Preparation and evaluation of fruit face wash

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ABSTRACT

Human skin is the highly exposed body organ to pathogens and disease causing micro organism. So it requires a lot of protection and care. Chemical antibiotic gels and anti-acne washes or masks are currently available in the market which are composed of synthetic drugs. Unfortunately these drugs have potential side effects besides curing diseases and fighting pathogens. The need brings us the idea of incorporating the herbs in the formulations to treat acne. In the current research, herbal face wash is prepared and evaluated for its properties and potency. The Fruit Facewash gel containing grape seed and pulp extract, cucumber juice, orange juice, lemon juice using carbopol 940 was prepared with good consistency. The reduction in the growth of microorganisms is clearly seen in the dishes contained Gel-CRB marked (aft CRB) respectively.

INTRODUCTION

Human skin is the highly exposed body organ to pathogens and disease-causing micro-organism. So, it requires a lot of protection and care. Chemical antibiotic gels and anti-acne washes or masks are currently available in the market which are composed of synthetic drugs. Unfortunately, these drugs have potential side effects besides curing diseases and fighting pathogens. They are recognized for causing skin irritation, resistance (Clindamycin) and even inflammation (Isotroin). The organisms responsible for acne are Staphylococcus aureus, S. epidermidis and Propioni bacterium acnes. It demands a need to develop the alternatives in the treatment of acnes along with the patient compliance [1].

In Ayurveda, Aloe vera is used in the treatment of acne and along with other herbs it becomes more potential treatment. Those herbs include neem, papaya, turmeric etc. In spite of the advantages, there are very limited investigations on these herbs to prove the potential as anti acne herbs . Herbal Products which are prepared from Rubia cordifolia, Curcuma longa, Hemidesmus indicus, and Azadirachta indica have been shown to have anti-inflammatory effects, but not aloe vera. Azelaic acid is suitable for mild and comedonal acne. Panthenolic acid suspended in the solutions at 5% has been proved to give some success in fighting the P. acnes bacteria compared to benzoyl peroxide Oral administration of Zinc gluconate has proved a better anti acne treatment due to better anti inflammatory activity compared to the tetracyclines [2-4].

Currently, fruit based formulations are also widely
available in markets that specifically treat acne and facial infections. Papaya is the most noted and proven among those face washes can also be used to control acne. Tea tree oil is a herbal ingredient found in some formulations is an effective treatment as compared to the synthetic drug benzoyl peroxide in treating acne and also by prevention of occurrence of new acne [5] .

The need brings us the idea of incorporating the herbs in the formulations to treat acne. There are many plants rich in the chemical constituents that are active against the above stated bacteria. Hence, a new way can be developed to combat the antibiotic resistant acne causing bacteria and this research states that the treatment is safe and effective in controlling acne. In the current research, herbal face wash is prepared and evaluated for its properties and potency [6, 7].

MATERIALS AND METHODS

Materials

The herbs used to prepare the face wash are collected from supplier of herbal crude drugs, Nellore, India. All the chemicals used in the experiments were procured from SD Fine Chem LTD., Mumbai, India.

Preparation of crude extract

Grape seeds and pulp are taken in the ratio of 4:1 and are air dried and extracted with 70%-ethanol for 6 hrs, the extract is dried under rotary evaporator and is added to the blend. Add 30 ml of cucumber pieces juice to the blend. Squeeze the juice from 1 lemon and add 30 ml into the blender. Also, squeeze juice of one orange and add 30 ml in to the blend. Blend the mixture on high speed for 1 to 2 minutes. The juices added are previously centrifuged after squeezing and before adding in to the blend so as to remove the tissue.

Formulation of herbal hand sanitizer

All the ingredients were weighed according to the table.1. Polymers were taken in two different beakers and glycerin was poured into them. Keeping on continuous stirring using a magnetic stirrer all other powder ingredient was added. Then measured quantity of distilled water was slowly added so it formed a thick mass. It was left for stirring overnight and has formed a gel. The fruit paste made by blending were added to each of the gel with stirring and left for 2hrs. They were tested for stability and packed.

Evaluation of prepared formulations

Evaluation of physical characteristics

The physical characteristics like colour, odour, consistency were observed and recorded.

The pH was determined by using digital pH meter. The measurement of viscosity of the gels were performed by ostwald viscometer. For better and accurate results brookfield viscometer can be used (Table 1).

Skin irritation study

Four human volunteers both male and female were used for evaluation of skin irritation. Their hands were sterilized and area of 2 cm was marked on both the hands, one side served as control while the other side was test, 2 humans for each formulation. The prepared formulations were applied 2times a day for 3 days and the site was noted for any sensitivity and reaction if any. Later 12 healthy human volunteers were selected 4 females and 8 males. A 2 cm area on the skin of the face was washed with the gels daily twice for 2 days and observed for any sensitivity (Table 2).

Stability test

Stability testing was performed by using freeze and thaw cycling method. In this method, syneresis was noted by subjecting the formulations to a temperature of 4°C for 2 days, then at 25°C for 2 days, then at 40°C for 2 days. pH changes were noted and texture of the formulations were noted when the product is brought back to normal conditions.

Invitro Anti Microbial evaluation of the gels

Turbidimetric analysis

A sterile conical flask was taken and 30 ml of nutrient broth was prepared & sterilised. 5 ml of the broth was kept aside marked (ref) in a sterile area and was taken as reference solution. The balance was inoculated using the microbes that are cultured in the plate (bfr) from the above test. Four sterile test tubes were taken and 5 ml of the inoculated broth was poured into each of the test tube. Three sterile cotton balls of approximately 1 cm in diameter were taken and marked CONT, STD, Gel-CRB. These balls were dipped in the distilled water, Clindamycin phosphate gel diluted with distilled water which yields a final concentration of 0.1mg/ml (serial dilution technique), 5ml of both the gels respectively and let to saturate for 5 min. These were transferred into 3 test tubes. The test tubes were incubated in an incubator for 24 hrs at 37°C. They were taken out and the absorbance was measured at 600 nm taking the (ref) as reference solution. This procedure is repeated for three times so as to minimize the variations in readings due to in process errors and the means of all the absorbance values were calculated individually. The
Table 1: Composition of Formulation

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Ingredients</th>
<th>Quantity (100 ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carbopol 940</td>
<td>500mg</td>
</tr>
<tr>
<td>2</td>
<td>Methyl paraben</td>
<td>0.5mg</td>
</tr>
<tr>
<td>3</td>
<td>Propyl paraben</td>
<td>0.5mg</td>
</tr>
<tr>
<td>4</td>
<td>Ethyl alcohol</td>
<td>30 ml</td>
</tr>
<tr>
<td>5</td>
<td>SLS</td>
<td>10 mg</td>
</tr>
<tr>
<td>6</td>
<td>Glycerin</td>
<td>50 ml</td>
</tr>
<tr>
<td>7</td>
<td>Water</td>
<td>20 ml</td>
</tr>
<tr>
<td>8</td>
<td>Triethanolamine</td>
<td>1 ml</td>
</tr>
<tr>
<td>9</td>
<td>Fragrance</td>
<td>q.s</td>
</tr>
</tbody>
</table>

Table 2: Turbidimetric assay of the prepared formulation

<table>
<thead>
<tr>
<th>S.No</th>
<th>Sample</th>
<th>Absorbance(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>1.236</td>
</tr>
<tr>
<td>2</td>
<td>Gel-CRB</td>
<td>0.165</td>
</tr>
<tr>
<td>3</td>
<td>Standard</td>
<td>0.137</td>
</tr>
</tbody>
</table>

Table 2: Turbidimetric assay of the prepared formulation

<table>
<thead>
<tr>
<th>S.No</th>
<th>Sample</th>
<th>Absorbance(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>1.239</td>
</tr>
<tr>
<td>2</td>
<td>Gel-CRB</td>
<td>0.171</td>
</tr>
<tr>
<td>3</td>
<td>Standard</td>
<td>0.145</td>
</tr>
</tbody>
</table>

values were taken as the measure of the bacterial growth (Figure 1).

Cotton swab method

The acne is caused by multiple species of bacteria. So instead of using single isolated organism culture or the alternative organisms for the method, the use of the intact native bacteria from the acne will prove the formulation activity against all the organisms that causes Acnes. For screening of the anti-bacterial activity, three sterile petri dishes were taken and marked as after (aft CRB), and before (bfr). Nutrient agar medium previously prepared and sterilized was poured onto the plates and set to solidify in a sterile environment. Three sterile cotton swabs were taken. The skin on face of a healthy subject which has distinct acne were washed with double distilled water and let dry. Then a cotton swab was rubbed on the ruptured pimple thrice and was let to soak in 1 ml of distilled water. This solution was evenly inoculated on to the medium in the plate marked (bfr). Each side of the human face was washed with the prepared gel and commercial gel separately according to the directions prescribed in the label and let to dry. The other cotton swabs were rubbed on the ruptured pimples thrice individually on each side and the same procedure was followed to inoculate the medium on the plates marked (aft CRB) and (aft commercial gel) respectively. These plates were then incubated in an incubator for bacterial growth for 24 hrs at 37°C. The cultured petri plates with visible bacterial growth were compared (Figure 2).

RESULTS

The Fruit Facewash gel containing grape seed and pulp extract, cucumber juice, orange juice, lemon juice using carbopol 940 was prepared with good consistency. The prepared formulations were pale brownish yellow colored and visually transparent. Odour and softness proves that they have a good acceptance to patient compliance. The stability test was performed for the gel and they showed no signs of syneresis, no pH changes and no color change.

The pH of gels was estimated as 6.88 which is neutral to the skin and effective against bacteria. The viscosity of the gels was found to be 10.124 which shows the gel will stay on the face when applied and washes the bacteria effectively.

Primary skin irritation test was performed to evaluate the irritation by the gels on intact skin of humans. Both the formulations were not showed any itching, inflammation, erythema and/or edema.

The anti microbial efficacy of the gel was evaluated by turbidimetric method. They infer that the gels could effectively inhibit the growth of the organisms. The graph shows that the gel stood competitive to the standard gel. The results of the anti microbial tests comparing the preparation and std were given in Table 2. It infers that the gel could effectively inhibit the growth of the organisms.

The invitro antimicrobial tests for the formulation was performed. The screening of the Gel in the cotton swab method proved the gel could reduce the bacterial growth. This shows the recognizable
Figure 1: Turbidimetric estimation of antimicrobial activity of gels

Figure 2: Cotton Swab method of analysis of antibacterial activity
growth of various colonies in the petridish with control, marked as (bfr). These colonies were shown clear in circles. The reduction in the growth is clearly seen in the dishes contained Gel-CRB marked (aft CRB) respectively.

CONCLUSION

Acnes are quite common in almost all the adolescents. The fruit face wash gel prepared has shown activity against the acne causing organisms and stood competent to the marketed formulation. The gel showed no signs of instability and irritation to the humans which were usually exhibited in the usage of synthetic drugs. There is a need to develop poly herbal formulations to treat acnes with limited side effects and toxicity that the available treatments presently have. In the current work it may be an advance in the treatment of acnes using fruits as well as in developing poly herbal formulations for the safe and effective management of diseases.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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REFERENCES


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