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Research Paper

Herbal treatment effect on fabric thickness

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■ **ABSTRACT :** The present work was carried out with an objective to study the physical property of control and treated samples were tested to analyze the effect of *Karanja* extracts on the samples. The Shirley thickness tester was used to determine thickness of controlled', samples treated with both extracts of *Karanja* in both viscous and dry state; and antiseptic treated samples in both concentrations using BS 2544: 1967 test method. A specimen size of 5"×5". The tests were performed for different types of samples *viz.*, control (scoured), samples treated with leaves and seed extracts in viscous and dry state; and samples treated with an antiseptic containing chloroxylenol. The samples were subjected to test for fabric thickness (mm). It was concluded that as the concentration of extract increased, thickness (mm) of all treated samples increased significantly. A 1% level significant increase in thickness (mm) was observed in all treated samples as compared to the control sample.

■ **KEY WORDS:** Extract, Antiseptic, Viscous, Thickness**,** Chloroxylenol

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In the present scenario of environmental consciousness, the new quaality requirements not only emphasize on the intrinsic functionality and long service life of the product but also a production process that is emvironment friendly (Thiagavathi and Kannaian, 2008). Increasing global competition in textiles created many challenges for textile researchers and industrialists. Consumers are increasingly becoming aware of the hygienic life and health (Mahesh *et al.*, 2011). Antimicrobial textiles with improved functionality find a variety of applications such as health and hygiene products, especially the garments worn close to the skin and several medical applications, such as infection control and barrier material (Chandrashekar *et al.*, 2012). Cotton is the natural vegetable fibre of great economic importance as a raw material for cloth (Banupriya and Maheshwari, 2013). Cotton fabrics are generally worn next to skin hence direct contact of textiles with human body provides warmth, humidity and nutrients; an excellent environment for micro-organism growth. These micro-organisms create unpleasant odour, discoloration, staining, degradation of textile materials and spread of diseases.

Pongamia pinnata being used as medicinal plant, particularly the Ayurveda and Siddha medicine system of India (Muthu *et al.*, 2006). Fresh bark of *Ponganua pinnata* is used internally to cure bleeding piles. The root and bark are bitter, anthelmintic and are used for vaginal and the skin diseases. A poultice of the leaves is applied to ulcers infested with worms (Kiritikar and Basu, 1984). Seed of Indian beech are anthelmintic, bitter, acrid and carminative. Aqueous extract of stem bark exhibits

CNS sedative and antipyretic activity (Pillai and Vijayamma, 1988). All the parts of the *Karanja* tree have medicinal property and are thus commercially exploitable. Therefore, keeping the above facts in mind the present study was planned to develop renewable treatment from *Karanja* plant and to study the effect of treatments on thickness (mm) of fabric.

■ RESEARCH METHODS

Material used :

- Cotton fabric
- Antiseptic containing chloroxylenol
- Leaves and seeds of *Karanja* plant

Pre-treatment of fabric :

Cotton fabric was desized in a solution containing 1% H_2SO_4 at 50°C for 60 minutes with material to liquor ratio 1:40. The fabric was rinsed thoroughly to remove any starch and acid residues. The fabric was weighed, soaked, squeezed, and treated in a solution containing 1 per cent soap, 3 per cent soda ash and 0.5 per cent sodium sulphite at boiling temperature (100°C) with 1:40 material to liquor ratio for 60 minutes. After that the fabric was rinsed thoroughly and dried on a flat surface (Gaba, 1999). Sample taken from scoured cotton was kept as control sample.

***Karanja* extract preparation :**

Extraction was carried out by refluxing (soxhlet) and distillation methods. Half quantity of leaves and seeds extracts separately converted from viscous to dry form by keeping in open place for four to five days. Through silica gel viscous extracts were converted in dry state.

Application of *Karanja* extracts on cotton fabric :

Solution of *Karanja* extracts of leaves and seeds in viscous and dry state in two concentrations *i.e.* 2.5g/l and 5g/l were prepared. The concentrations of 2.5g/l and 5g/l for treatments were selected on the basis of review. On the basis of weight of the fabric quantity 1:20 material to liquor ratio of *Karanja* extracts were calculated. Four pieces of scoured cotton fabric were sterilized and impregnated with these four prepared solutions separately. The samples were immersed in the treatment bath for 30 minutes. Without squeezing the fabric was placed in the dry place.

Application of an antiseptic containing chloroxylenol on cotton fabric :

Solution of an antiseptic containing chloroxylenol was prepared in distilled water in 2.5g/l and 5g/l concentrations. Material to liquor ratio was taken as 1:20. Another piece of cotton fabric was sterilized and immersed in the solution for 30 minutes. Without squeezing the fabric was kept overnight for drying. The antiseptic treatment was taken as standard.

Determination of fabric thickness :

The Shirley thickness tester was used to determine thickness of controlled', samples treated with both extracts of *Karanja* in both viscous and dry state; and antiseptic treated samples in both concentrations using BS 2544: 1967 test method. A specimen of 5"×5" was placed on the flat surface below pressure foot of the instrument without any folds. The pressure foot was lowered slowly upon the specimen until the pointer of the dial meter stopped moving further and the reading on the dial was recorded in mm. An average of five readings was calculated as the fabric thickness.

■ RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Assessment of thickness (mm) of control and treated samples :

The thickness (mm) property of control (scoured) and treated samples were measured to assess the change in the thickness (mm) due to the treatments with leaves extracts in viscous state (LEVS), seeds extracts in viscous state (SEVS), solution of dry leaves powder (SDLP) and solution of dry seeds powder (SDSP) of *Karanja* plant and antiseptic containing chloroxylenol (standard). The samples were tested for physical property before and after treatments. Thickness (mm) property after treatment were compared with in the same concentrations of treatments, between treatments with leaves and seeds extracts in viscous state, between treatments with solutions of dry leaves and dry seeds powder, among all treatments from *Karanja* plant parts, and all treatments with antiseptic containing Chloroxylenol (standard). The results were as follows:

Effect of *Karanja* extract treatment on c of fabric samples :

The data in Table 1 and Fig. 1 that the thickness of control sample was 0.293±0.00 mm. The thickness of the sample treated with 2.5g/l concentration of leaves extract in viscous state was 0.313±0.00 mm and there was 6.82% increase from the thickness of control sample. The thickness of the sample treated with 5g/l concentration leaves extract in viscous state was 0.332±0.00mm and there was 13.31% increase from the thickness of control sample. The increase in thickness of all samples was found to be significant at 1% level of significance.

The thickness of the treated sample in seeds extract in viscous state with 2.5g/l and 5g/l concentration was 0.312±0.00mm and 0.331±0.00mm, respectively. There was 6.48% and 12.97% increase from the thickness of control sample. The increase in thickness was found to be significant at 1% level of significance.

Sample treated with solution of dry leaves powder with 2.5g/l concentration was found to have 0.306±0.00 mm thickness. There was 4.43% increase in the thickness of the treated sample from the thickness of control sample. Similarly in 5g/l concentration sample thickness was 0.324±0.00 mm. Increase of 10.58% thickness from the thickness of control sample was found to be significant at 1% level of significance.

Thickness of the samples treated with solution of dry seeds powder with 2.5g/l and 5g/l concentrations were 0.304±0.00 mm and 0.323±0.00 mm, respectively. There were 3.75% and 10.23% increase in thickness when compared to the thickness of control sample,

Table 1 : Effect of *Karanja* extract treatment on thickness (mm) of fabric samples

Concentration	Thickness(mm)				
	2.5 g/l		5 g/l		
Treatments	Mean±S.E (m)	Per cent change	Mean±S.E (m)	Per cent change	t-value
LEVS	0.313±0.00	+6.82	0.332±0.00	+13.31	20.05**
SEVS	0.312±0.00	+6.48	0.331±0.00	+12.97	19.86**
SDLP	0.306±0.00	+4.43	0.324±0.00	+10.58	31.47**
SDSP	0.304±0.00	+3.75	0.323±0.00	+10.23	38.38**
Chloroxylenol (standard)	0.294±0.00	+0.34	0.301±0.00	+2.73	13.89**
Control	0.293±0.00	-	0.293±0.00	-	-

** indicates significance of value at P=0.01 level

LEVS – Leaves Extract in Viscous State treated sample
SEVS – Seed Extract in Viscous State treated sample
SDLP – Solution of Dry Leaves Powder treated sample
SDSP – Solution of Dry Seeds Powder treated sample

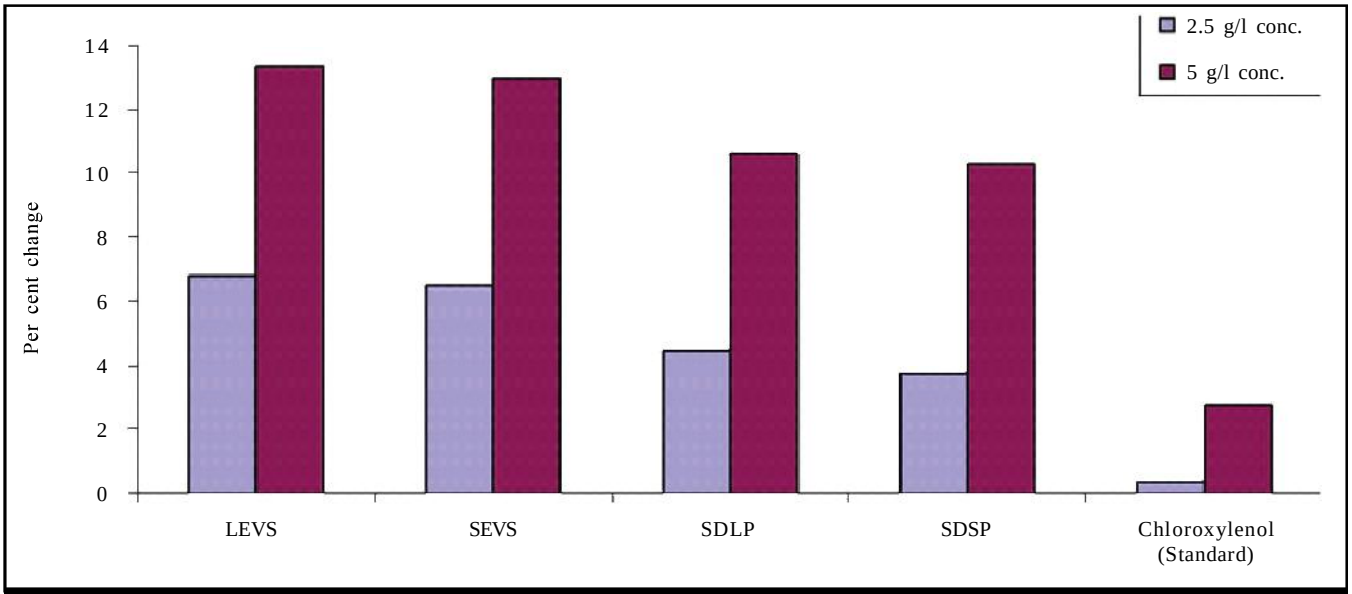

Fig. 1 : Effect of *Karanja* extract treatment on thickness (mm) of fabric samples

respectively. The gain in thickness was found to be significant at 1% level of significance.

The thickness of the samples treated with 2.5g/l and 5g/l concentrations of antiseptic containing Chloroxylenol (standard) was 0.294±0.00 mm and 0.301±0.00mm. There were 0.34% and 2.73% increase in thickness, respectively from the control sample and found to be significant at 1% level of significance.

It was clear from the results presented in Table 1 that thickness of all treated samples increased. The thickness of the samples treated with leaves extract in viscous state and solution of dry leaves powder in both concentrations was more than the samples treated with seeds extract in viscous state and solution of dry seeds powder. Moreover, as the concentration of extract was increased from 2.5g/l to 5g/l, significant increase in thickness at 1% level of significance was observed.

Changes in fabric thickness (mm) property of treated samples were compared with contemporary literature.

Thickness (mm):

Thickness of all samples treated with leaves and seeds extracts in solutions of viscous and dry power and an antiseptic containing chloroxylenol (standard) in both concentrations increased. The thickness of the samples treated with leaves extract in viscous state and solution of dry leaves powder in both concentrations was more than the samples treated with seeds extract in viscous state and solution of dry seeds powder. This may be due to the reason that more amount of leaves extract in both states *i.e.* viscous and powdered might have attached to the fabric surface. Moreover, as the concentration of extract was increased from 2.5g/l to 5g/l there was significant increase in thickness. The increase in thickness may be due to more absorbance of the *Karanja* extracts by the fabric samples in solution of highest concentration. The results are supported by the findings of Santosh (2012) who reported significant increase in the thickness of herbal finished fabrics than the unfinished ones. Similarly Nagarajan (2009) also reported significant difference in thickness between herbal treated and untreated fabric. Sumithra and Vasugi (2013) stated that thickness of the herbal finished denim fabric was found to be highest as compared to the untreated fabric. Verma (2013) reported that the thickness of fabric increased after treatment. Sood *et al*. (2014) reported that measurement of the physical properties of the treated fabrics was done to assess the effect of the herbal antibacterial treatments on this property of the herbal treated fabric thickness (mm). There was a significant change in the performance property of the treated polyester fabric.

Conclusion :

It was concluded that as the concentration increased, thickness (mm) of all treated samples (including standard) also increased significantly. A significant percentage increase in thickness (mm) was observed in all treated samples as compared to the control sample at 1% level of significance.

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