

Isolation, Identification and Characterization of Microorganisms from Different Cosmetic Samples

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Cosmetics means any substance or mixture of substances that are applied to the human body for use in cleaning, coloring, conditioning, improving, or altering the complexion, skin, hair, teeth, nails, lips or eyes. Cosmetics are generally mixtures of different chemical compounds derived from natural sources (such as coconut oil, king coconut oil, plant extracts and etc.) or may be synthetic or artificial. Cosmetics can be classified to 4 major groups depend on the area of the body intended for application including Oral care (Mouth wash, Toothpaste and etc.), Skin care (Lotions, Cream and etc.), Hair care (Shampoo, Hair cream and etc) and Perfumes. Microbial contamination of cosmetic products is a matter of great disadvantage to the industry and it can become a major cause of both consumer safety and economic loss. The moisture and nutrients present in cosmetics make them susceptible to microbial growth, however few cases of human injury due to contaminated cosmetics have been reported. For the manufacturer of cosmetic products, it is important to ensure that their products are free of pathogenic microorganisms and are safe for consumer use. Microorganisms in cosmetics may cause spoilage or chemical change in the product and can possibly harm health, beauty and personal care. The usages of cosmetics are increasing day by day, although it is contaminated by various microorganisms like *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Candida* and etc. The purpose of this study was isolation and identification of microorganisms with the ability to survive and develop in cosmetics. Ten cosmetic samples from various brands which were used at home (Toothpaste, Cream, Lotion, Powder, Face wash, Hair oil, Hair cream, Shampoo, Body wash and body spray) were collected. The surface of sample container was disinfected with 70% Iso Propyl Alcohol before opening and removing contents. Then 10g of sample was dispersed in 90 ml sterile Eugon broth. From this 10^{-1} to 10^{-7} series of dilution were done and plated out on Tryptone Soy Agar to isolate and determine the bacterial load of the sample (Test Method – ISO 21149:2017). Sabouraud dextrose with chloramphenicol agar was used for the isolation and enumeration of yeasts and molds (Test method – ISO 16212:2017). Then plates were observed after 3 days incubation (25°C-yeast & molds, 32.5°C-bacteria). Morphological characterization of colonies was done by observing the appearance of colonies. Microscopic characterization was accomplished by Gram staining, motility test and endospore staining. Further biochemical tests and molecular biological tests were performed for further identification. Here, twenty-nine biochemical tests were carried out according to Cowan and steel's manual. And molecular biological 16s rRNA sequencing was carried out for confirmation of identified strains from biochemical tests. The performed study confirms that microbiological contamination in cosmetic product is a current issue. According to the tests isolated strains were *Pseudomonas aeruginosa* from cream, lotion, *Serratia marcescens* from lotion, *Aspergillus niger* from powder and *Escherichia coli* from toothpaste. No micro contamination was observed from body wash, body spray, hair oil, shampoo, hair cream and facewash.

Keywords: Cosmetics; *Pseudomonas*; *Serretia*; *Aspergillus*; *Escherichia coli*

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