FORMULATION OF HERBAL HYDROGELS FOR WOUND HEALING ACTIVITY BY USING VITIS VINIFERA SEEDS EXTRACT

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ARTICLE INFO
Article history
Received 30/09/2014
Available online
30/10/2014

Keywords
Vitis vinifera , ethanolic, wound healing, carbohydrates, proteins, alkaloids, flavanoids, tannins.

The present study was carried out to explore the phytochemical and pharmacological studies on seeds of Vitis vinifera. Formulation was made by ethanolic extracts of Vitis vinifera and made into gel form. The extract was subjected to preliminary phytochemical screening which indicates the presence of carbohydrates, proteins, alkaloids, flavanoids, tannins. The wound healing activity of compound was pharmacologically evaluated by excision method on swiss albino rats. It was concluded that the ethanolic extract and herbal formulation shows significant wound healing activity compared to standard compounds.


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INTRODUCTION

Hydrogels

Hydrogels are water swollen three dimensional structures composed of primarily hydrophilic polymers. These are cross linked macro molecular networks that are insoluble but are able to swell rapidly in water or biological fluids. These materials uniquely offer moderate-to-high physical, chemical, and mechanical stability in their swollen state. The structure of a hydrogel can be designed for a specific application by selecting proper starting materials and processing techniques. Since the equilibrium swelling capacity of a hydrogel is a balance between swelling and elastic forces, hydrogel with different swelling capacities can be designed by modulating the contribution of individual forces. Certain hydrogels respond to the changes in environmental factors by altering their swelling behavior.

Herbal Formulation

Herbal medicines are the synthesis of therapeutic experience of generations of practicing physicians of indigenous systems of medicine for over 100 of years and they are known to be oldest health care products that have been used by man kind allover the world in the form of folk medicines or ethnic medicines. The therapeutic use of herbal medicine is gaining considerable momentum in the world past decade. The over use of synthetic drugs with impurities results in higher incidence of adverse drug reaction. Therefore quality control standards of various medicinal plants used in indigenous system of medicine are becoming more relevant today in view of commercialization of formulations based on medicinal plants unlike in the past when the traditional doctors would themselves dispense the medicines. Indian medicinal plants also provide a rich source for antioxidants that are known to prevent/delay different diseased states. The antioxidant protection is observed at different levels. Due to varied geographical locations where their plants grow, couple with the problem of different vernacular names these plants are known by a great deal if adulteration is encountered during commercial markets. Hence the reproducible standards of each plant is necessary for effective quality control. WHO encourages, recommends and promotes traditional herbal medicines in national health care programs because these drugs are easily available at low cost, and people have faith in them. The WHO assembly in number of resolutions as emphasized the need to ensure quality control of medicinal plant products by using modern techniques and applying suitable standards. Traditional use of medicines is recognized as a way to learn about potential future medicines. In 2001, researchers identified 122 compounds used in main stream medicine which were derived from ethno medical plant sources, 80% of these compounds were used in the same manner as the traditional ethno medical use.

MATERIALS AND METHODS

Vitis vinifera

Chemical constituents of grape seeds

These seeds contain lipid, protein, carbohydrates, and 5-8% polyphenols depending on the variety. Polyphenols in grape seeds are mainly flavonoids, including gallic acid, the monomeric flavan-3-ols catechin, epicatechin, gallocatechin, epigallocatechin, and epicatechin 3-O-gallate, and procyanidin dimers, trimers, and more highly polymerized procyanidins. Grape seed extract is known as a powerful antioxidant that protects the body from premature aging, disease, and decay. Grape seeds contain mainly phenols such as proanthocyanidins (oligomeric proanthocyanidins).
Extraction process of *Vitis vinifera*

About 90g of powder of *Vitis vinifera* was packed into soxhlet apparatus and extracted with 200-250 ml of ethanol at 40° C by continuous hot percolation. The extract was subjected to distillation and it was stored on desiccators and the % yield value was determined. The same mark was continued with different organic solvents like benzene, chloroform, acetone, methanol and water according to their polarity wise. Percentage yield of extracts were determined.

**FORMULATION OF HYDROGEL**

The appropriate amount of tween80,IPA, oleicacid, seed extract, ghee, honey were weighed accurately and placed in a stoppered flask. The mixture was stirred using a magnetic stirrer for 10 mins, then the microemulsion gel was formed by adding water with continuous stirring for another 10 mins. The gel was stored at room temperature for 48 hrs for equilibration. The hydrogels which are prepared by using different concentration of ingredients as shown in table.

**Figure: Hydrogels prepared by using different concentrations of ingredients.**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Vitis vinifera</em></td>
<td>3g</td>
<td>3.5g</td>
<td>4g</td>
</tr>
<tr>
<td>Oleic acid</td>
<td>3.12ml</td>
<td>3.12ml</td>
<td>3.12ml</td>
</tr>
<tr>
<td>Tween 80+IPA</td>
<td>20.5ml</td>
<td>20ml</td>
<td>19.5ml</td>
</tr>
<tr>
<td>Water</td>
<td>Q.S</td>
<td>Q.S</td>
<td>Q.S</td>
</tr>
<tr>
<td>Carbapol</td>
<td>0.50g</td>
<td>0.75g</td>
<td>1g</td>
</tr>
<tr>
<td>Honey</td>
<td>2g</td>
<td>2g</td>
<td>2g</td>
</tr>
<tr>
<td>Ghee</td>
<td>2g</td>
<td>2g</td>
<td>2g</td>
</tr>
</tbody>
</table>

**PHARMACOLOGICAL SRCEENING**

**Animals used**

Swiss albino rats of either sex weighing about 100-130g were used. In this study animals were grouped in cages. The animals were fed with pellet diet and water. All the animals were acclimatized to laboratory conditions prior to experiment.

**Method**

Excision method

**Procedure**

Hairs were removed from the dorsal thoracic central region of anaesthetized rats. The rats were depilated on the back. One excision wound was inflicted by cutting away a 300 mm² full thickness of skin from a predetermined area; the wound was left undressed to the open environment. Then the hydrogels were applied calculated as percent reduction in wound area. The progressive changes in wound area were monitored planimetrically by tracing the wound margin on graph paper every alternate day. Epithelialisation time was noted as a number of days after wounding required for the scar to fall off leaving no raw wound behind.

**Group 1 - Control**

Group 2 - Standard (Framycetin)

Group 3 - Formulation F1

Group 4 - Formulation F2

Group 5 - Formulation F3

**Treatment profile**

Route of administration : Topical

Dose level : 200mg/kg b.w

Frequency of administration : once

**RESULTS AND DISCUSSION**

**Extractive value and percentage yield of *Vitis vinifera* seeds**

The collected seeds were weighed and the weight was taken the percentage purity of the extract was found as

**Table .Results of extraction value and percentage purity.**

<table>
<thead>
<tr>
<th>Different solvents</th>
<th>Percentage yield(%) (w/w)</th>
<th>Colour</th>
<th>Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>24</td>
<td>Brown</td>
<td>Greasy</td>
</tr>
</tbody>
</table>
Phytochemical evaluation

Table: Results of phytochemical screening.

<table>
<thead>
<tr>
<th>TESTS</th>
<th>ETHANOLIC EXTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>_</td>
</tr>
<tr>
<td>Phytosterol</td>
<td>_</td>
</tr>
<tr>
<td>Fixed oils</td>
<td>_</td>
</tr>
<tr>
<td>Saponins</td>
<td>_</td>
</tr>
<tr>
<td>Tannins and Phenols</td>
<td>+</td>
</tr>
<tr>
<td>Proteins and Amino acids</td>
<td>+</td>
</tr>
<tr>
<td>Flavanoids</td>
<td>+</td>
</tr>
<tr>
<td>Lignins</td>
<td>_</td>
</tr>
</tbody>
</table>

DISCUSSION

The preliminary phytochemical evaluation of the extract showed the presence of alkaloids, tannins, phenolic compounds and flavonoids. Those compounds may responsible for the wound healing activity.

DISCUSSION

The wound healing activity of herbal hydrogel is represented graphically the wound area of formulation 2 showed a marked reduction in the wound area of the rat. The formulation 3 showed considerable reduction than formulation 1 due to the presence of more amount of active compod which helps the drug to penetrate deeper layers of skin.

CONCLUSION

Hence, the drug *Vitis vinifera* seeds ethanolic extract shows significant wound healing property. When compared with that of Framycetin cream , the standard formation used. The *P*-value is *P*<0.01 significant and shows quick wound healing action with the standard and the test formulations used. The formulation F2 was found to show wound healing activity comparing to other formulations.

REFERENCES


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