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Importance of anti-inflammatory cleansers for skin

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Abstract

The present study deals with an anti-inflammatory cleanser- A Siddha drug formulation. Cleansers are although used for the limited use of cleaning the skin and hair, the surfactant in them bound to cause irritant reaction. For the first time we have studied the anti-inflammatory benefit a cleanser-Psorolin Medicated Bathing Bar and the importance of herbs for the above purpose is discussed. A simple and novel method adopted for evaluating the anti-inflammatory benefit.

Keywords: Cleansers, anti-inflammatory, soap, bathing bar, protein denaturation

1. Introduction

Use of cleansers to make the skin clean and perfumed has started several centuries ago. The art of perfection in formulating an ideal cleanser for skin care is still continuing as newer and newer dermatological problems compel the scientists to formulate cleansers with several medicinal benefits^[1, 2].

Psorolin medicated bathing bar is a proprietary Siddha product of Dr. JRK's Research and Pharmaceuticals Pvt. Ltd indicated largely for Psoriasis, atopic dermatitis, urticaria, pruritus and dryness of the skin.

Most of the cleansers are formulated with chemical base such as fatty acids made after saponification of vegetable oils, synthetic cleansers or a combination of both.

The pH of most of the cleansers is alkaline in nature. The high pH and the Surfactant of the cleansers are known to induce some level of skin irritation and allergic reactions in those who suffer from certain skin susceptibility. The conditions like psoriasis, atopic dermatitis, urticaria, pruritus requires high moisturizing, emollient rich, pH non-reactive cleansers. Formulating such cleansers with chemical ingredients is quite challenging. However use of certain herbal extracts may offer superior therapeutic benefit and such formulations also can be hypo-allergenic if formulation science is followed accordingly^[3, 4].

Psorolin medicated bathing bar is formulated with the extracts of *Wrightia tinctoria* and *Aloe vera*. Both these plants although have rich mention in the scriptures of ancient traditional systems of medicine in India, several scientific studies have undisputedly proved the anti-inflammatory and anti-psoriatic benefits of both *Wrightia tinctoria* and *Aloe vera*^[5-7]. Whether the anti-inflammatory activity of the above herbal extracts are retained well in the surfactant ecosystem used in Psorolin medicated bathing bar is not yet established.

Our earlier study however has proved that the phytochemical properties of the oil extract of *Wrightia tinctoria* and *Aloe vera* in the Psorolin medicated bathing bar is preserved well when tested by TLC^[8].

Further the oil extract did not undergo rancidity up to a period of two years. The present study report the anti-inflammatory effect of *Wrightia tinctoria* and *Aloe vera* in Psorolin medicated bathing bar and details are presented in the paper.

2. Materials and Methods

Extraction of *Wrightia tinctoria* and *Aloe vera* oil from Psorolin Medicated bathing bar above for various batches.

In brief 50 g of the sample was weighed and powdered using mortar and pestle. The sample was treated with 300 ml of diethyl ether: hexane in a conical flask which was maintained in a shaker. Duplicate sets were maintained for all the batches. After 24 hours incubation the solvent was evaporated at room temperature in a pre-weighed vessel and the final weight of the residual oil was measured. Similarly bathing bar was made with either the extract of *Wrightia tinctoria* or *Aloe vera* and then attempt was made to separate the extracts from the bathing bar base formulated with either of the extract.

Table 1: Details of the batches used for the study

S. No	Batch details		
	Batch number	Mfg. date	Expiry date
1	108/18	April-18	March-20
2	109/18	June-18	May-20
3	110/18	July-18	June-20
4	111/18	September-18	August-20
5	112/18	November-18	October-20
6	101/17	September – 17	August – 19
7	104/17	December- 17	November - 19
8	Sample 1 – Oil extract of Aloe Vera	-	-
9	Sample 2 –Oil extract of <i>Wrightia tinctoria</i>	-	-
10	Aloe vera extracted from base	-	-
11	<i>Wrightia tinctoria</i> extracted from base	-	-

2.1 Evaluation of anti-inflammatory activity: *In vitro* Preparation of protein solution

0.2 ml of egg albumin (fresh hen's egg) along with 2.8 mL of phosphate buffered saline (PBS, pH 6.4) and 2 mL of varying concentrations of total oil extract (combination of *Wrightia tinctoria* and Aloe vera) from Psorolin medicated bathing bar of different batches were studied. The concentrations used for the test were 100, 200, 300 mg/mL. Then above reaction mixture was incubated at (37 °C ± 2) in a BOD incubator for 15 min and then heated at 70 °C for 5 min. After cooling, the absorbance was measured at 660 nm. Acetyl salicylic Acid was used as positive control.

The percentage inhibition of protein denaturation was calculated by using the following formula:

$$\% \text{ Inhibition} = \frac{\text{Abs control} - \text{Abs test}}{\text{Abs control}} \times 100$$

2.2 Determination of Acid Value

A solution of 25 ml each of diethyl ether and ethanol was

prepared and 2.0 g of the sample oil was added, and the mixture was digested in a water bath for ten minutes. It was then titrated with 0.1 M of KOH solution until the pale pink colour appears. Under the same condition, a blank titration was conducted ^[10].

$$\text{Titre value} \times 56.1 \text{ Acid value} = \text{Weight of sample}$$

3. Results

The oil extract of *Wrightia tinctoria* exhibited 93 % inhibition of protein denaturation whereas the oil extract of Aloe vera showed 77.3% inhibition in denaturation of protein. The Aloe vera oil and *Wrightia tinctoria* oil extracted from the base showed 70.2 and 86.5% inhibition of protein denaturation respectively. The oil extracts of Aloe vera and *Wrightia tinctoria* extracted from different batches of Psorolin medicated bathing bar showed the inhibition of protein denaturation 75% and above for various batches. Table- 2

Table 2: Anti-inflammatory assay *In vitro*

S. No.	Details of the sample	Batch number	% Inhibition of Protein denaturation – 100mg/ml
1	Psorolin medicated bathing bar	108/18	89
2	Psorolin medicated bathing bar	109/18	89.5
3	Psorolin medicated bathing bar	110/18	78.2
4	Psorolin medicated bathing bar	111/18	85.2
5	Psorolin medicated bathing bar	112/18	83.8
6	Psorolin medicated bathing bar	101/17	77.5
7	Psorolin medicated bathing bar	104/17	75.6
8	Sample 1 – oil extracts of Aloe Vera	-	77.3
9	Sample 2 –oil extracts of <i>Wrightia tinctoria</i>	-	93
10	<i>Aloe vera</i> extracted from base	-	70.2
11	<i>Wrightia tinctoria</i> extracted from base	-	86.5
12	Coconut oil extracted from base	-	40

3.1 Analysis of Acid value

Table 3: Determination of Acid Value

S.no	Details of the sample	Batch number	Acid value
1	Psorolin medicated bathing bar	108/18	10.2
2	Psorolin medicated bathing bar	109/18	10.5
3	Psorolin medicated bathing bar	110/18	13.2
4	Psorolin medicated bathing bar	111/18	12.2
5	Psorolin medicated bathing bar	112/18	13.5
6	Psorolin medicated bathing bar	101/17	16.3
7	Psorolin medicated bathing bar	104/17	15.8
8	Sample 1 – Oil extracts of Aloe Vera	-	4.0
9	Sample 2 –Oil extracts of <i>Wrightia tinctoria</i>	-	3.0
10	<i>Aloe vera</i> extracted from base	-	10.5
11	<i>Wrightia tinctoria</i> extracted from base	-	9.5
12	Coconut oil extracted from herbs	-	22.0

The oil extracts of *Wrightia tinctoria* and *Aloe vera* showed lowest acid value which indicates herbs do not cause rancidity of the oil. The oil extracts extracted from different batches of Psorolin medicated bathing bar as well as *Aloe vera oil* or *Wrightia tinctoria* oil extracted from the base showed uniform acid value ranging from 10 to 16. Table-3

4. Discussion

The present study has highlighted the importance of anti-inflammatory cleansers for various dermatological conditions. It was always suspected that how a cleanser with very short contact time can offer such benefit. Further how the actives will be preserved in the high pH surfactant dominant environment of bathing bar also pose a serious doubt on the performance of such cleanser.

We have clearly established the anti-inflammatory effect of the Siddha product Psorolin medicated bathing bar. Both the *Aloe vera* and *Wrightia tinctoria* possess anti-inflammatory activity however the *Wrightia tinctoria* showed greater anti-inflammatory activity when compared to *Aloe vera* [6, 7].

Interestingly the high pH surfactant dominant bathing bar environment has not affected the anti-inflammatory property of *Aloe vera* and *Wrightia tinctoria*. The soap that was prepared with plain coconut oil and subsequently the oil was extracted from the base and was studied for its acid value and protein denaturation property. The result showed that the coconut oil turned rancid and did not inhibit protein denaturation process. The above finding undoubtedly establish that *Aloe vera* and *Wrightia tinctoria* not only possess anti-inflammatory activity but also prevent the rancidity of coconut oil in high pH surfactant dominant bathing bar environment.

A clear link between acid value and protein denaturation was seen in our study. Higher the acid value, lower the protein denaturation inhibition effect. It means the oil that has higher acid value can elicit inflammatory responses than acting as anti-inflammatory smoothening agent.

The presence of *Aloe vera* and *Wrightia tinctoria* has dramatically changed the chemico-behavioural property of both coconut oil and the surfactant base. This is the first anti-inflammatory cleanser from Siddha system of medicine with established scientific evidence.

The present study highlight the therapeutic value of Psorolin medicated bathing bar for various inflammatory skin conditions such as urticaria, atopic dermatitis, pruritus etc. psoriasis requires super specialized, super fatted cleanser in order to achieve both exfoliation and subsequent emolliency. Anti-inflammatory cleansers have enormous value in the treatment of psoriasis.

The anti-psoriatic benefit of *Wrightia tinctoria* was discovered by Dr. JR Krishnamoorthy, a registered and qualified medical practitioner and an expert in Siddha medicine, who was later awarded Padmashri, a highest civilian award by Govt. of India. Since then *Wrightia tinctoria* has been exploited extensively for the treatment of psoriasis all over the world. However this plant is yet to get its due recognition for the treatment of psoriasis by psoriasis foundation. The anti-inflammatory effect of *Wrightia tinctoria* as revealed by the present study suggest that besides keratinocyte proliferation inhibition the plant also possess anti-inflammatory benefit which is essential for the treatment of psoriasis. Plenty of research support is available for *Aloe vera* proving its anti-inflammatory effect. Psorolin medicated

bathing bar is the first anti-inflammatory cleanser for psoriasis and other skin condition with proven science and evidence.

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