

Folk Medicine, Pharmacological and Biological Activities

The leaves of *Amaranthus tricolor* have been used against external inflammations, as a diuretic, and as a treatment for bladder distress (Jayaprakasam *et al.*, 2004). Compositions containing *Amaranthus tricolor* extract were reported as a useful treatment for atopic dermatitis (Mitsuyama and Yoshino, 1996). Polyherbal preparations (containing *Amaranthus tricolor*) are used in traditional Chinese medicine for the treatment of hemorrhoid (Wu, 2010) and eye diseases (Zhao and Zhao, 2011). Preparations (containing *Amaranthus mangostanus*) are also used for the treatment of sinusitis (Lu and Lu, 2010), hemorrhoid (Gao, 2011a), cervical erosion (Hu, 2009) and has good health care effects (Zhang and Zhou, 2011).

The *n*-alkanes, *n*-alkanols and in particular the sterols isolated from the aerial parts of *Amaranthus tricolor* exhibited antibacterial activity against *Staphylococcus aureus*, *Staphylococcus albus*, and *Streptococcus viridans* (all gram positive bacteria) and *Escherichia coli*, *Pseudomonas pyocyanea*, and *Klebsiella* (all gram negative bacteria) (Sharma and Behari, 1991). Betacyanins, the colouring pigments of *Amaranthus tricolor*, have been reported to possess antioxidant activity (Piattelli *et al.*, 1964; Cai *et al.*, 1998a; Cai and Mei, 2003).

The three galactosyl diacylglycerols, isolated from *Amaranthus tricolor* exhibited cyclooxygenase-1 inhibitory activity and antiproliferative activities against human colon, breast, lung, stomach and central nervous system tumor cell lines (Jayaprakasam *et al.*, 2004).

An anti-inflammatory agent which contains extract of *Amaranthus tricolor* (*Amaranth*, *Amaranthus tricolor* L. subsp. *mangostanus*, *Amaranthus mangostanus* L.) is effective in relieving edema of foot caused by carrageenin, and inhibiting release of histamine and metabolism of arachidonic acid. It can be used for treating or preventing inflammatory diseases such as pachylosis, xerosis cutis, skin pruritus, eczema, urticaria, atopic dermatitis, allergic dermatitis, allergic rhinitis, and pollinosis (Kojima *et al.*, 2000). The antioxidant (Gambarova and Gins, 2008; Khandakar *et al.*, 2008; Shao *et al.*, 2008; Adithya *et al.*, 2012; Tharun *et al.*, 2012), anti-ulcer (Devaraj and Krishna, 2011), and hepatoprotective (Al-Dosari, 2010) activities of *Amaranthus tricolor* were reported. There are several reports on the antioxidant activity of *Amaranthus mangostanus* (Chon *et al.*, 2009; Kumar *et al.*, 2011d, Li *et al.*, 2011b; Zhou *et al.*, 2012).

Disclosed is a dental plaque-dyeing composition characterized by containing *Amaranthus tricolor* pigment, its derivative, or salt thereof, which selectively dyes the plaque without affecting gum, mucosa and lip (Fujii, 2010).