

# Food prospects and nutraceutical attributes of *Momordica* species: A potential tropical bioresources – A review

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## Abstract

Plants with potential therapeutic values have been used from time immemorial to cure various ailments and infectious diseases. Of late, scientific evidences have been provided on the potential therapeutic agent exhibited by certain traditionally used vegetable extracts. The importance of wild edible plants may be traced to antiquity but systemic studies are recent. All the *Momordica* species have been consumed as vegetable and traditionally used for various disorders. The whole plant parts are ascribed to possess the anti-diabetic effect in traditional medicinal system. The active constituents of *Momordica* plant parts were cucurbitane type triterpenoids, phenolics, glycosides, and several kinds of peptides including *Momordica* anti-HIV protein (MAP 30). Recent reports revealed the presence of several kinds of cucurbitane type triterpenoids in leaf, stem and fruits of *Momordica* species having several pharmacological activities. There is lack of scientific information available on the wild species which also having several bioactive components with potential activities. So the present review compares and highlights the current knowledge of the nutritional value, phytochemistry and physiological effects of wild species with known variety.

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**Keywords:** *Momordica* spp.; Anti-diabetic; Triterpenoids; *Momordica* anti-HIV protein (MAP-30 protein)

## 1. Introduction

*Momordica* species are vegetable crops, belonging to the family of Cucurbitaceae (also commonly referred as cucumber, gourd, melon or pumpkin family), which comprise of medium sized plants that grow abundantly in warmer regions of the world. They are well-known for the bitter taste due to the presence of phytochemicals (alkaloid) and have a wide range of medicinal values. Although the exact origin of *Momordica* genus is unclear, most experts agree that the center of bitter gourd domestication lies in eastern Asia, possibly eastern India or southern China [1,2]. However, in Ayurvedic texts written by members of the Indo-Aryan culture, it is stated to be emerged in India from 2000 to 200 BCE [3]. Consumption of *Momordica*

species as vegetables is mainly concentrated in Africa and Asian countries. The fruits are usually parboiled or soaked in salt water before cooking to reduce the bitter taste [4]. The *Momordica* species have been used in indigenous medical systems in various countries in Asia and Africa. Based on the indigenous knowledge, wild plant foods play a vital role in the complex cultural system of tribal people for reducing various disorders. Research has shown that many edible wild plants are rich in specific constituents, referred as phytochemicals, which may have health promoting effects. The major plant-derived chemical groups in this family now recognized as having potential health promoting effects in Type I and Type II diabetes are cucurbitane triterpenoids, saponin glycosides and *Momordica* anti-HIV protein (MAP 30 protein). These phytochemicals may be incorporated into food stuffs or food supplements as nutraceuticals. The green fruits and leaves of *Momordica* species play a major role in improving human health by offering nutritional and nutraceutical components. Therefore the present review mainly focuses on providing baseline information on exploring nutritional and nutraceutical properties of some wild plant species along with cultivated variety of *Momordica* species such as *M. charantia*, *M. balsamina* (Linn), *M. dioica* (Roxb), *M. cochinchinensis*

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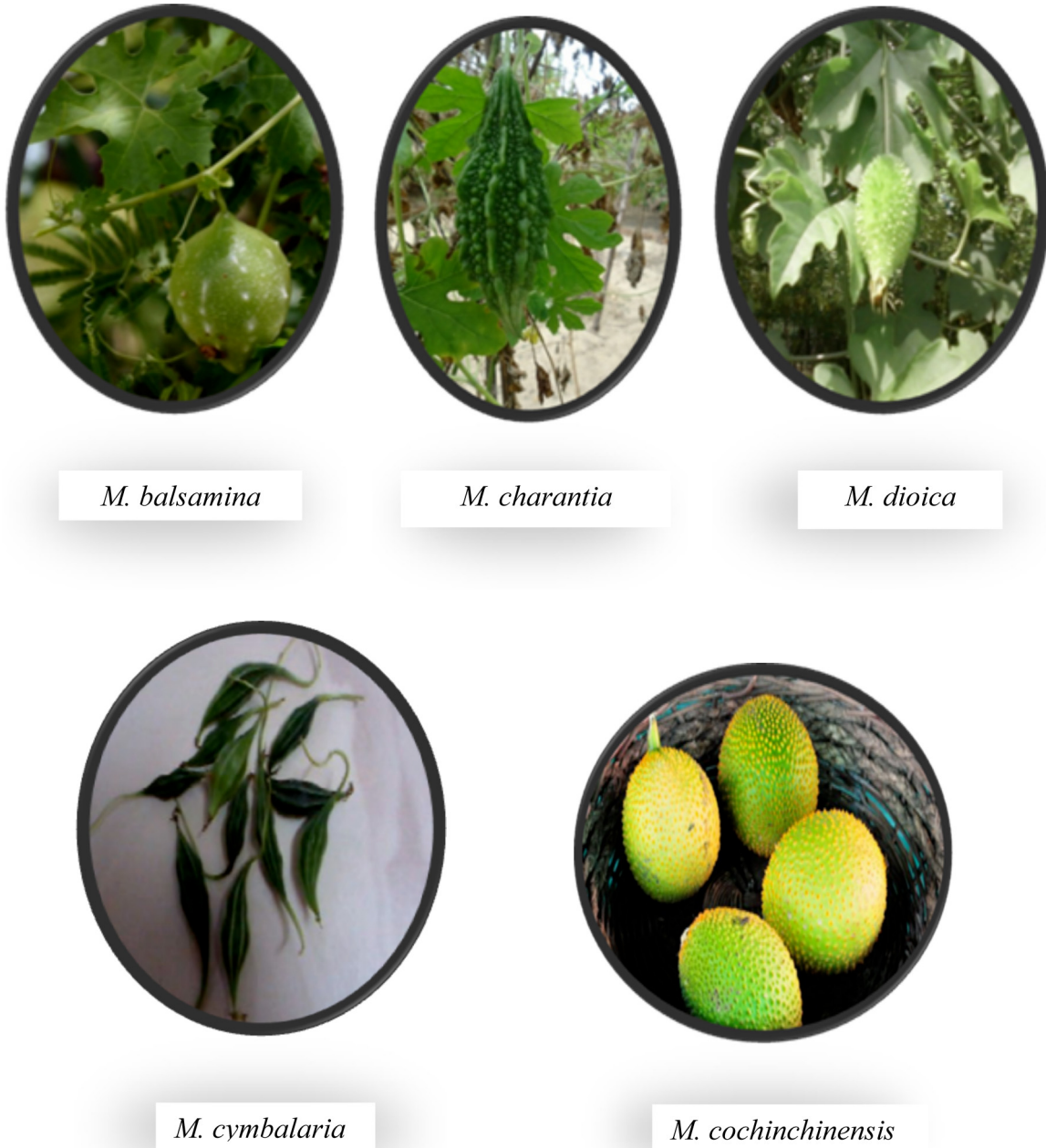


Fig. 1. Green fruits of different *Momordica* species.

(Spreng), and *M. tuberosa* or *cymbalaria*. Fig. 1 shows the green fruits of five different species in this genus. This study highlights the potential of *Momordica* species as an important source of both nutritional and bioactive compounds. In addition, this study also supports the inclusion of these wild species into the main food stream of the local population, improving their nutritional status.

## 2. Biogeography and botanical description

Based on both historical literature [1,2,5], and recent analysis of random amplified polymorphic DNA [6], inter simple

sequence repeats [7] and amplified fragment length polymorphisms [8] molecular analyses, eastern India (including the states of Orissa, West Bengal, Assam, Jharkhand and Bihar) may be considered as the primary center of the diversity of bitter gourd, where a wild feral form, *M. charantia* varieties also exists. *M. dioica* and *M. charantia* are ubiquitous in distribution over India except in north-east region, whereas *M. subangulata* ssp. *Renigera* is restricted to north-east and adjoining north Bengal hills. *M. cochinchinensis* is distributed in Andaman and a few of regions in the eastern and north eastern states of India. *M. balsamina* is restricted to the arid belt zones such as Rajasthan and Gujarat, while *M. cymbalaria* is

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