

# A Progress of Artifact of UV Protective Bamboo Knit Garments of Mens T- Shirt by Green Tea and Cloves

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## ABSTRACT

Body armor technologists over the year are seeking to develop protective systems, especially the harmful effects of UV radiation can be substantially alleviated by wearing heavyweight garments or by using sun creams. However, these materials are very expensive and have certain weight constraints. Therefore, there is a growing demand in the marketplace for apparels that offers comfort and protection from UV-A and UV-B radiation. This study aims to ascertain the ultraviolet rays' protection ability to the fabric and focuses on the UV transmission of Bamboo fabric, commonly used textile summer with the application of UV absorbers using herbal extracts from Green tea and Clove. The UPF (Ultraviolet Protection Factor) of fabrics is determined by using UV-VIS spectrophotometrically for untreated grey fabric and UV absorbers treated fabrics. As a result, UV absorbers treated fabrics have good UV protection. Based on the result, best herbal extract approach was used to impart UPF of lightweight knitwear fabrics have been suggested against UV radiation.

**Key Words:** Protective Textiles, Green Tea, Clove, UV Protective Finish, Bamboo Knits, Single Jersey Fabric, Men's T- Shirt.

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## 1 INTRODUCTION

UV protective garments developed by using the combined theories and concepts of alternate medical concepts have immense medical value and it is a genuine answer to pollution and artificial textiles. While development such kind of fabric, all stages of processing are done in eco-friendly way for natural UV absorber finishes. It also safeguards the environment, prevents pollution and promotes eco-friendly textiles to ensure that reach to individual and to mass and generate true awareness. The fabrics can be used which naturally has anti-ultraviolet protection to some extent. The natural sources which have high antioxidant content offer good UV protection. In that category, three natural sources are selected which have combined effect of colors and good fragrance. It is known that ultraviolet radiation is harmful to human. The ultraviolet light is electromagnetic radiation with a wavelength shorter than that of visible light, but longer than x-rays, in the range 10nm to 400nm, and energies from 3 eV to 124eV. It is so named, because the spectrum consists of electromagnetic waves with frequencies higher than those that humans identify as the color violet.

AREA: Protective Textiles

Fabric: Bamboo Single Jersey Fabric

UV Protective Finish: Green tea & cloves

GSM: 140

Machine Details:

Garment Details: Men's T-shirt

Size: M-size

### **1.1 Parameters to be tested: before / After**

- 1) GSM
- 2) Colour Fastness to light
- 3) Ultraviolet protection factor
- 4) Survey Study

### **1.2 Protective Textiles**

Extensive research is being done to develop the protective clothing for various regular and specialized civilian. Protective clothing refers to the garments and other fabric related items designed to protect the wearer from harsh environmental effects that may result in injuries or death. Protective clothing is now a major part of textile classified under technical textiles. & Protective textiles are the fastest growing area of textile consumption in the world. military occupations.

### **1.3 Green Tea**

Tea is one of the most widely consumed beverages in the world, next only to water [1,2] and well ahead of coffee, beer, wine and carbonated soft drinks [3]. It can be categorized into three types, depending on the level of fermentation, i.e. green (unfermented), oolong (partially fermented) and black (fermented) tea. The term fermentation is often used incorrectly in tea processing. The more correct term should be oxidation, which means exposure to air while drying without any additives during the process. Another form of tea is white tea which is made from new growth buds and young leaves that have been steamed to inactivate polyphenol oxidation and then many health benefits as green tea. The Chinese have known about the medicinal benefits of green tea since ancient times, using it to treat everything from headaches to depression. In her book 'Green Tea: The Natural Secret for a Healthier Life', Taylor [5] stated that green tea has been used as a medicine in China for at least 4000 years.

Green tea is consumed as a popular beverage worldwide, particularly in Asian countries like China, Korea and Japan.



Fig:- 1 - UV Protective Finish: Green tea & cloves and



Fig: - 2 - Green tea & cloves

### 1.3 Clove

Other Common Names: Mother cloves, clove tree, Gewürznelken (German), lavanga (Sanskrit), Kryddernellike (Danish), clouds de girofle (French), clavo (Spanish), chouji (Japanese), Lang (Hindi). The English common name “cloves” derives from the Latin word Clavus, which means nail. Habitat: It is believed that the clove-tree is originally native to the Maluku Islands or the Moluccas, an Indonesian archipelago and from there it has spread to other parts of the globe with suitable climate. Today, it is commercially cultivated in many tropical countries.

### 1.4 Objectives of research

- 1) To produce UV Protection Garments.
- 2) To impact and produce T-Shirt for Mens with Ultraviolet Protection Finishing Technique.
- 3) To incenses and produce Productive Textile Garment with medical sense towards Men's T- Shirt.
- 4) To finish the garment Green Tea, Clove and 50% Green Tea 50% Clove
- 5) To test the Colorfastness retains ability and Ultraviolet Production Factor.
- 6) To make a clear cram as survey on the T-Shirt in Men's viewpoint.

## 2 REVIEW OF LITERATURE

### 2.1 Description

Clove tree is an evergreen tree that belongs to the myrtle family (Myrtaceae). It can reach up to 12 to 15 meters in height. It has a pyramid-shaped crown with hanging branches, and shiny green, ovate and opposite aromatic leaves. The flowers sit in terminal clusters on the tips of the branches. The flowers are bell-shaped and have red cups and white crowns. The fruit is a small berry that contains one or two seeds.

Plant Parts Used: The dried immature flower buds are mostly used as a spice but also as an herbal medicine. The flower buds are collected before they turn red from trees that are least 10 years old and then sun-dried for 4-5 days. Each tree can produce around 4 or 5 kilos of clove every year. When the flower buds are fully dried they will turn dark brown and very hard so to make use of them as a seasoning or medicine they must be ground into powder. Whole cloves can be kept for several years if they are stored in an airtight container. In powder form, they lose their flavor relatively quickly.

An essential oil is obtained from the leaves, stems and flower buds of the clove-tree by steam distillation. The clove oil is a pale yellow liquid with a strong and spicy aroma. The oil with the highest quality and the one that should be used in herbal medicine is obtained from the flower buds as the ones obtained from the leaves and stems are rather toxic.

### 2.2 Benefits:

Therapeutic Uses, Benefits and Claims of Cloves, Active Ingredient and Substances, Cloves contain 12-26% oil, with eugenol (70-90%) and beta-caryophyllene (as high as 7%) as the main constituents. Other ingredients found in the oil are furfural, methyl salicylate and alpha-pinene. The composition of the essential oil can vary depending on the quality and origin of the clove-tree. Eugenol inhibits prostaglandin and explains the analgesic and anti-inflammatory properties of cloves. Cloves also contain rubber, mucins, tannins, vitamins and minerals. Recorded medical use of cloves, as early as 240 BC, comes from China, where it was used as a remedy for many different ailments, including diarrhea and hernia.

### 2.3 Clove

Clove tea is also thought to be good for the nervous system and is sometimes used to lessen tension, anxiety, and depression. Cloves are believed to be beneficial for the digestive system by reducing cramps, remove flatulence and increase the absorption of nutrients. In addition, the astringent properties of the tannins present in the herb might be quite useful for diarrhea. Cloves have a slight skin numbing effect and are sometimes used for topical pain relief. This numbing effect might also be helpful in preventing premature ejaculation, though no studies are available to confirm the effectiveness of this use.

## 2.4 Green tea for skin treatment

Treatment of green tea polyphenols to skin has been shown to modulate the biochemical pathways involved in inflammatory responses, cell proliferation and responses of chemical tumour promoters as well as ultraviolet light-induced inflammatory markers of skin inflammation. Topical treatment with EGCG on mouse skin results in prevention of UVB-induced immunosuppression and oxidative stress. The protective effects of green tea treatment on human skin either topically or consumed orally against UV light-induced inflammatory or carcinogenic responses are not well understood. Based on documented extensive beneficial effects of green tea on mouse skin models and very little in human skin, many pharmaceutical and cosmetic companies are supplementing their skin care products with green tea extracts. Research using pooled human keratinocytes (skin cells) to study the normal growth of the skin cells alone and comparing it to the growth of the cells when exposed to EGCG revealed that EGCG reactivated dying skin cells. Cells that migrate toward the surface of the skin normally live about 28 days and, by day 20, they sit on the epidermis getting ready to die and slough off. Current research seems to show that EGCG reactivates epidermis cells [19].

## 3 METHODOLOGY

### Padding Technique

Padding is a method adopted to apply the herbal extracts onto the fabric and give them the required properties. Padding mangle is used for this process.

### Testing Instrument

UV transmittance analyzer

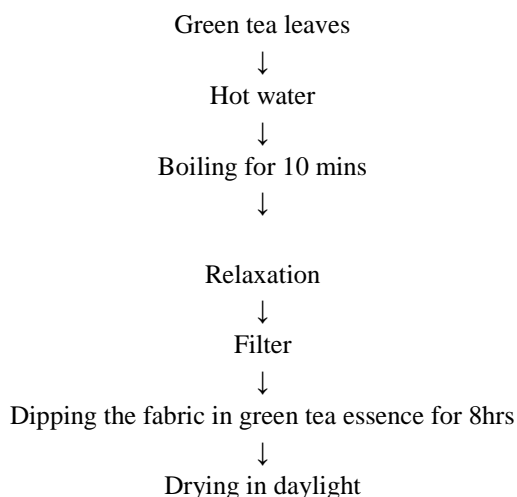
UV-visible spectrophotometer (or) spectroradiometer

These have use of flash xenon lamp, it has provided to be the best alternative for reproduction of natural sunlight.

### Testing Standard

This standard test method AATCC 183:2004 is used to determine the ultraviolet radiation blocked or transmitted by textile fabrics intended to be used for UV protection.

### 3.1 PROCESS FLOW CHART OF GREEN TEA OF A BAMBOO T-SHIRT MANUFACTURING



STEP 1: Take a fabric according to our need of a size of the sample.

STEP 2: Now take water according to the sample and boil at a boiling temperature for 10mins.

STEP 3: Then after boiling the required amount of green tea is poured in a boiling water.

STEP 4: Then boil it for 5mins and allow it to cool in a room temperature.

STEP 5: After cooling the solution the fabric is kept in a solution for 8 hrs.

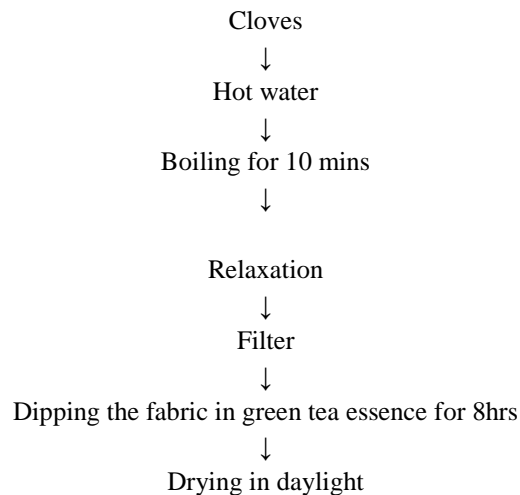
STEP 6: After 8hrs the fabric is taken out from the solution and it should be washed.

STEP 7: After washing the fabric should be treated with fixing agent for 20mins.

STEP 8: After 20mins the fabric is taken out and it should be dried.

STEP 9: The fabric should be dried in daylight but not in sunlight.

### 3.2 PROCESS FLOW CHART OF CLOVES OF A BAMBOO T-SHIRT MANUFACTURING



STEP 1: cut a sample of bamboo fabric.

STEP 2: Take a liter of water and boil for 10mins.

STEP 3: After boiling the water for 10 mins the cloves should be powdered and it should be put in boiling Water and allow it cool in room temperature.

STEP 4: Then after cooling the liquor the fabric is dipped in the solution for 8hrs.

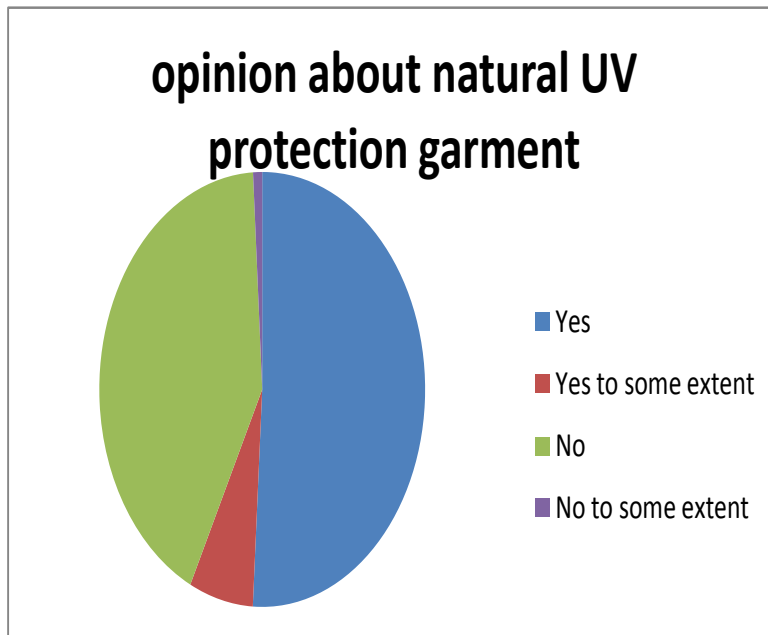
STEP 5: After 8 hrs the fabric is taken and with 5ml of fixing oil is used for 2ltr of water and the fabric is dipped and kept for 15mins.

STEP 6: After 15mins the fabric is taken out and it should be dried in daylight not in sunlight

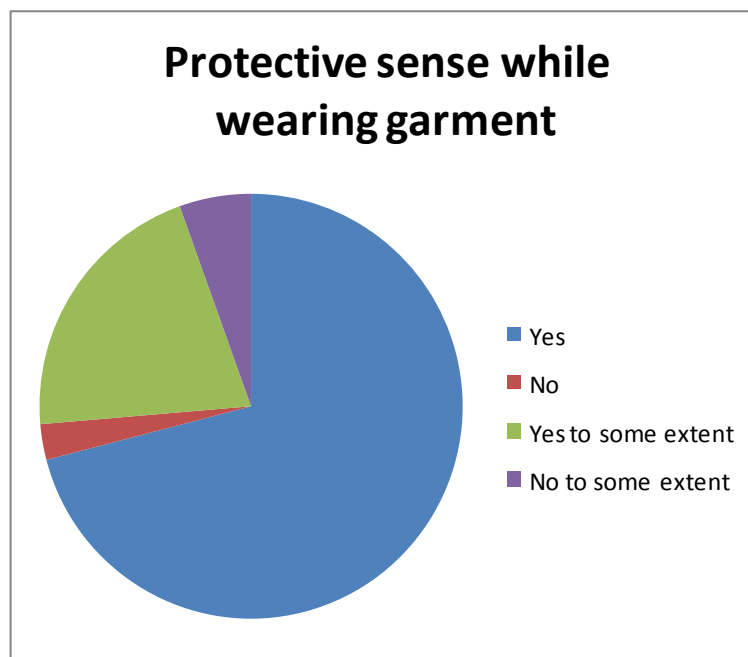
## 4 RESULTS AND DISCUSSION

Phytochemical screening tests of the leaf extracts of green tea: The presence of different phytochemical elements in the leaf extracts was identified using a standard phytochemical screening test proposed by Harbone (1994). From the green Tea and Clove it was understood that different phytochemicals were evident in the extracted Green tea leaves and Clove. The major components present in green tea leaf extracts was Alkaloids, Steroids and Sterol, Cardio glycosides, Flavanoids, Saponins, Glycosides, Amino acids and Proteins, Tannins and phenolic compounds, Terpenoids and Carbohydrates. These compounds have been found to possess antibacterial and antiviral action as well as anti-carcinogenic and anti-mutagenic properties (Kuroda and Hara, 1999). Similar phytochemical analysis reported by Kuroda and Hara (1999) showed that the green tea extracts contains catechin and polyphenols. The Survey Graph is as follows,

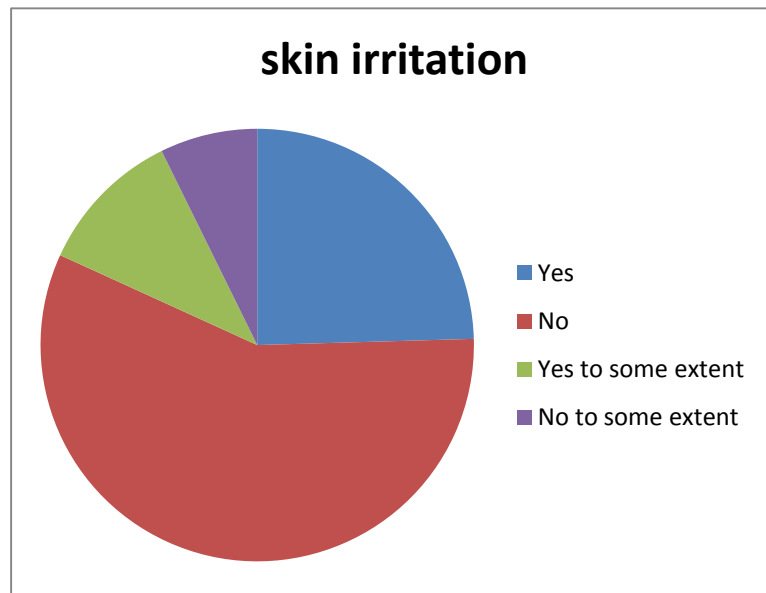
### 4.1 Survey Graph



Graph: - 1 – Opinion about natural UV Protective Garment



Graph: - 2 – Protective Sense while wearing garment



Graph: - 3 – Skin Irritation

## 5 CONCLUSIONS

The present investigation aimed at developing UV protection finish on Bamboo fabric using Green Tea herbal leaves extract and Clove. The cotton fabric was finished with the herbals extract, It shows that cotton finished with green tea leaf has a better result on UV protection followed by cotton finished with betel leaf and least with cotton finished with curry leaf but Clove is better for the Bamboo Fabrics. Thus, from the findings, it can be concluded that application of UV protective and antibacterial finish on Bamboo fabrics by using *S. cumini* (L.) leaves extract improved UV protective and antibacterial properties to a greater extent, leading to excellent protection. This new plant source exhibiting, antibacterial and UV protective property can be used for development of medical textiles as well as for apparels for daily use. This study also provides a new source for natural plant material which can be combined with new technologies such as microencapsulation and nanotechnology to develop effective and durable textile materials.

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