

## INVITRO STUDY ON THE ANTI - ACNE PROPERTY OF AYURVEDIC SOAP AND BODY WASH

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### ABSTRACT

Anti-acne property of two herbal cosmetics namely a soap and Body wash containing 18 herbal ingredients were screened against *Staphylococcus epidermidis*. The samples were selected from various periods of manufacturing until expiry at particular intervals to evaluate the efficacy of the products. The study elucidated a clean zone of inhibition by MIC which was well established in Soap when compared with Body wash. Further the efficacy was sustained upto 12 months for Soap and 9 months for Body wash. The study suggest the efficacy against Acne.

**KEYWORDS:** Anti-acne, *Staphylococcus epidermidis*, MIC, Ayurvedic, Soap, Body wash.

### INTRODUCTION

Acne is one among the common skin problems encountered during adolescent and young age. There are three major forms, namely *Acne vulgaris*, *Acne conglobata* and *Acne rosacea*. *Acne vulgaris* is characterized as a superficial disease which affects hair follicles and oil secreting glands of the skin. It also manifests as blackheads, whiteheads and inflammatory process. Though it is not life threatening, it affects the quality of life by creating a psychological burden due to diverse lesions on the face, chest, shoulders and back.<sup>[1]</sup>

*Staphylococcus epidermidis* is a gram-positive coagulase negative cocci which is an integral part of our normal flora which is involved in acne lesions. These are non pathogenic and at some point of time it turns infectious due to extrinsic factors. Though various antibacterial drugs are considered to be in the first line of treatment, apart from that there are many synergistic drugs from herbs which are also being practised from time to time.

Cosmetics with herbal ingredients are also being widely used against Acne and to evaluate the effect two common products were selected from Soap and Body wash and were screened for their effect to establish the efficacy of the product on the dosage form and further on the aging of the product, how the consistency of the results were also being screened and with this objective the study was carried out.

## MATERIALS AND METHODS

The Samples were collected from the market and were subjected for the entire study. Soap was coded as MSO5 and Body wash as MBW4. Apart from the Excipients and Inactives used for the formulation, it contain similar Herbal actives. The formulation contain 18 herbal actives namely, *Hemidesmus indicus*, *Smilax china*, *Zingiber zerumbet*, *Azadirachta indica*, *Acorus calamus*, *Vetiveria zizanioides*, *Berberis aristata*, *Cedrus deodara*, *Celastrus paniculatus*, *Coriandrum sativum*, *Cuminum cyminum*, *Plumbago indica*, *Embelia ribes*, *Glycyrrhiza glabra*, *Holarrhena antidysenterica*, *Nigella sativa*, *Psoralea corylifolia*, *Commiphora wightii*.

Further real time stability was also done under normal room condition and samples were tested during Initial, 3, 6, 9, 18 and 24 months respectively. *Staphylococcus epidermidis* MTCC 435 were procured from IMTECH, Chandigarh and was subcultured and stored in refrigerator. The cultures were confirmed further using Baird Parker agar with egg yolk supplement. Further they were also subjected for biochemical test where it was positive for Catalase, Hydrogen sulphide, Voges Proskauer test and Gram staining and Negative for Citrate, Coagulase and Methyl red.

Inoculating Nutrient broth media were procured from Himedia, Mumbai, India and used. Inoculum was adjusted to 0.5 MacFarland standard measuring  $10^8$ cfu/ml. MIC was determined at various increasing concentrations from 0.5 mg/ml upto 10 mg/ml, in a serial aliquots) with 10 ml of Muller Hinton agar. 100  $\mu$ l of the inoculum was inoculated on each plates. The plates were incubated for 24-48 hr at 35-37<sup>0</sup>C. Studies were carried out in triplicate and mean values were calculated.<sup>[6]</sup>

## RESULTS

The minimal inhibitory effect of the study drugs against *Staphylococcus epidermidis* were found to be effective and also noticed that the Soap formulation was having a consistent inhibition of 2mg/ml upto 12 months, which was reduced to 3.5 mg/ml at the time of expiry.

Further the Body wash formulation demonstrated a different scenario, where it was consistent upto 9 months with an MIC of 7.5 which was reduced to 10 mg/ml at 12 months and at 24 months it was 20 mg/ml. The results are elaborated in Table 1 and 2.

**Table 1: Minimum Inhibitory concentration for Soaps (MSO5).**

S.No	Interval	MIC(mg/ml)*
1	Initial	2±0.00
2	3 months	2±0.00
3	6 months	2±0.00
4	9 months	2±0.00
5	12 months	2±0.00
6	24 months	3.5±0.00

Results are represented as the Mean value of triplicates (Mean ± SD)\*.

**Table 2: Minimum Inhibitory concentration for Body wash (MBW4).**

S.No	Interval	MIC(mg/ml)*
1	Initial	7.5±0.00
2	3 months	7.5±0.00
3	6 months	7.5±0.00
4	9 months	7.5±0.00
5	12 months	10±0.00
6	24 months	20±0.00

Results are represented as the Mean value of triplicates (Mean ± SD)\*.

## DISCUSSION

Acne is a cutaneous pleomorphic disorder of the pilosebaceous unit involving abnormalities in sebum production. *Staphylococcus epidermidis* is a common pus-forming microbes responsible for the development of Acne vulgaris. It is a disease of pilosebaceous follicle characterized by non inflammatory and inflammatory lesions. Its pathogenesis is multifactorial the interplay of hormonal, bacterial and immunological factors results in the formation of acne lesions. It can be classified as Comedonal (mild), Papular (mild to moderate), Pustular (moderate), Nodulocystic (Severe). Primary cause of acne is due to increase level of androgen. Rising androgen levels make the oil glands under skin grow; the enlarged glands produces more oil. Excessive sebum can break down cellular walls in pores causing bacteria to grow. Antibiotics used for the treatment of acne.

Benzoyl peroxide is an anti-septic, acts as an oxidising agent, anti-inflammatory drug. It is used to treat acne. Other antibiotics such as acelaic acid, Clindamycin, tetracycline are used in the treatment of acne. These synthetic chemicals causing some side effects. Several herbs and herbal based preparations used to treat acne.

Terpenoidal fraction of *Hemidesmus indicus* is effective against *S. epidermidis*.<sup>[2]</sup> Ethyl acetate extract of *Smilax china* demonstrated remarkable anti-inflammatory<sup>[3]</sup> properties. *Zingiber zerumbet* was effective against *E. coli*, *Salmonella spp* and *Staphylococcus spp*.<sup>[4]</sup> *Azadirachta indica* pocesses antibacterial and antifungal activities<sup>[5,6]</sup> and *Acorus calamus* against *Salmonella typhi*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*.<sup>[7]</sup> Similar observations were also noticed with Green Tea extract. *Vetiveria zizanioides* in skin care, helps to balance the secretion of sebum and also as an antiseptic used for oily skin, acne and weeping sores.<sup>[8]</sup> *Celastrus paniculatus* was effective against *Micrococcus pyrogenus*, *Bacillus subtilis*, *B.cereus*, *Corynebacterium diphtheriae*, *S. paratyphi*, *Staphylococcus aureus* and *Klebsiella pneumoniae*.<sup>[9,10]</sup>, whereas *Coriandrum sativum* against *Salmonella typhimurium*, *Listeria monocytogens*, *S. aureus*, *Bacillus cereus*.<sup>[11]</sup> Similarly *Cuminum cyminum* against *Streptococcus mutans* and *Streptococcus pyrogenus*.<sup>[12,13]</sup> *Plumbago indica* and *Embelia ribes* are antibacterial, antifungal and antimicrobial activities.<sup>[14,15,17,18]</sup> *Glycyrrhiza glabra* is attributed to its antioxidant, Skin depigmenting and anti-acne<sup>[19,20]</sup> properties. *Nigella sativa* reduces the incidence of papules and pustules.<sup>[21]</sup> *Psoralea corylifoloia* is effective against gram positive and gram negative skin pathogens.<sup>[22]</sup> *Holarrhena antidysenterica* with its against skin disease<sup>[23]</sup> and *Commiphora wightii* is suggestive drug for nodulocystic acne.<sup>[24]</sup>

With a combined effect the two formulations were found to possess therapeutic benefit against Acne, where in the effect was more with the Soaps compared to Bodywash, due to the influence of surfactants and nature of the formula. Further the efficacy was also found to be inline and consistent and at the time of expiry only there was a mild degree of deviation.

## CONCLUSION

The study clearly elucidated that the Ayurvedic soap and Body wash are effective against *Staphylococcus epidermidis*.

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