Original Article

Beta Vulgaris – A Review On Pharmacological Activity

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Abstract

Beta vulgaris (beet) is a plant of the amaranthaceae family (which is now included in betoideae subfamily). It has numerous cultivated varieties, the most well known of which is the root vegetable known as the beetroot or garden beet. Other cultivated varieties include the leaf vegetable chard; the sugar beet, used to produce table sugar; and mangelwurzel, which is a fodder crop.

Keywords: Beta vulgaris, Nootropic

PLANT PROFILE:

Beta vulgaris is an herbaceous biennial or, rarely, perennial plant with leafy stems growing to 1–2m tall. The leaves are heart-shaped, 5–20 cm long on wild plants (often much larger in cultivated plants). The flowers are produced in dense spikes; each flower is very small, 3–5 mm diameter, green or tinged reddish, with five petals; they are wind pollinated. The fruit is a cluster of hard nutlets. The roots are most commonly deep red-purple in color, but less common varieties includegolden yellow and red-and-white striped roots. (Zeldes *et al*, 2003)

Taxonomical Classification

Kingdom: Plantae
Subkingdom: Tracheobionta
Superdivision: Spermatophyta
Division: Magnoliophyta
Class: Magnoliopsida
Subclass: Caryophyllidae
Order: Caryophyllales
Family: Chenopodiaceae
Genus: *Beta* L.
Species: *Beta vulgaris* L.

Morphological Characters (Ahmad *et al*., 2013)Organoleptic properties

Shape	: globular
External colour	: reddish purple
Size	: 8cm
Surface	: tuberculated
Texture	: no hair
Odour	: slight
Taste	: strongly astringent

Microscopical Characters (Ahmad *et al*., 2013)

The cell vacuoles of cortical parenchyma and the pith, are coloured in a deep red. Rhizodermis andconductive vessel are not coloured. Sugar beet, red beet roots do not contain starch. There is a secondary structure of roots, which contain concentric circle consisting of conductive tissues, penetrated by parenchyma as wider rays, formed from cells with cellulose walls. Beet root showedin the cross section well represented xylem vessel, revealing to the root center (to pith) aprotoxylem, outwards associated with a metaxylem. Under the phloem is cambium, provided fromthe pith rays, pericycle or pith. Most of the root thickness due to this cambium, which produces more secondary xylem than secondary phloem.

Beet vascular bundles are collateral type, the phloem is located in the back. Between two primary tissues persists meristematic tissues namely cambium, from which secondary xylem and phloem are forming.

Relavent previous work done on *Beta vulgaris* L. roots extract.

Sr. No.	Pharmacological action evaluated	Title of research work	Author	Year
1.	Source of omega-3& antioxidant	Study showed beet roots are an excellent source of omega-3, in addition to having significant antioxidant activity.	Polyana *et al.*	2014
2.	Immunomodulatory:	Study evaluated the various concentrations of methanolic extracts of roots of *Beta vulgaris* L.showed in vitro inhibition of tumor cell growth.	Tripathy *et al.*	2013
3.	Hepatoprotective	Study showed an n-butanol fractionof *Beta vulgaris* L. to possess potent hepatoprotective effect against ethanol-induced hepatic toxicity.	Jain *etal.*	2012
4.	Hematopoietic benefits	Methanolic root extract produced dose-dependent increase in packed cell volume, hemoglobin concentration, RBC counts, and total lymphocyte counts.	Indhumathi *et al.*	2012
5.	Supplementation in radiotherapy	Study showed supplementation of*Beta vulgaris* L. in irradiated patients did not worsen survival time. there was reduction of acute radiation reactions, and level markers of oxidative stress/DNA damage were not influenced.	Roszkowski *etal.*	2012
6.	Anti-inflammatory	An ethanolic extract of B. vulgaris roots showed good anti- inflammatory activity oncarrageenan-induced rat paw edema method.	Chakole *et al.*	2011
7.	Anti-inflammatory	Aqueous extract showed anti-inflammatory activity in the carrageenan-induced rat paw oedema.	Jain *etal.*	2011
8.	Antioxidant	Beet can protect the entire body from oxidative damage caused by ischemia-reperfusion of the liver.	Vali *etal.*	2006
9.	Peroxidase production	Study showed the red beet hairy rootsystem is a promising source for theproduction of Peroxidase (free radicals scavenging) enzyme.	Rudrappa *et al.*	2005
10.	Hepatoprotective	Hepatoprotective activity of *Beta vulgaris* L. roots extract against carbon tetrachloride-induced hepatotoxicity in rats.	Agarwal *et al.*	2005
11.	Cholestrol reducing	The augmented triglyceride and cholesterol due to diabetes were significantly decreased by the *Beta vulgaris* L. plant extract.	Khalili *et al.*	2004
12.	Anti-adhesion activity	Beta Vulgaris L. root has the potential of interfering with adhesion of bacteria to host epithelial surfaces.	Ali et al.	2003

Table No. 5A: previous work done on *Beta vulgaris* L. roots extract

Relavent previous work done to identify chemical constituents of *Beta vulgaris* L.

Sr. No.	Title of research work	Author	Year
1.	Chemical composition, functional properties andprocessing of beetroot —a review	Singh *et al.*	2014
2.	Betalain and phenolic compositions, antioxidant activity of tunisian red beet (*Beta vulgaris* l. *conditiva*) roots and stems extracts.	Agnieszka *et al.*	2014
3.	Quantitative phytochemical,proximate/nutritive compo sition analysis of *beta vulgaris* linnaeus (chenopodiaceae)	Odoh *et al.*	2013
4.	Pharmacognostic specifications of roots of *beta vulgaris* cultivated in india	Ahmad *etal.*	2013
5.	Phytochemical constituents of some medicinal plant species used in recipe during 'bohag bihu' inassam	Gogoi *et al.*	2000
6.	Phenolics and betacyanins in red beetroot (*Beta vulgaris*) root.	Kujala *et al.*	2000

Table No. 5B: previous work done to identify chemical constituents of *Beta vulgaris* L

CONCLUSION:

Beta vulgaris can be considered as a plant with excellent therapeutic value.

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