Microbiology – a Tool in Research and Safety Assessment of Cosmetics

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Abstract

Every day one of us uses at least seven different types of personal care products to enhance our appearance. The quality of these products should play a crucial role in delivering a high expectation of their safety yet this may be interrupted by a number of factors starting from the production line through to the daily customer use habit.

According to Cosmetic Directive 76/768/EEC, a finished cosmetic product and its raw materials are required to be microbiologically tested and be of an acceptable microbiological quality. These limits include Total Viable Count for aerobic mesophilic microorganisms and specified microorganisms – pathogens, which are required to be analysed. Bacteria, yeast and mould are considered as pathogens if they supply disease-forming factors that enable them to produce recognised disease and infection. The common pathogens which may be found in cosmetic products such as shampoo, tonic and cream include; *Pseudomonas aeruginosa, Staphylococcous aureus*, *Candida albicans* along with *Escherica coli* and *Aspergillus niger.* To eliminate the risk of infecting the consumer, the experimental assessment of the efficacy of the product preservation under development has become a mandatory requirement for all cosmetics.

Why do the unicellular or cell-cluster microscopic organisms which cannot be seen by human eyes endanger the safety of the consumer when using cosmetics? The aim of this review is to give an insight into the microbiological and regulatory aspects of cosmetic care products in Europe and illustrate the importance of microbiological science in the cosmetic development industry.

Introduction

The microbiology of cosmetics can be a complex issue due to the enormous variety of formulations, manufacturing methods and uncontrolled conditions of domestic and consumer use.

Microorganisms found around us live in capsulated and single species colonies. They produce and grow in a sticky extracellular polymer matrix - a biofilm - composed of exopolysaccharides, proteins and extracellular DNA. A high tolerance to environmental changes ensures that these microcolonies are able to survive even the harshest conditions. The opportunistic human pathogen *Pseudomonas aeruginosa* is known to produce biofilms on inert, abiotic (non-living) surfaces such as glass. Biofilms, within bacteria can share nutrition can cause significant problems in industrial settings such as contamination of production lines, particularly biofilm expansion in purified water systems which is one of the major problems of product contamination in the cosmetic manufacturing industry.[1,7] Therefore a routine performance of microbiological control of cosmetics as a whole package is a necessity to ensure their safety in use.

The adult immune system and the body's bacteria flora are natural defences against some of the common pathogens. However, if the immune system becomes compromised and bacteria's flora becomes damaged, the pathogenic bacteria will proliferate and cause harm due to the opportunistic infection. Skin infection may happen when a cosmetic product is used on damaged skin, on mucosa membranes in the eye area or when used by small children or elderly people who have a compromised immune system. To be able to understand the process of bacterial disease and product contamination some features will be highlighted below.

Microorganisms and their Characteristics

Many human diseases can be caused by pathogens which gain access to the host tissues or accumulate the microbial