

### **Folk Medicine, Pharmacological and Biological Activities**

In South Africa, *Amaranthus caudatus* L. is one of the Bantu snuff plants. The leaf is used in South Africa as an abortifacient. The leaf has been used a tea for the relief of pulmonary conditions. In India the seed is used as food and as a diuretic and application to scrofulous sores (Hussain *et al.*, 2010). Traditionally, it is used nutritionally for infants, children, pregnant and lactating women and in countering heavy menstrual bleeding and vaginal discharge. The roots were used to cure kidney stones, leaves to cure cuts, leprosy, boils, burns, fever, and decoction of the stem in jaundice. It is also used as diuretic, abortifacient, vermifuge, antipyretic, astringent and anthelmintic (Iqbal *et al.*, 2011; Chakrabarti *et al.*, 2012). Polyherbal compositions (containing *Amaranthus caudatus*) are used as natural nourishing supplement for the control of gastric secretion and improvement of digestion (Ibrahim *et al.*, 1986), and for treating constipation (Jain and Gautam, 2011).

The plant showed significant hepatoprotective activity against paracetamol-induced liver damage in rats. This finding supports its use in ethnomedicine for the treatment of liver diseases (Kumar *et al.*, 2011a). It has been found that the consumption of extruded amaranth reduces LDL and total cholesterol levels and may be option to prevent coronary heart diseases (Plate and Areas, 2001). The plant extract decreased the most important risk factors (the serum lipoproteins: apolipoprotein A and oxidized LDL) of cardiovascular diseases and inflammatory factors prevented atherosclerosis and was more effective than lovastatin (Kabiri *et al.*, 2010). The antioxidant activity of the plant has been reported (Conforti *et al.*, 2005; Asadul *et al.*, 2006; Odukoya *et al.*, 2007; Manea *et al.*, 2008b; Repo de Carrasco and Zelada, 2008; Veeru *et al.*, 2009; Kumar *et al.*, 2011b; Popescu *et al.*, 2011). Other studies revealed that the plant possesses antimicrobial (Oita, 1996; Ogawa, 1999), antihypercholesterolemic, antiatherogenic (Kabiri *et al.*, 2011), anthelmintic (Kumar *et al.*, 2010g) and hepatoprotective (Kumar *et al.*, 2011a) effects which provide scientific validation for its traditional use.

The pulverized powder or the extract of the whole herbal, preferably the seed of the plant of the genus *Amaranthus* (such as *Amaranthus caudatus* L., *Amaranthus edulis* Spengazzini, *Amaranthus mantegazzianus* Pass., *Amaranthus hypochondriacus* L., *Amaranthus hybridus* L., *Amaranthus frumentaceus* Buch.-Ham., *Amaranthus cruentus* L., *Amaranthus paniculatus* L., *Amaranthus sanguinea* L., *Amaranthus dubius* Mart. ex Thell., *Amaranthus lividus* L. var. *ascendens* (Lois.) Thell., *Amaranthus blitum* L., *Amaranthus*

*gracilis* Desf., *Amaranthus patulus* Bertoloni, *Amaranthus retroflexus* L., *Amaranthus spinosus* L., *Amaranthus tricolor* L. subsp. *mangostanus* (L.) Aellen, *Amaranthus gangeticus* L., *Amaranthus tricolor* L. subsp. *tricolor*, *Amaranthus viridis* L.) have new use as antimicrobial agent. The antimicrobial agent takes the protein components that contains as effective ingredients; and is effective against bacteria such as *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Propionibacterium acnes*; and fungus such as *Candida albicans*, *Aspergillus niger* and *Pityrosporum ovale*. It can be added to food, medicine, cosmetic, etc. The antimicrobial agent has the advantages of lower allergy, low irritation and low toxicity (Ogawa, 1999).

A herbal nutritional supplement (comprising *Amaranthus caudatus*) for preventing of free radicals and degenerative diseases, has been described (Manea *et al.*, 2008a). Shibata *et al.* (1996) described a skin-lightening cream containing melanin formation inhibitors from the plant extract. The extract also inhibited tyrosinase activity.

### **Other Uses**

In addition to its use as a source of food (cf. p. 311), the possible utilization of *Amaranthus caudatus* for pulp and paper production has been reported (Korenskaya *et al.*, 2011; Kone *et al.*, 2012). Also, the exploitation of the plant as a fuel material was reported (Krishnakumari and Priya, 2006).