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RESEARCH ARTICLE

ISOLATION, CHARACTERISATION AND PHYSICOCHEMICAL STUDY OF SAPONINS DERIVED FROM MORUS NIGRA PLANT.

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Abstract

The saponins were isolated from Morus nigra by solvent extraction method employing seven different solvents .The crude plant extracts with green colour showed significant quantity of saponins present in almost pure form . The physicochemical study of the saponins as well as their characterisation by IR spectroscopy is described. The IR spectra of the crude plant extracts showed distinct absorption bands for functional groups similar to those obtained from purified samples.

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Introduction:-

Use of medicinal plants is known from early age of man. Ancient Chinese, Indian and North African civilisation has written evidence of using medicinal plants for treatment of variety of diseases ¹. Clinical, pharmacological , and chemical studies of the traditional medicines derived from plants were the basis of early drugs such as aspirin, digitoxin, morphine, quinine , streptomycin, chloramphenicol, cephalosporin-c and erythromycin ². Saponins are a group of compounds distributed in plant kingdom and are characterised by their structural features . They are generally possessing triterpenes or steroidal nucleus with one or more sugar chains ³. Their surfactant property and biological activity made them important phytochemicals and has wide applications in the field of food, cosmetics and pharmaceutical sectors ⁴. Saponins have diverse range of properties such as insecticidal, piscicidal, nutritional , alleopathic action, antimicrobial etc. Some of the marine plants are known for their anti-carcinogenic property ⁵. Many methods are known in the literature and one of them involves extraction of plant matrix with aqueous and organic solvents. Saponins has many pharmacological applications, some of them are anti-platelet, hypo-cholesteromelic, fungicide anti-HIV , anti-inflammatory, anti-bacterial . Many biological properties allied to diversity make saponins promising compounds for the development of pharmaceutical and nutraceutical in natural or synthetic form ⁶. Saponins are also responsible for the defence mechanism of plants against fungal attack ⁷.

Materials and Methods:-

Identification of saponins:-

The extract of plant material (2 ml) was taken and 5 ml of distilled water was added to it. The mixture was shaken vigorously for 2 minutes. Two drops of olive oil was added where foam or emulsion was observed . This proved the presence of saponins in the plant extract .

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Green Method:-

In this method leaves of *Morus nigra* were taken, crushed finely and subjected to the solvent extraction. Seven different solvents were used for this purpose.

General procedure for the isolation of saponins:-

25 g of crushed leaves were taken in 50 ml petroleum ether. The mixture was heated on water bath at 60 °C for 30 minutes. The mixture was left overnight and was filtered to obtain the extract. The extract was then used for further purpose. A similar method was employed with ethyl acetate, chloroform, acetone, methanol, water and aqueous chloroform. The extracts were also collected from the shade dried leaves of the plant. The extracts with their varying colours can be summarised in the following table.

Table 1:-

Plant	Parts used	Solvent	Colour
<i>Morus nigra</i>	Leaves	Pet. ether	Dark green
<i>Morus nigra</i>	Leaves	Ethyl acetate	Green with oily mass
<i>Morus nigra</i>	Leaves	Chloroform	Light green
<i>Morus nigra</i>	Leaves	Acetone	Yellowish green
<i>Morus nigra</i>	Leaves	Methanol	Brownish green
<i>Morus nigra</i>	Leaves	Aq.Chloroform	Brown
<i>Morus nigra</i>	Leaves	Water	Brown

Results and Discussion:-

Different extracts of the selected plants gave positive results for saponins. These results were confirmed by infrared absorptions recorded. Saponins showed characteristic IR absorptions for various functional groups present in them. The results can be shown in a tabular form.

Table 2:-

Sr. No	Functional Group	Frequency Range
1	-O-H	3345-3455
2	-C-H	2926-2937
3	-C=C-	1623-1653
4	-C=O	1727-1733
5	-C-O	1044-1061

The significance of this work is that the saponins can be detected in crude medicinal plant powders by IR spectroscopy. This saves valuable time and the need of extraction before the analysis. The present method is clean, fast and economical.

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