

Chapter 12

Mustard Is a Miracle Seed to Human Health

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ABSTRACT

Brassica juncea, known as Indian mustard, has been used for centuries for its nutritional and medicinal values. *L. brassica* is a genus of plants in the mustard family, Brassicaceae. The members of the genus are informally known as cruciferous vegetables, cabbages, or mustard plants. Among the different varieties of mustard, the three principals are *Brassica hirta* or *Alba* (yellow-white), *B. nigra* (black), and *B. juncea* (brown). In Asian countries, India ranks first in mustard production, and mustard is the primary cooking oil used. In folkloric medicine, different parts of the plants are obtained to treat a wide variety of human ailments. Mustard seed is good source of protein, fibre, minerals, vitamins, antioxidants, and phytonutrients. The plant has several health benefits acting as antimicrobial, antibacterial, anti-diabetic, antimalarial, etc. The present study aims to discuss the up to date information regarding the botany, traditional uses, phytochemistry, and pharmacological applications of mustard seed and its essential oil.

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INTRODUCTION

India is the land of medicinal plants, which forms the basis of traditional medicinal systems, such as Ayurveda, Siddha, and Unani. In modern society, a number of drugs have been derived from these natural resources, which form a major backbone of the primary healthcare systems throughout the world. *Brassica juncea* is known as Indian mustard and has been used for centuries for its nutritional and medicinal importance.

Brassicaceae or cruciferae is a medium-sized and economically important family of flowering plants commonly known as mustard plants. Among the different varieties of mustard, the three principal ones are *Brassica hirta* or *Alba* (yellow-white), *B. nigra* (black), and *B. juncea* (brown) (Elvin-Lewis, 2001). *Brassica hirta* is a native of Eastern Mediterranean regions, *B. nigra* comes from the Middle East, and *B. juncea* is found in the foothills of the Himalayas (Wikipedia, 2009). *Brassica juncea* is known as mustard seeds, and in India, it is commonly called as Rai, Sarso, Shorshe, and Kadugu.

The plant is a winter crop that requires a temperate climate and moist soil for its growth (Wikipedia, 2009). It is an herbaceous plant having petiolate leaves and small yellow flowers. The tiny seeds are present in one flower, which is about two millimetres in diameter, and the seeds are used as spices in many countries. Among the agricultural, it is an important oilseed crop that contributes approximately 14% of the world's vegetable oil production, and it is among the third leading source of vegetable oil, after palm and soybean oil, as per data revealed by National Commodity & Derivatives Exchange Limited (NCDEX). In Asian countries, India ranks first in mustard production and mustard accounts for the main oil used in Indian cooking. The defatted mustard cake is used as fertilizer and animal fodder (John & Soba, 2011).

In folkloric medicine, different parts of the plants are obtained to treat a wide range of human ailments. However, most of the traditional uses are centered on the seed and oil. The seed has been used for the treatment of ailments such as arthritis, foot pain, cancer, vomiting, dengue, and rheumatism. Mustard seed is also a good source of protein, with a protein efficiency ratio of 2.64, which is higher when compared to soybean. The seed of this crop is also rich in fibre, minerals, vitamins, antioxidants, and phytonutrients, such as alpha-linolenic acid, erucic acid, palmitic acid, tocopherols, tocotrienols, carotene, oryzanol, squalene, and thiamine (Billman, 2013). Tocopherols are recognized for their antioxidant activity and have been observed to be useful in treating degenerative diseases such as cancer, cataracts, cardiovascular disease, and aging. Tocopherols in oil act through several mechanisms, such as inhibiting the lipid peroxidation, chain termination, singlet oxygen quenching, and radical scavenging from deactivating free radicals that are produced during the oxidation of biomolecules (Qureshi et al., 1991). The oil from this seed has a balanced ratio of saturated fatty acids/monounsaturated fatty acids/polyunsaturated fatty acids (SFA/MUFA/PUFA) and antioxidants. Consuming mustard oil will not compensate for a generally unhealthy diet or a lack of physical activity.

Producing mustard oil involves pressing or grinding the seeds. The presence of allyl isothiocyanate in the oil gives it its strong taste and may contribute to some health benefits. Allyl isothiocyanate is also present in foods such as horseradish and wasabi. Mustard oil may pose a serious risk because it contains high levels of erucic acid. In small doses, erucic acid is safe, but at higher levels it may be dangerous (Delisle, 1984).

The market for mustard oil is huge, and it is expected to see significant growth in the coming years, mainly attributed to increasing applications of mustard seeds in the food and beverage industries, pharmaceutical industry, personal care industry, the cosmetic industry, and others. *B. juncea* seeds are a source for obtaining pharmacologically standardized phytotherapeutics, which could be potentially useful for

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