Study on the efficacy of Natural Actives vs Natural Actives with Synthetic Ingredients in Anti Pimple Face Wash against *Propionibacterium acnes*

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ABSTRACT:
Pimple is a small inflammation or swelling of the skin that may or may not be filled with pus.Pimples are due to over activity of the oil glands located at the base of the hair follicles, especially on the face, back, chest, and shoulders. *Propionibacterium acnes* are responsible for pimple formation.

In this study seven popular anti pimple face wash samples were collected from the market and evaluated against *Propionibacterium acnes*. All the results were encouraging and demonstrated efficacy against the test organism and are briefed in detail.

KEYWORDS:
Pimple, *Propionibacterium acnes ,* Herbal, Synthetic, Actives.

INTRODUCTION:

Pimples are common skin conditions caused by clogged or inflamed oil glands or and increased presence of pimple causing bacteria on our skin. It affects peoples of all races covers 85% of teenagers, 42.5% of men and 50.9% of women between the ages of 20 and 30years([1-2]). It is a disorder that affects the pilosebaceous units of the skin and may result in inflammatory or non inflammatory lesions([3-5]). It is a chronic inflammatory dermatosis which consist of open comedones (blackheads), closed comedones (whiteheads) and inflammatory lesions such as nodules, pustules and popules([6]). Pimple lesions are most commonly present on the face, chest, upper back and upper arms which are known to have a high density of sebaceous glands([7]).

Propionibacterium acnes are responsible for the various forms of pimples. It is a gram positive human skin commensal that prefers anaerobic growth conditions and is involved in the pathogenesis of pimple. The four main pathological factors involved in the development of pimple are the increased sebum production, irregular foliicular desquamation, *Propioniacterium* proliferation and inflammation of area.

Propionibacterium acnes are a common resident of the pilosebaceous glands of the human skin & pimples are suppressed with topical & oral antibiotics.

The most frequently used topical antibiotic for pimple was Clindamycin which is available in a solution, lotion or gel at 1% strength. Salicylic acid is also used in the treatment of pimple as it was found to be one of the good cleansers that has both anti-inflammatory & comedolytic effects.

Though various antibacterial drugs are in the first line treatment, apart from that there are many synergistic drugs from herbs which are also being practiced time to time. Essential oils and medicinal plant extract have been extensively studied as another opinion to overcome the problem of antibiotics resistance. Herbs are known as safe, effective as well as multifunctional.

Ingredients used in topical pimple treatments especially herb and naturally derived compounds have fewer adverse effects in comparison with synthetic actives ([8]). Herbal active ingredients like *Aloe barbadensis, Azadirachta indica, Curcuma longa, Salix tetrasperma, Symploco rocemosa* are used in the ayurvedic anti-pimple face wash samples. These herbal ingredients produce anti-bacterial, anti-fungal and anti-microbial activity.

In this study Seven Natural actives and Natural actives with synthetic ingredients containing anti pimple face wash samples were evaluated for its anti-microbial activity.

MATERIALS AND METHODS:

Seven anti pimple face wash samples were collected from market and evaluated for the anti-microbial efficacy study. The Study products are categorized based upon the specialty ingredient present in it as per the label.

Propionibacterium acnes used in the study were procured from Microbial Type Culture Collection Culture Collection IMTECH, CHANDIGARH, India.

Twenty-four hours broth culture of the test organism was used for the study. Agar dilution method was adopted for the evaluation of Anti pimple face wash samples. Muller Hinton agar was used for determining the activity. MIC was determined at various increasing concentrations from 1 to 20mg/ml in serial aliquots with Muller Hinton agar. Standardized culture suspension was inoculated on to the plates. The plates were incubated at 31 to 35□ for 1 - 3 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 Natural Actives vs Natural actives with Synthetic ingredients in Anti acne Face wash against *Propionibacterium acnes*

S.No.	Sample Details	Active ingredients	MIC (mg/ml)
1.	Brand I	*Azadirachta indica, Ahwagandha*	10-12mg/ml
2.	Brand II	*Aloe barbadensis miller, Azadirachta indica, Ocimum sanctum*	12-14mg/ml
3.	Brand III	*Melaleuca alternifolia, Azadirachta indica,* Salicylic acid	5-7.5mg/ml
4.	Brand IV	*Citrus medica limonum,* Salicylic acid	3 - 4 mg/ml
5.	Brand V	*Aloe barbadensis, Azadirachta indica, Curcuma longa, Salix tetrasperma*	5- 7.5mg/ml
6.	Brand VI	*Rubia cordifolia, Azadirachta indica ,Curcuma longa, Symploco rocemosa,*	7.5-10 mg/ml
7.	Brand VII	*Azadirachta indica, Curcuma longa*	7.5-10 mg/ml

DISCUSSION:

Pimple is a cutaneous pleomorphic disorder of the pilosebaceous unit involving abnormalities in sebum production. It is as disorder of pilosebaseous follicle characterized by non inflammatory and inflammatory lesions. Primary cause of pimple is due to the increase level of androgen. Rising androgen levels make the oil glands under skin glow. The enlarged glands produces more oil. Several antibiotics used for the treatment of Pimple.

Antibiotics like Benzyl peroxide like Clindamycin, Tetracycline is widely used for the treatment of pimple. Synthetic active ingredients causing side effects.

Several Herbal and Herbal based preparations like *Azadirachta indica, Curcuma longa* are used for the treatment of pimple.

This study clearly demonstrates that Brand IV shows higher anti-microbial activity compared to other samples (3-4mg/ml).

It has the composition of Salicylic acid. Salicylic acid is a beta hydroxyl acid agent. Salicylic acid peeling effect can alter the underlying dermal tissue without directly wounding the tissue or causing inflammation ([9]).

Brand III also has better antimicrobial activity because of the presence of Salicylic acid.

Brand V, VI, VII has herbal active ingredients also has good anti-microbial activity. In this *Azadirachta indica* has Antibacterial, anti-fungal, anti-inflammatory, antiseptic activity and highly beneficial for oily and pimple prone skin ([10]). *Curcuma longa* has antibacterial, antifungal property. It protects the skin from many skin infections and also adds glow to the face.
Symploco rocemosa helps to control pimple due to its anti-inflammatory property.

Brand I and II shows higher inhibition level.

CONCLUSION:

This study clearly demonstrates that anti pimple face wash with Salicylic acid shows higher anti -microbial activity.

Salicylic acid has some side effects like dizziness, burning abdominal cramps and central nervous system reactions.

Herbal anti pimple face wash with *Rubia cordifolia, Azadirachta indica, Curcuma longa, Symploco rocemosa,* also recorded good anti-microbial activity but slightly higher than anti pimple face wash with Salicylic acid in MIC.

Herbal anti pimple face wash prevents skin damage and it's relatively safer for people with pimple prone and sensitive skin problem.

Naturally and organically derived ingredients are mostly sustainably sourced which is not only beneficial for our skin but also for the environment.

Hence, Anti pimple face wash with natural actives is safer than natural actives with synthetic ingredients.

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