



Review

Okra: Mucilage extraction, composition, applications, and potential health benefits

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ABSTRACT

Background: *Abelmoschus esculentus*, also known as okra, is a member of the Malvaceae family. It is utilized in both culinary and traditional medicine for different illnesses. The okra mucilage (OM) is composed of natural polysaccharides, containing D-galactose, L-rhamnose, and galacturonic acid monosaccharides, and are also abundant in proteins, vitamins, and minerals. Multiple investigations have provided evidence that the inclusion of the OM extract in various food matrices enhances the properties of the resulting products through suitable reformulation. The mucilage found in the okra plant contains bioactive substances that have been associated with a range of biological characteristics, including insulin resistance, anti-cancer, anti-hypertensive, and antimicrobial properties.

Scope and approach: In this review, conventional and non-conventional extraction techniques are systematically discussed. We investigated the impact of various extraction methodologies on the structural attributes of mucilage extract derived from okra fruit. These attributes are molecular weight, composition of monosaccharides, and functional properties.

Key findings and conclusions: Various extraction techniques had a significant impact on the OM extract with distinct structural characteristics. It is important to understand the extraction-structure-property relationships of okra polysaccharides (OPs) to obtain polysaccharides that generate specific functional outcomes.

1. Introduction

Plant-based foods and medications have been recognized as an intrinsic component of the human dietary pattern since old times [1–7]. As per the World Health Organization (WHO), in developing nations, over 80 % of the population depends on botanical medicines [8]. Consumption of vegetables is important for maintaining optimal health and well-being, as it enables the body to incorporate nutrients such as soluble fiber (polysaccharides), proteins, bioactive compounds, enzymes, vitamins, and inorganic substances [9–14]. Among other vegetables, okra is of great interest due to its significant role in improving human health [15,16]. Okra, scientifically recognized as *Abelmoschus esculentus*

Moench belongs to the Malvaceae family. This vegetable is known by various names globally. In Spain, it is known as guano-gombo, and in Pakistan and India, it is recognized as bhindi [17]. In England and America, it is commonly referred to as ladies' fingers or gumbo, a widely cultivated vegetable crop that is highly popular across the globe and universally acknowledged as a 'protective food' [18]. It maintains a prominent status among vegetables as a rich source of minerals, vitamins, and vegetable protein [19]. In warm temperate regions, okra is grown as a summer vegetable crop and is famous as a garden crop around the globe. Okra first originated in Ethiopia and then propagated in many countries such as Pakistan, Japan, Iraq, Ghana, Greece, India, Brazil, Italy, Burma, Afghanistan, and Iran [20]. With 3.5 million tonnes

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