## Grain Amaranth (Amaranthus sp.) - An Underutilized Crop Shilpa V. Chogatapur<sup>1</sup>., Shweta A. Manniker<sup>2</sup>., Vijaylaxmi I. Mundinamani<sup>3</sup> and Chitti Bharatkumar<sup>4</sup>

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### Introduction

Grain amaranth (Amaranthus sp.) belongs to the family Amaranthaceae and is categorized as pseudocereal in the list of underutilized crops. Sixty species of the genus Amaranthus are reported native to the New World and about 15 to the Old World and Australia. Grain amaranth was an ancient staple food crop for the native Aztecs of South America till Spanish invasion, when maize was introduced which replaced grain amaranth gradually. The word "amaranth" in Greek means "everlasting" and in fact, the crop has endured. The distinctly beautiful appearance of amaranth has helped to prevent the crop from slipping into obscurity. The enchanting beauty of the vividly coloured leaves stems and seed heads in an amaranth field is a sight which evokes emotions that other crops cannot stir. The cultivated amaranths are utilized as food grains, leafy vegetables, and forage crops in diverse geographic areas. For use in food products and human consumption, three varieties are of interest, namely Amaranthus cruentus, A. caudatus and A. hypochondriacus.

In India, these are cultivated both in hills as well as plains covering states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Tripura, Jharkhand, Chattisgarh, Maharashtra, Gujarat, Orissa, Karnataka, Kerala and Tamil Nadu.The exact information about the statistics on area and production in India is lacking. However, as a grain crop it is estimated to be grown in about 30 - 40 thousand hectares. Amaranth has great potential to combat climate change and malnutrition. It is receiving attention now-a-days because of its high nutritional value, rapid growth, and adaptability to a wide range of climatic and soil conditions (Chitra *et al.*, 2016).

Though, Grain Amaranth is grown in many states in India with varied proportions, the area under this crop in Gujarat is increasing, particularly in Banaskantha district where this crop competes with wheat and potato on account of water scarcity. In Karnataka, the crop is grown as Akkadi crop with other cereals sporadically in limited areas of Tumkur, Kolar, Chitradurga districts and in Tribal hilly areas of Biligiriranagana Hills, Male Mahadeshwara Hills of Chamarajanagar district of southern Karnataka (Niranjana Murthy, 2013; Niranjana Murthy et al., 2011). In northern Karnataka, it is grown as mixed crop with other cereals in few pockets of Belgaum, Bagalkote, Bijapur and Bidar districts.

Though, grain amaranth was an ancient staple food crop for the native Aztecs of South America, its cultivation vanished after Spanish invasion who introduced maize crop which replaced grain amaranth gradually. However, after knowing the biochemistry in the middle of the 20th century, the nutritional qualities, especially the higher protein and lysine content of Grain Amaranth was known and the crop started gaining importance and re-emerged as one of the heath care crops in many countries including Indi

#### Grain Amaranth as nutritionally potential crop

Amaranth has very high nutritional value due to its protein quality and other nutrients. Grain of the amaranth species is of high nutritional value. Grain amaranth has higher protein than other cereal grains and has significantly higher lysine content. *Amaranthus cruentus* L. seed contain approximately 4% ash, 8% fat, protein concentration between 12.5% to 17.6%, 13% dietary fiber and 60% starch (Capriles *et al.*, 2008). The seeds come with simple protein 13.1–21.0% and albumins, which digest quickly, including globulins, the greater part of their composition. Protein content differs between amaranth species and varieties. The fieldmanaged species were discovered to carry less protein and amino acids throughout other nutrients compared to the wild species.

#### Health benefits of grain amaranth

Grain amaranth is a nourishing ancient pseudocereal attained remarkable consciousness in recent years due to its important health good. This multiple-purpose grain, grown and consumed for ages by many cultures is constituted of critical nutrients, antioxidants, and bioactive compounds that help the gross welfare of animals and humankind.

# Table 1: Nutritional composition (per 100 gram) ofgrain amaranth

Nutritional composition	per 100 grams
Protein (g)	16.0
Carbohydrates (g)	62.0
Lipid (g)	8.0
Crude fibre (g)	2.43
Mineral matter (g)	3.0
Ca (mg)	490
P (mg)	600
Fe (mg)	17.5

(Source: Joshi and Paroda, 1991)

Table 2: Essential amino acid composition (g/100gprotein) in grain amaranth

Essential amino acid	g/100g protein
composition	
Lysine	5.0
Methionine	4.0
Cystine	4.0
Isoleucine	3.0
Leucine	4.7

(Source: Bhagmal, 1994)

- 1. The various nutrients in amaranth play crucial roles in many bodily functions, such as energy production, red blood cell formation, and maintaining healthy bones and teeth.
- 2. Consuming amaranth seeds contributes to heart health in some ways.
- 3. Seeds of amaranth are naturally low in saturated fat and cholesterol, making them heart-friendly by lowering cholesterol levels and regulating blood pressure
- 4. Squalene, found in grain amaranth is attributed to cholesterol level reduction and prevents the building up of arterial plaque
- 5. Regular inclusion of amaranth seeds prevents constipation due to their fiber content.
- 6. Eating amaranth grains helps to reduce infammation by slowing the body's production of Immunoglobulin

**Antinutrients in amaranth:** Antinutrients (ANF) are compounds produced in naturally existing food products through a variety of procedures, such as the dismissal of certain nutrients, reduction in the digestive

process, or a metabolic utilization of feed, that have an unfavourable outcome upon required condition. The term 'anti-nutritional factors' relates to organically operative chemical substances that repress the accessibility of nutrients to the body of a living organism and obstruct normal metabolic operations. The subsidiary biogenic substances found in amaranth include saponins, tannins, trypsin inhibitors, nitrates, oxalates, phytates, alkaloids, and cyanogenic chemicals. Phytates and oxalates are particularly problematic. Phytic and phytate work as anti-nutrients through reactions with minerals and trace elements like zinc, iron, calcium, and magnesium. They interrupt the assimilation of these minerals in the stomach, thereby minimizing their potency. Young children are more vulnerable to this risk of this chelation as their digestive systems are more sensitive compared to adults; therefore, they need more of these nutrients for growth.

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