

A Comprehensive review on pharmacological and therapeutic potential of two commonly consumed leaves of *Amaranthus* in Bengali cuisine: *Amaranthus cruentus* and *Amaranthus viridis*

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Abstract

Amaranthus cruentus and *Amaranthus viridis* are considered indispensable leafy vegetables and pseudo-cereals, both with their traditional applications as well as increasing scientific interest, and they also represent plants that are known in various countries; and also their growth as pseudo-cereals. They are nutrient laden and rich in a variety of phytochemicals (phenolic acids, flavonoids, betalains, carotenoids, saponins, and bioactive peptides) that have the potential as functional foods and pharmacological properties of their compounds for food. Studies in 2020-2026 demonstrated antioxidant activity in these species including direct radical scavenging, metal chelation, protection against lipid peroxidation, and activation of internal defense systems such as Nrf2-ARE. Antioxidant function is increasingly considered the main mechanism underlying their anti-inflammatory, antidiabetic, antihypertensive, cardioprotective, neuroprotective, hepatoprotective, antimicrobial, and anticancer effects. This manuscript summarizes recent information on nutritional and phytochemical characteristics of *A. cruentus* and *A. viridis*, describes the antioxidant-driven pharmacological properties, and concludes with the knowledge gaps. It provides future clinical implications, bioavailability studies, as well as a product development plan.

Keywords: *Amaranthus cruentus*, *Amaranthus viridis*, antioxidant, phenolic acids, flavonoids, Nrf2, NF- κ B, functional foods, phytochemicals