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Ethanol Extraction of Microbial Pigments for Polyester Fabric

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ABSTRACT

The Micrococcus Luteus is a Gram-positive bacterium. Gram-positive bacteria are said to be bacteria with thicker cell walls, and the thinner cell walls are said to be gram-negative. The micrococcus luteus is present in the natural flora of the mammalian body in soil, dust, water and air. It is also found in the human mouth, mucosa, osopharynx, and upper airways. In these two colonies the agar plate produces bright yellow pigments. Carotenoid in the key which contains bright yellow colour. M.luteus pigment having the highest variety of anti-carcinogenic and immune modulation properties. Anti-carcinogenic (an agent whose cancer cells are killed or prevented) The yellow pigment showed promising antioxidant, antibacterial, and UV-protective activity. Results which clearly indicate the potential application of these pigments in food and pharmaceutical cosmetics in industries following clinical evaluations as natural coloring agents and UV protection agents..M.luteus was shown to be healthy. The filament made of the coarse pigment. This dye absorbs UV rays and is used with a sunscreen in cosmetics. This is a type of vitamin used in natural colours. The polyester fabric was used in this study. The polyester content is in general far less absorbent. Nevertheless the color pigment was extracted using M.luteus ethanol, which even for polyester fabrics shows very good promising color.

1. Introduction

1.1. Micrococcus Luteus

This is a Gram-Positive bacteria. Gram-positive bacteria are said to be bacteria with thicker cell walls, although the thinner cell walls are said to be gram-negative bacteria. The natural flora of the mammalian body includes micrococcus luteus in dirt, dust, water, and air.It also occurs in human anus, mucosa, osopharynx, and the upper airways. Sir Alexander Fleming first identified it in 1928 before founding penicillin. Negative coagulase (a protein enzyme created by a number of micro-organisms) and bacitracin (a mixture formed by cyclic peptide organisms).These two agar-plated colonies contain bright yellow pigments. Carotenoid in the primary produces a vivid, yellow colour. Micrococcus Luteus, in Lake George, New York, found an oligotrophic lake. It can remain in an oligotrophic environment for long periods of time. Micrococcus is usually a harmless bacterium, although there have been rare cases of micrococcus infections in people with compromised immune systems, as in HIV patients Micrococcus luteus rarely causes illness or body disorders, believed to be caused by diseases of the m.luteus skin, or compromised immune systems, such as HIV patients. Bacterial infections are rare and the bacterium forms a natural part of the skin's bacterial flora.

1.2. Medicinal Uses

In 2013, Norwegian researchers found that the Micrococcus luteus strain synthesizes a pigment that absorbs from 350 to 475 nano meters of light wave length. An increased incidence of skin cancer has been associated with exposure to these ultraviolet light wavelengths, scientists believe this pigment can be used to produce a sunscreen that can protect against ultraviolet light. M.luteus pigment has antibacterial activity against the sp, klebsiellasp, wound-isolated Pseudomonassp (KF532949)sp.

M.luteus can function against gram-negative and positive bacteria. Further attention is drawn to microbial dyes. It has several advantages including cheaper production, faster processing, higher yields, efficiency of the raw material, lack of multiple variations. Bacterial pigments offer promising prospects for various applications in industries such as food, pharmaceuticals, cosmetics, textiles, and so on, due to biodegradability and greater environmental sustainability. Anti-carcinogenic (an agent which kills or stops cancer cells)The yellow pigment has shown promising activity in the UV, antioxidants and antibacteria. The results clearly show the potential for use of such pigments as natural coloring agents as well as UV protection agents in cosmetics in the food and pharmaceutical industries following clinical evaluations. The strain from the crude pigment was made. Pigment used for the removal of UV radiation in sunscreen makeup. It is a vitamin source, which is used in natural colours.

1.3. Polyester Fabric

Polyester is a synthetic fiber derived from coal, petroleum, water and air created by the chemical action of alcohol-acid. A mixture of molecules in this reaction makes it difficult to stain a large product with a structural repeat that preserves its shape all along its length. Polyester and polyester mixtures are also used in home furnishings, covers, sheets, bed spreads, curtains, mattress ticking and table clothes to improve the absorption and minimize static electricity polyesters. They are also used in pillows, comforters, bedspreads, quilted clothes and other houses, coats in winter, etc.

2. Methodology

2.1. Extraction of microbial pigments from bacteria

2.1.1. Materials Required For Finishing

Fabric	-	Polyester
Ethanol Pigment	-	100ml
M: L: R	-	1:5
Drying Temp	-	60ºC -70^{0}C
Time	-	30 minutes
Curing Temp	-	60ºC -70^{0}C

2.2. Isolation and Identification of pigment producing bacteria

The ground suspensions were prepared using sterile distilled water from the soil samples obtained. The loop was streaked on soil suspension-filled sterile nutrient agar plates, and the plates were incubated at 37 ° C for 24 hours. Only the pigmented bacterial colonies were picked and sub-cultivated on nutrient agar plates for further study.

Fig 1:Bacteria colonies

Fig 2:Agar plates

Fig 3:Colonies

2.3.Extraction of pigments

Removal of pigments using the extraction method of oil fluid. The plants are inoculated in 100 ml sterile Nutrient Broth flasks. Two sets were prepared: one in the 37o C static incubator, and one in the 90 rpm rotary shaker's 37oC temperature setting. At the end of 7 days of incubation, the pigment was extracted using cold centrifuge, with conditions set at 6000rpm/12C/15minutes. The supernatant was extracted, and the pellet mixed with ethanol was discarded. The pigmented supernatants were differentiated further by the use of filtering funnel. Separate the colored supernatant and dip it through the Whatman No.1 filter paper.

Fig 4:Broth

Fig 5:Purified Pigment

Fig 6: Soxlhlet

Fig 7:Ethanol Extraction

3. Result

3.1.Finishing of Extracted Pigments on Polyester Fabric

Separately, citric acid is used as a cross-linking agent to treat the fabric samples. The samples of the fabric were treated separately with the pigments collected as a cross-linking process using citric acid. The extracts are applied to the fabric through the dip and dry process. The finished fabrics were taken and dried for 5min at 100-1200ºC and healed at 1800ºC for 3min.

Microbial Pigment Dyed Polyester Fabric

4. Conclusion

Even in polyester fabrics the color pigments extracted from M.luteus give a very good colour. The main advantage is that there are very few pigments for colouring. These finished polyester cloth paint pigments also have special properties, such as antibacterial, antifungal, antioxidant and carcinogenic activity. Properties of the dyeing are examined. The test on color speed yields a very good result. Further experiments can be carried out by changing the mordants to give various shades and colours.

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