75 respectively - (Figure 5 and Table 1). The maximum improvement was achieved on cotton and polyester/

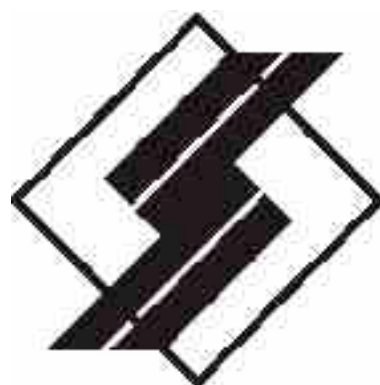
cotton fabrics with Sarafinish 162 (Conc.), followed by Supercone 4000. Conventional aminosilicone emulsion gave a THV of 3.53 hardly any improvement. ○

**REFERENCES**

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2. Kawabata and M. Niwa, *The standardization and Analysis of Hand Evaluation, 2nd Edition. The Hand Evaluation and Standardization Committee. The Textile Machinery Society of Japan, Osaka (1980).*

**Table 1. Total Hand Values (THV) for fabrics subjected to different finishes.**

Finish	Cotton		Poly/Cotton	
	THV	ΔTHV	THV	ΔTHV
Control	3.30	.....	3.74	.....
Enzyme-treated	3.52	0.22	3.89	0.15
Enzyme-treated + Supercone 4000	3.69	0.39	3.94	0.20
Enzyme-treated + Sarafinish 162 (Conc.)	3.75	0.45	3.97	0.23
Enzyme-treated + Conventional aminosilicone	3.53	0.23	3.92	0.18



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