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IN-VITRO EFFICACY STUDY OF BODY PERFUMES AGAINST RESPECTIVE MICROBIAL STRAINS

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ABSTRACT

Body odour refers to the unpleasant smell that arises due to the breakdown of sweat by the bacteria on our skin. An unpleasant body odour can undermine one's self-esteem, confidence, and reputation. It can make them conscious about their own self, leading to decreased social interactions. Body has two glands Eccrine and Apocrine glands. Eccrine glands are present all over the body. Apocrine glands are in areas like armpits. The odour develops when the bacteria come in contact with the perspiration of apocrine glands. Body perfumes are used to control Body odour. In this study ten popular brands of body perfumes were collected from the market and evaluated against the test organisms in detail. The tests conducted therefore to demonstrate that the test active is effective and safe to use.

KEYWORDS: Perfume, Odour, Eccrine, Apocrine, *Corynebacterium*, *Brevibacterium*.

INTRODUCTION

The layers of skin keep the body moist and protects from harmful environments including pathogens. In the underarm (axilla), a large and permanent population of microorganisms thrives on secretions from the eccrine, apocrine and sebaceous glands.

Skin contains two types of sweat glands which are eccrine and apocrine glands. Eccrine glands are found all over the body especially on the palms and feet, while apocrine glands can be found at specific areas such as armpits. Skin is also the living place for normal

bacteria. These bacteria in beneficial surrounding by secretions from sweat glands creates body odour.

The Microbiota consists mainly of *Micrococcaceae* species, lipolytic large colony aerobic diptheroids (predominantly *Corynebacterium* species) and *Propionibacterium* species. Significantly higher numbers of both total bacteria, and in particular *Corynebacteria* were associated with a ‘’pungent’’ apocrine odour quality, while high numbers of *Staphylococci*[1] correlated with a ‘’fatty acid ‘’nonapocrine odour quality. *Corynebacteria* generates ‘’ apocrine odour’’, while *Staphylococci* produces an ‘’acid odour’’. *Corynebacterium* and *Brevibacterium spp* involves in body mal odour.[2]

Body Perfume is used to control Body odour.[3] Body Perfume is a combination of alcohol, water and fragrance oils applied to the body to create a pleasant fragrance.[4] It is used to give a pleasant and desirable scent to a person’s body, typically with the aim of increasing self appeal and self-confidence.

Perfume comes from the Latin ‘per’ meaning through and fumum or smoke. Nowadays, it is mostly a fragrant liquid that is applied or sprayed on the skin, clothes or environment to create a pleasant aroma or smell to humans.[5]

Perfume is a mixture of fragrant essentials and aroma compounds, fixatives and solvents used to give the human body, objects and living spaces a pleasant smell.

In this study Antimicrobial efficacy of Body perfume samples against *Staphylococcus aureus*, *Corynebacterium xerosis*, *Brevibacterium epidermidis*, *Candida albians*, *Aspergillus brasiliensis.*

MATERIALS AND METHODS

I. Composition of body perfume

Perfumes are made composed of mainly composed of Essential Oils, Fixatives and solvents.

a. Essential oils: Derived from natural aromatic plant extracts and synthetic aromatic chemicals, e.g. limonene, citral.

b. Fixatives: Natural or synthetic substances used to reduce the evaporation rate. e.g. benzyl benzoate, benzyl alcohol.

c. **Solvents:** The liquid in which the perfume oil is dissolved in usually 98% ethanol and 2% water. Alcohol allows fragrance to spread along with it and does not permit microbial growth in perfume.

II. Minimum inhibitory concentration

Microbial Cultures *(Staphylococcus aureus, Corynebacterium xerosis, Candida albicans, Brevibacterium epidermidis, Aspergillus brasiliensis)* used in the study were procured from Microbial Type Culture Collection Culture Collection IMTECH, CHANDRIGARH, India.

Twenty-four hours broth culture of the test organism was used for the study. Agar dilution method was adopted for the evaluation of Body perfume samples (Brand I – Brand X). Muller Hinton agar was used for determining the activity. MIC was determined at various increasing concentrations from 0.1 to 10mg/ml in serial aliquots with Muller Hinton agar and Yeast and Mould Sabouraud Dextrose agar was used. Standardized culture suspension was inoculated on to the plates. The plates were incubated at 31 ± 2℃ for 1 - 3 days. For fungal plates were incubated at 23 ± 2℃ for 3 - 5 days. Proper control plates were maintained for testing the growth of the culture suspension. The experiments were repeated at least thrice.

RESULT

Table 1: Anti-microbial efficacy of Commercially Available Body Perfumes against respective Microbial strains.

S. No.	Sample Details	Active ingredients	MIC (mg/ml)				
			C. xerosis	*B. epidermidis*	*S. aureus*	*C. albicans*	*A. bracilliensis*
1.	Brand I	Ethyl Alcohol, Tertiary Butyl Alcohol, Denatonium Benzoate.	0.7- 0.8	0.8-0.9	0.9-1	3-4	4-5
2.	Brand II	Alcohol (96% v/v)-70% w/w Denatured with 0.0006% w/w Denatonium Benzoate, Aqua, **Fragrance**, PPG-20 Methyl Glucose Ether, PEG-40 Hydrogenated Castor Oil.	0.6 - 0.7	0.7-0.8	0.9-1	2-3	3-4

3.	Brand III	Ethyl Alcohol, Perfume, Dipropylene Glycol, C12-15 Pareth-12, Hydroxypropylcellulose, PVP, Sodium carboxymethylcellulose, Pectin, Phenoxyethanol, Ethylhexylglycerin, Polyvinyl Alcohol, DEP, Propylene Glycol, Farnesol, BHT.	0.8 – 0.9	0.9-1	0.9-1	1-2	5-7.5
4.	Brand IV	Alcohol Denat., Aqua, Parfum, PEG-40 Hydrogenated Castor Oil, Citral, Citronellol, Coumarin, Farnesol, Geraniol, Limonene, Linalool.	0.8 – 0.9	0.8-0.9	1-2	2-3	4-5
5.	Brand V	Alcohol Denat., Aqua, Parfum, PEG-40 Hydrogenated Castor Oil, Citral, Citronellol, Coumarin, Farnesol, Geraniol, Limonene, Linalool. Propellant, Ethyl alcohol (95% v/v); content:89.5% with 1% w/w Diethyl Phthalate Fragrance, Propylene Glycol	0.5 -0.6	0.7-0.8	0.9-1	1-2	5-7.5
6.	Brand VI	Ethyl Alcohol	0.7 - 0.8	0.8-0.9	1-2	2-3	4-5
7.	Brand VII	Ethyl Alcohol, Fragrance, Propylene glycol	0.6 – 0.7	0.8-0.9	0.9-1	1-2	4-5
8.	Brand VIII	Ethyl Alcohol Denatured with Butyl Alcohol, Denatonium Benzoate	0.7 - 0.8	0.9-1	1-2	2-3	2-3
9.	Brand IX	Ethyl Alcohol Denatured with Butyl Alcohol, Denatonium Benzoate	0.8-0.9	1-2	1-2	1-2	5-7.5
10.	Brand X	Ethyl Alcohol(95%), Diethylphtalate, Perfume, Propylene Alcohol	0.6 - 0.7	0.9-1	0.9-1	2-3	4-5

DISCUSSION

Human olfaction is the most ancient form of our distal senses, providing information of different chemicals from distant sources in real time.[6]

Humans emit a complex array of non-volatile and volatile molecules, depending on their genetics, diet, stress, and immune status. Numerous volatile compounds may be emitted from several areas of the body that are prone to odour production (e.g., scalp, axillae, feet, groin, and oral cavity).[7]

Body odour is the unpleasant smell caused by the mixing of perspiration (or sweat) and bacteria on the skin. The idea that human scent is produced through bacterial activities on dead skin cells and secretions is the most common depiction of the creation of human Body odour.[8]

Sweat is generally an odourless body secretion. However, as bacteria multiply on the skin and break down these secretions, the resulting by-products may contain a strong, disagreeable odour. The quick formation of odour was also proposed to support the idea that such a mechanism proceeds via simple bond cleavage as opposed to a complex bacterial action.[9]

A person's individual odour is genetically determined and can also be affected by food or medication.[10]

The three most frequently used methods to deodorise (Combat body odour) are to mask Inhibition of body odour-causing bacteria, another important strategy for deodorisation.

Fragrance will react to the pH of the skin it's sitting on and will perform differently depending on how far off balance it is.

But, unless some of the environmental things you're exposed to be constant, your pH skin is likely to normalize before long and it shouldn't have long-term effects.

In this study, all the Brands of body perfume contains Ethyl alcohol along with some ingredients.

Body perfumes are very effective against *Corynebacterium xerosis (*0.5to 0.9mg/ml) compared to other organisms. *Brevibacterium epidermidis* and Staphylococcus aureus MIC values are almost similar (0.8 to 1mg/ml).

Candida albicans and *Aspergillus brasiliensis* MIC values found to be slight high.

CONCLUSION

This study clearly demonstrates that all body perfumes samples are effective against *Corynebacterium xerosis(*0.5to 0.9mg/ml).

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