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REVIEW ON EXTRACTION, CHARACTERIZATION AND MEDICINAL ACTIVITY OF OKRA MUCILAGE

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ABSTRACT

Okra (*Abelmoschus esculentus* L.) is a flowering plant of the Malvaceae family which is also known as lady's finger, gumbo, banya or bania or commonly known as bhindi. Natural polymers have been used in different pharmaceutical formulations. They are easily available, non-toxic, biodegradable and cost effective to be used as pharmaceutical excipients. In present investigation, we have reviewed about method for extraction and characterization of mucilage (*Hibiscus esculentus*) and further characterized to be used as pharmaceutical excipient. Main focus of review was to study about anti cancer activity of okra mucilage. Different methods for isolation and physicochemical method for characterization was focused. Antioxidant activity as well as IR spectra determination was noted. Okra is rich in phenolic compounds with important biological properties like quaterning and Flavonol derivatives, Catechin Oligomers and hydroxycinnamic derivatives. Okra is also known for being high in antioxidants activity. Okra has several potential health beneficial effects on some of the important human diseases like cardiovascular disease, type 2 diabetes, digestive diseases and some cancers.

Keywords: - Okra, Excipients, Antioxidant and Anticancer

INTRODUCTION

Nowadays, plant gums and mucilage have evoked large interest due to their various pharmaceutical applications as diluents, binders, disintegrant thickeners and gelling agents in gel making them attractive substitutes for costly synthetic excipients. Binders play important role in tablet formulation as tablet formulation to impact cohesion on powder mix and hence improve on the flow properties of the granules. A majority of the investigations on natural excipients in drug delivery systems have centered on proteins and polysaccharides, due to their ability to produce a wide range of materials and properties according to molecular structural alterations Mucilages are very often used in various industries. Vast application of plant mucilage and gums in various industries is because of low cost, ready availability and important properties which they confer on products. Two plants are prominently used, and have been chosen for this investigation; these are the leaves of *Hibiscus rosa sinensis* Linn and fruits of Okra (*Abelmoschus esculentus* Linn)¹.

Okra (*Abelmoschus esculentus* L.) is a flowering plant of the Malvaceae family which is also known as lady's fingers, gumbo, banya or bamia or commonly known as bhindi. This plant was formerly name as *Hibiscus esculentus*, and was originated from India. Size of okra can be divided into three categories; large (L), medium (M) and small (S) with respect to their lengths. Mucilage can be termed as plant hydrocolloid having polymer of a monosaccharide. But polysaccharide is having mucilage having hydrophilic substances with high molecular weight molecules. Their swelling properties are observed by characterized by the entrapment of large amount of water between the polymer chains and branches.²

From literature it was found that okra posses anticancer activity. For the detection of activity, okra was isolated and characterized for significant cell growth inhibition in human breast cancer (MCF7) cells up to 63% is reported. Hot buffer extraction of okra pod could induce apoptosis in melanoma cells by interacting with Gal-3 and cause a cell cycle arrest in G2/M phase. Moreover, the fraction of okra polysaccharide extract had inhibition effect on MCF-7, Hela, and MCG803 cells with the lowest survival rates of 63.90, 63.5,1 and 67.71 %, respectively.³

It is repotted that Mucilage from okra contains significant levels of protein, carbohydrate, neutral sugars, minerals and other complex polysaccharides and medically reported to be linked with anticancer, antimicrobial, hypoglycemic, anti-ulcer activities. The rheological

behavior of okra mucilage is pseudoplastic and can be used to enhance viscosity hence it acts as an ideal substitute for costly synthetic and semi-synthetic excipients.⁴

Extraction of mucilage

In present study, we have concluded two different methods for extraction of okra which can give maximum yield with minimum requirements.

First method

Step 1 Extraction of mucilage

Hibiscus esculentus fruit were used for isolation of mucilage. Firstly Fruit were washed with water to clean it from dirt if any and grinded into in a mixer. The material obtained was soaked in warm water for 4 h, boiled for 2 h and kept aside for 2 h for release of mucilage into water. After a period of 2 h material was squeezed in a muslin bag to remove the mark from the filtrate.

Step 2. Isolation of mucilage

Equal volume of ethyl alcohol was added to filtrate to precipitate the mucilage, the mucilage was separated, dried in oven at about 45°C, powdered and passed through sieve # 80. The powdered mucilage was stored in desicator until further use.⁵

Second method

Okra pods (without seeds) were sliced and immersed in water at room temperature. After 12h, with the aid of a muslin cloth, the solid was separated from the liquid fraction (filtrate). Three volumes of ethanol were added to the filtrate and the liquid was slowly stirred by handling until mucilage was precipitated. The mucilage was dried for 12h at 300°C in an oven, pulverized to a fine powder with the aid of a grinder and passed through sieves (mesh 100 and mesh 325). The resultant fine powder was stored in an amber recipient until the moment of use.⁶

Physicochemical Characterization of Isolated Mucilage

Identification tests for carbohydrates, proteins, mucilage and gums:

With the help of aqueous solution of extracted mucilage chemical characterization can be performed. Determination of carbohydrates, proteins, mucilage, alkaloids, fats, tannins amino acids and gums can be performed as standard procedure in IP.

Organoleptic Evaluation of Isolated mucilage:

The isolated mucilage can be characterized for organoleptic properties such as color, odor, taste, fracture and texture.

pH of mucilage:

Weighed the mucilage and dissolved in water separately to get a 1%w/v solution. With the help of digital pH meter, pH can be measured.

Infrared spectra of the mucilage:

A potassium bromide disc of each of the dried purified mucilage should be prepared, and the infrared spectra should be recorded.⁷



CONCLUSION

Okra (*Abelmoschus esculentus* L.) is Natural polymers which have been used in different pharmaceutical formulations. They are easily available, non-toxic, biodegradable and cost effective to be used as pharmaceutical excipients.

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