

# Methanol Extraction of Microbial Pigments For Polyester Fabric

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**Abstract:** *Micrococcus Luteus* is a bacterium that is Gram-positive. Bacteria with thicker cell walls are said to be gram-positive bacteria, and it is said that thinner cell walls are gram-negative bacteria. In the natural flora of the mammalian body, *Micrococcus luteus* is present in soil, dust, water and air. In the human mouth, mucosa, oesopharynx, and upper airways, it is also present. In these two colonies, there are bright yellow pigments in the agar plate. Carotenoid containing a bright yellow color in the primary. *M.luteus* pigment with the highest variety of properties for anti-carcinogenic and immune modulation. Anti-carcinogenic (an agent that destroys or prevents cancer cells). The yellow pigment has shown promising activity as antioxidant, antibacterial and UV-protective. Results that clearly indicate the potential application of these pigments after clinical trials as natural coloring agents and UV protection agents in food and pharmaceutical cosmetics in industries. *M.luteus* has been shown to have activity. The strain was made of the coarse pigment. The dye absorbs Ultraviolet radiation and is used in cosmetics with sunscreen. It is a type of vitamin that is used in natural colors. In this study, the polyester fabric was chosen. In essence, polyester fabric is much less absorbent. But the color pigment was extracted using *M.luteus* methanol, which is showing very good promising color even for polyester fabrics.

**Keywords:** *Micrococcus Luteus*, medicinal use, methanol extraction, color pigments, polyester fabric, evaluation.

## I. INTRODUCTION

### 1.1. *Micrococcus Luteus*

This is a bacterium that is Gram-positive. Gram-positive bacteria, though thinner cell walls are said to be gram-negative bacteria, are said to be bacteria with thicker cell walls. *Micrococcus luteus* is present in soil, dust, water and air in the natural flora of the mammalian body. It is also found in the mouth, mucosa, oesopharynx, and upper airways of humans. It was first identified by Sir Alexander Fleming in 1928 before the discovery of penicillin. Negative coagulase (a protein enzyme produced by a number of micro-organisms) and bacitracin (a mixture produced by the organism of cyclic peptides). These two colonies make the agar plate with bright yellow pigments. Carotenoid producing bright yellow color in the primary. *Micrococcus Luteus* found an oligotrophic lake at Lake George, New York. It can exist for long periods of time in an oligotrophic environment.

*Micrococcus* is generally harmless, but there have been rare cases of *Micrococcus* infections in people with compromised immune systems, as is the case with HIV patients. *Micrococcus luteus* rarely causes illness or body

disorders, those known to be caused by *m.luteus* skin infections, or compromised immune systems such as patients with HIV. Bacterial infections are rare and the bacterium is a natural part of the bacterial flora of the body.

### 1.2. Medicinal Uses

In 2013, Norwegian researchers found that *Micrococcus luteus* strain synthesizes a pigment that absorbs light wave lengths from 350 to 475 nanometres. Exposure to these ultraviolet light wavelengths has been associated with an increased incidence of skin cancer, scientists believe that this pigment can be used to produce a sunscreen that can protect against ultraviolet light. *M.luteus* pigment has antibacterial activity against *Staphylococcus* sp, *klebsiellasp*, wound-isolated *Pseudomonasp*(KF532949).

*M.luteus* can function against bacteria that are gram negative and positive. Microbial dyes are attracted more attention. It has several benefits such as cheaper manufacturing, faster production, higher yields, raw material performance, lack of multiple variations. Thanks to biodegradability and greater environmental protection, bacterial pigments offer promising prospects for various applications in industries such as food, pharmaceuticals, cosmetics, textiles, etc. Anti-carcinogenic (the agent which

destroys or stops cancer cells) This yellow pigment has shown promising Ultraviolet, antioxidant and antibacterial activity. The results clearly show the potential for these pigments to be used in the food and pharmaceutical industries as natural coloring agents as well as UV protection agents in cosmetics following clinical evaluations. The strain was made of the crude pigment. Pigment used in sunscreen makeup to remove UV radiation. It is a source of vitamin that is used in natural colours.

### 1.3. Polyester Fabric

Polyester is a synthetic fiber produced by the chemical action of alcohol acids from carbon, oil, water and air. A mixture of molecules in this reaction makes a large product with a structural repeat that maintains its form, hard to stain, throughout its length. For home furnishings, blankets, sheets, bed spreads, curtains, mattress ticking and table clothes, polyester and polyester mixtures are also used to enhance absorption and reduce static electricity polyesters. Also used in pillows, comforters, bedspreads, quilted sheets and other houses, winter jackets, etc.

## II. METHODOLOGY

### 3.1. Extraction of microbial pigments from bacteria

#### 3.1.1. Materials Required For Finishing

Fabric	-	Polyester
Methanol Pigment	-	100ml
M:L:R	-	1:5
Drying Temp.	-	60°C -70°C
Time	-	30 minutes
Curing Temp	-	60°C -70°C

#### 3.2. Isolation and Identification of pigment producing bacteria

Soil suspensions are processed using sterile distilled water from the soil samples obtained. The loop was streaked on sterile nutrient agar plates full of soil suspension and the plates were incubated for 24 hours at 37 ° C. Only the pigmented bacterial colonies have been selected and sub-cultivated for further analysis on the nutrient agar plates.



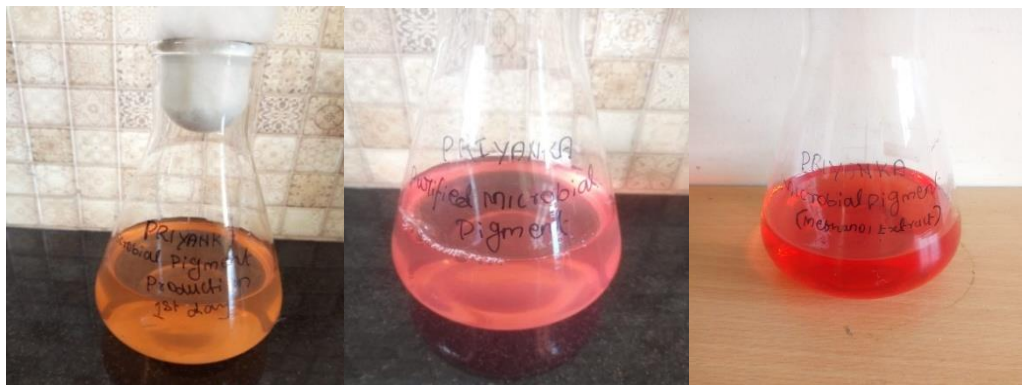
Bacteria colonies

Agar plates

Colonies

### 3.3. Extraction of pigments

Extracting the pigments using the oil fluid extraction method. The plants are inoculated in 100 ml flasks of sterile Nutrient Broth. Two sets have been prepared: one in the 37° C static incubator and one in the 37°C temperature setting of the 90 rpm rotary shaker. The pigment was extracted using cold centrifuge at the end of 7 days of incubation, with conditions set at 6,000rpm/12C/15minutes. The supernatant was extracted and the pellet was discarded mixed with methanol. The pigmented supernatants were further separated by the use of the separating funnel. Separate the colored supernatant and funnel it through the filter paper Whatman No.1.



Broth

Purified Pigment

Methanol Extraction

### III. RESULT

#### 4.1. Finishing of Extracted Pigments on Polyester Fabric

Separately, the tissue samples are handled as a cross-linking agent using citric acid. The specimens of the fabric were treated separately with the pigments obtained as a cross-linking method using citric acid. The extracts are added to the fabric through the dip and dry process. The finished fabrics were taken and dried at 100-1200°C for 5min and healed at 1800°C for 3min.



Drying Oven

Microbial Pigment Dyed Polyester Fabric

### IV. CONCLUSION

The color pigments extracted from *M.luteus* give a very good color even in polyester fabrics. The main advantage is that there are very few coloring pigments. This finished paint pigments made of polyester fabric also has special properties such as antibacterial, antifungal, antioxidant and carcinogenic activity. Dyeing properties are researched. The color speed test results in a very good result. More experiments can be done by adjusting the mordents to give different shades and colors.

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