

Natural Deodorants: A way towards sustainable cosmetics

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ABSTRACT

Deodorants and Antiperspirants are two of the most commonly used cosmetics, with millions of people applying them to their axilla regularly. Antiperspirants are used to minimize sweat production and deodorants are used to mask frequently, these two merged into a single product. Deodorant products inhibit the growth and activity of bacteria that degrade the apocrine gland in the armpit. Despite their effective antibacterial properties, common antibacterial agents such as triclosan and aluminum salts increase the risk of Alzheimer's disease, breast and prostate cancer, and contact dermatitis. As a consequence, plant extracts with antibacterial properties are useful. Herbal cosmetics products have grown in popularity among the general public. Herbal cosmetics are believed to have effectiveness and inherent acceptability due to their widespread use in everyday life while avoiding the negative effects associated with synthetic products. Herbal products are in high demand for primary health care in the developing world, not just because they are cheap, but also because they are more compatible with the human body and have fewer side effects, Natural deodorant and synthetic deodorant are of great importance. This study aims to review on beneficial applications of natural deodorant over synthetic ingredients of the formulation.

Keywords: Natural Deodorant, Antiperspirants, Body odor, Armpit,

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INTRODUCTION

The Physiology of Body Odor

Skin is the largest organ that forms the boundary between the organism and also the environment (Reiger, 2000). It prevents skin dehydration, prevents the entry of weak foreign substances and microorganisms, cushions against mechanical shock, helps maintain vital signs, and transduces incoming stimuli (Reiger, 2000).

The bacterial degradation of precursors in sweat secretions is usually blamed for human armpit odor (Ferdenzi et al., 2020; Reinartz, 2014). Age, sex, genetic conditions, environmental factors such as temperature or stress circumstances, grooming, and therefore the use of cosmetics may all lead to foulness by affecting the volume and consistency of secretions, as well as the types of bacteria present on the skin. A type of bacterial flora found on human skin that is usually considered an innocuous symbiont but can also be an opportunistic pathogen. traditional skin flora doesn't have an adverse effect on the skin except the assembly of odorous substances (Schlegel, 1993) bacterial flora on normal skin was found as predominantly gram-positive and it's assumed that the population of gram-negative bacteria has increased there with a rise in either temperature or humidity (Nipa, 2015).

Bacterial skin flora is found to be commensal, symbiotic, or parasitic relative to the host, although alterations in host immune status are known to have a major impact. The kind of relationship established is usually inherent to bacteria (Chiller et al., 2001).

Sweat has no odor of its own. When it comes into contact with viruses and bacteria that are still present on the skin, foulness develops. Bacteria grow in moist environments, such as those found in your armpits (Pastor and Harper, 2012). When you sweat, bacteria break down those proteins in the sweat and convert them to acids. So the bacteria aren't the ones that stink. It's a by-product of the bacteria decomposing sweat (Inaba and Inaba, 1992).

Apocrine perspiration is primarily made from proteins, lipids, carbohydrates, and nitrogen derivatives, and is, therefore, an excellent source for bacterial metabolism (Noble, 2004). The enzymes produced by the bacterial metabolism permit the components of sweat to rework into sub-products with a lower relative molecular mass, therefore becoming more volatile and producing an unpleasant odour (Franco, 2017).

Control of body odour involves the use of deodorants that act primarily depending on the mechanism of the action like the use of antimicrobial preparations to prevent the occurrence of bacteria flora (Halla et al., 2018). Antiperspirants such as aluminum salts are used to reduce the amount of perspiration. Perfumes or perfumed compounds are used to mask odors. Use of absorbent chemicals to neutralize odours (Piérard et al., 2003).

The most common bacteria present in armpits were *Corynebacterium*, *Staphylococcus*, *Betaproteobacteria*, *Clostridiales*, *Lactobacillus*, *Propionibacterium*, and *Streptococcus*. The bacterial inhabitants of armpits were found to be extremely diverse even within the small community of people; some were dominated by *Corynebacterium* species and some by *Staphylobacter* species. (Gao et al., 2010; Troccazet et al., 2015). The human armpit has a high biomass bacterial community, and up to date, studies have observed substantial inter-individual variation in armpit bacteria, even relative to variation among individuals for other body habitats. One major explanation for this variation needs to do with the utilization of private hygiene products, particularly deodorants and antiperspirants (Urbanet et al., 2016).

Deodorants and antiperspirants

Aerosol, roll-on, creams & wipes and sticks & solids are the five main forms of deodorant and antiperspirant products. The market is divided into aerosol deodorants, roll-on deodorants, creams & wipes deodorants, sticks & solids deodorants, among others by deodorant product form (Plechner, 1972; Ficheux et al., 2015).

Deodorants and antiperspirants are two of the most popular cosmetic products, with many people applying them to their axilla on a daily basis. Deodorants are used to mask odors, while antiperspirants are used to reduce the amount of sweat produced. These two activities are often combined into a single product. The active ingredient in antiperspirants is sometimes aluminum-based, which reduces sweat by causing obstruction of the eccrine glands. Deodorants work by two different mechanisms (Abrutyn, 2015; Oliveira et al., 2021). Antimicrobial agents decrease the amount of bacteria that produce volatile odoriferous substances and perfume covers any odour that is produced. Recently, current zeolite minerals, which are sold as natural deodorants and antiperspirants in the form of aluminum or aluminum crystals (Laden, 1999). These items are available in solid crystal form. To prevent odour, the customer is advised to damp the crystals and add the product to the underarm region. About the fact that no study investigating the mode of action of such drugs has been conducted. Claims that the mineral salts create an environment during which bacteria cannot survive (Zirwas and Moennich, 2013).

Antiperspirants and deodorants are generally very safe products. However, these products have received much attention because the possible reason behind increasing rates of carcinoma and skin problems, with most hypotheses indicating the estrogenic properties of

parabens because the main contributing factor. A spread of chemical antimicrobials is currently added to deodorants and antiperspirants to decrease the degree of odour-forming bacteria. These include antifreeze, triclosan, benzalkonium chloride and metal (e.g. Aluminum (Al)) salts (Kanlayavattanukul and Lourith,2011; Zirwas and Moennich,2013). The effectiveness of those chemical compounds depends on the kind of microbial flora present for every individual. Of concern, the security of the many chemical additives has yet to be determined and in some cases has been linked with serious health problems. Indeed, the common deodorant additive aluminum has been linked with a good range of negative health effects including degenerative neurological conditions (e.g. Alzheimer's disease, encephalopathy) (Shaw and Tomljenovic 2013; Exley, 1998) and cancer (Darbre et al., 2004), although the link to cancer has not been definitively proven. Studies have indicated that aluminum additives might also cause respiratory problems and cause anaphylaxis in susceptible individuals. Similarly, there are concerns about chronic exposure to triclosan, a standard bacterial growth inhibitor in many deodorants. Triclosan has been reported to cause a range of health problems including dermal irritation and allergies, although the authors of that study report relatively high levels of exposure are required for these effects to become evident (Bhargava and Leonard, 1996).

Deodorants play a serious role in allergic dermatitis caused by fragrances. Deodorants seem to possess an unfortunate composition of fragrance ingredients, resulting in allergic dermatitis. As deodorants are employed in sensitive areas of the body, it may well be argued that these sensitizing fragrance ingredients should either be avoided or utilized in lower concentrations in deodorants than in other forms of product. Natural alternatives that inhibit the expansion of odour-forming bacteria are desirable and should be more acceptable to consumers thanks to their natural origin and consumer perception of safety (Heisterberget et al., 2011).

A deodorant is a product that is applied to the body to remove odor from bacterial breakdown in the armpits, feet, and other areas. Antiperspirants, a subgroup of deodorants, cause odor as well as sweating prevention by disrupting sweat glands. Antiperspirants are usually added to the underarms, although deodorants in the form of body sprays may be applied on the feet and other areas (Callewaert et al., 2014)

Advantages of Natural deodorant over Synthetic

Natural ingredients, such as plants, insects, microorganisms, and aquatic organisms, have been used in medicine since ancient times to alleviate and treat diseases. Plants have been used as drugs by humans for at least 60,000 years, according to fossil records (Parasuraman, 2018).

Natural deodorant is the modern trend in the field of beauty and fashion. These agents are gaining popularity as nowadays most people prefer natural products over synthetic materials for their personal care to enhance their beauty as these products supply the body with nutrients and enhance health and provide satisfaction as these are free from synthetic chemicals and have relatively less side-effects compared to the synthetic cosmetics (Joshi and Pawar,2015).

Antibacterial agents such as quaternary ammonium compounds like triclosan, aluminum salts, and aromatic odor-masking agents are now found in deodorant materials. Aluminum salts have an antibacterial benefit, but they can raise the risk of Alzheimer's disease, breast cancer, and prostate cancer. Many other antibacterial agents that have been found to be

effective against skin bacteria are irritants or sensitizers. There's also the risk of developing resistance to common antibiotics. For the prevention of armpit odour, natural additives with antibacterial action against *Staphylococci* and *Corynebacterium* are an option. (Shahtalebi, 2013).

Nowadays, Deodorant products that are free from Parabens, aluminum, alcohol, and artificial preservatives, are getting very talked-about within the market due to the rising demand for safe, natural and organic products. Aim of this review to check different synthetic materials and natural materials against the axillary and foot odor-forming bacteria *Corynebacterium jeikeium*, *Staphylococcus epidermidis*, *Propionibacterium acnes* and other odour causing bacteria with the aim of identifying safe and effective natural deodorant components (McManus et al.,2017).

Some study confirms that sufficient dosage of Soxhleted alcoholic extracts of Curry leaf, Methi Seeds & Neem leaves not only effectively prevents body bad odor but also provides long lasting efficacy up to 48 hrs (Vaibhav and Satish,2017), The methanolic leaf extract of *Terminalia ferdinandiana* has the ability to be used as a natural antibacterial ingredient in deodorant formulations. Due to the frequency at which deodorants are used, research is needed to ensure that their components do not aggregate and induce persistent toxicity. The low toxicity of *Terminalia ferdinandiana* leaf extracts, as well as their ability to prevent the growth of axillary and plantar malodour-producing bacteria, suggest that they may be used as deodorant ingredients (McManus et al, 2017).

Agar well diffusion was used to test the effects of sage extract on sweat-decomposing bacteria. It was discovered that 1 percent CO₂ sage extract inhibits *Corynebacterium* strains and *S. epidermidis* significantly. To check the in vitro antimicrobial effects of various sage extracts, researchers evaluated axillary deodorancy of dichloromethane sage extract in a silicone-based stick formulation (Shahtalebi et al.,2013)

The health effects of antiperspirants are a matter of dispute regarding their extent. A small percentage of people are allergic to aluminium and may experience contact dermatitis when exposed to aluminium-containing deodorants. Deodorant crystals containing synthetically made potassium alum were found to be a weak irritant to the skin. Natural Deodorants are a great way to avoid parabens, aluminum, and neuro-toxins found in commercial deodorants and antiperspirants. Because of above reason herbal antimicrobial agents are used in the formulation of deodorant stick. Experiment was performed by selecting the plant oil of *Eugenia caryophyllus* which was reported to have antibacterial activity (Debnath et al.,2011)

Conclusion

Consumers are increasingly searching for cosmetics that have a lower environmental impact. The demand for natural cosmetics is increasing, as it is widely accepted that these ingredients are safe and free of side effects. In the personal care industry, natural deodorant is becoming more common. All of this has occurred as a result of the widespread use of synthetic-based materials, synthetic additives, organic dyes, and their derivatives; their manufacture and use pose a health risk to humans, with a variety of side effects contributing to a variety of diseases.

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