



Carotenoid Extract of *Ocimum Sanctum* as an Antibacterial Finish

KEYWORDS

Ecofriendly antibacterial agents, Herbal product (tulsi), Cotton fabric

Veena. P

Vimalin Hena J

P Research Scholar, PG & Department of Microbiology, Hindusthan college of arts and science, Coimbatore.

Assistant Professor, PG & Department of Microbiology, Hindusthan college of arts and science, Coimbatore.

ABSTRACT *In the present scenario of environmental consciousness, the new quality requirements not only emphasize on the intrinsic functionality and long service life of the product but also a production process that is environment-friendly. Therefore, research on environment-friendly antimicrobial agents based on natural products for the textile application is gaining worldwide interest. Different classes of active ingredients found in extracts of natural products and their mechanism of antibacterial action have been presented. An ecofriendly natural antibacterial finish has been prepared from the plant extracts for the textile application. Herbal extracts from *Ocimum sanctum* (tulsi) have been applied to cotton fabric by the method of direct application.*

INTRODUCTION

Traditionally various plants are used as medicines. Different parts like leaves, stem, flowers, roots, seeds were used. The whole plants of *Ocimum sanctum* linn known as tulsi in hindi a small herb seen throughout India have been recommended for the treatment of bronchitis, bronchial asthma, Malaria, diarrhoea, dysentery, skin disease chronic fever and insect bite. Tulsi grow wild in the tropic and warm regions. *Ocimum sanctum* has specific aromatic odour due to the presence of essential oil mainly on leaves. This aromatic volatile oil contains phenols, terpenes and aldehydes, The oil extracted from seeds are called fixed oil which contain fatty acid. Beside oil, the plant also contains alkaloids, glycosides, saponins and tannins. The leaves contain ascorbic acid and carotene. Ursolic acid, one of the major constituents of the tulsi leaves, has been suggested to possess antifertility effect in rats of both sexes and in male mice (S. Rajeshwari, 1992). The juice of fresh leaves is also given to patients to treat chronic fever, dysentery (B.P Anita, 1990). Tulsi leaves also check vomiting and has been as anthelmintic (Sen P, 1993). Thus tulsi is tested over the Staphylococcal scaled skin syndrome (SSSS) caused by *Staphylococcus aureus* exfoliative toxin known as exfoliatin (ET). It is a skin disease in which the outer layer of epidermis gets separated from the underlying tissue.

MATERIALS AND MATERIALS

1. IDENTIFICATION AND SELECTION OF MEDICINAL PLANTS

The Tulsi plant was identified and collected from Tamilnadu Agricultural university based on standard property.

2. FABRIC SELECTION

100% gray cotton fabrics of knitted woven and non woven were used for the study. They have chosen for applying the antimicrobial agents with a view to assess the versatility and wide applicability of the agents. In all the stages of the fabric development eco friendly process was adopted without using any chemical.

3. EXTRACTION OF CAROTENOID FROM TULSI

The Tulsi plants were taken, dried, powdered. Column chromatography was done for the sample using methanol as solvent. The fraction was collected.

a) PREPARATION OF COLOUM

In to a column a small amount of glass wool is pushed down to the bottom as a bed. Above this some sand is added to a height of 1.5 cm above 6g adsorbent (Alumina) previously activated is taken in a beaker and a small amount of benzene

is added to make a slurry. This slurry is carefully poured into column to avoid air bubbles the adsorbent should never to be allowed to dry. Add more benzene and allow it to pass through the column.

b) PREPARATION OF THE LEAF EXTRACT

Take about 5g of leaf and adding 20ml of benzene and methanol in the ratio 2:1. Filter the extract through a filter paper and transfer the filtrate through the separate funnel. Add 10ml of water, shake well and then allow layers to separate. Remove the lower aqueous layer containing methanol. The benzene layer is taken in a beaker and the solvent evaporated by placing it over steam in a water bath. A pasty solid will be obtained because of the presence of some water. The residue is dissolved in small volume of benzene and solid sodium sulphate is added. This will remove traces of water. The clear benzene layer is decanted to another beaker and evaporated to dryness. Dissolve the dried extract in 1ml of benzene and quantitatively transfer it with a pipette to the top of the column without disturbing the adsorbent. The solution is elevated with benzene until the color pigments are well separated. Collect each fraction separately.

4. FABRIC TREATMENT WITH CAROTENOID FROM TULSI

a) Direct application method

The yellow coloured methanol extract was directly applied on 100% cotton fabric by pad-dry-cure method. 1% of the extract was applied on cotton fabric along with 6% citric acid.

5. ANTI STAPHYLOCOCCUS AUREUS ACTIVITY OF CAROTENOID COATED FABRIC

a) Agar diffusion test

In this method the round test fabric coated with tulsi was placed over the surface of Muller Hinton Agar (MHA) which was swabbed with culture. Incubated for 24 hrs at 37°C and observed for the zone of incubation around the fabric (Olukoya DK et al., 1993).

b) Parallel streak method

The fabric finished with tulsi extract material was placed centrally onto the surface of the MHA and the test organism was parallel streaked on both sides and plates were incubated at 37°C for 24 hrs after the period of incubation the zone of incubation was observed (6).

RESULT AND DISCUSSION:

Cotton fabric is preferred for the study. It is the predominant fabric in the fashion area favoured for its natural comfort and aesthetic appeal so 100% cotton fabrics of knitted woven

and non woven were selected for the study.

Tulsi herb is chosen as they have been used traditionally for the treatment of asthma, Malaria and skin disease. The test organism *Staphylococcus aureus* is sensitive to methanol. Tulsi extract was tested under agar diffusion method and parallel streak method were shown in Table1. From the primary screening we have identified that the yellow methanolic extracts of tulsi have got the antibacterial activity against the Methicillin Resistant *Staphylococcus aureus* (MRSA).

The methanolic natural extract obtained from the tulsi was coated on cotton fabrics and subjected for quantitative antibacterial analysis. The present study reveals the antimicrobial efficiency of tulsi contain large amount of carotenoid. (Sathianarayanan et al., 2010)

The carotenoid which was present in the extract which is response for the healing the staphylococcal scaled skin syndrome(ssss).

TABLE : 1

S. NO	TEST ORGANISM	METHANOLIC EXTRACT OF TULSI	
		AGAR DIFFUSION METHOD	PARALLEL STREAK METHOD
1	<i>Staphylococcus aureus</i>	+	+

+ = positive

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