



- **Latin Name:** Beta vulgaris L
- **Active**
Ingredient: Betanin, isobetanin, prebetanin
- **CAS No.:**
- **Test method:** UV-VIS
- **Specifications:** 99%

Product Description:

Name :Beetroot Extract Pigment

Source: Beetroot

Botanical Name : Beta vulgaris L

Extract part: Root

Assay: Color Value (EL% 1cm 535±5nm) NLT50

Composition ratio: 4 to 1

Appearance: Fine Red powder

Country of origin: P.R. China

Source

The beetroot also known as the beet, red beet, table beet, garden beet or golden beet, is the taproot portion of the beet plant. It is several of the cultivated varieties of Beta vulgaris grown for their edible taproots and their leaves (called beet greens). As a common ingredient in dietary, beetroots are eaten either boiled, roasted or raw, either alone or combined with any salad vegetable. In recent years there has been a growing interest in the biological activity of beetroot and its potential utility as a health promoting and disease preventing functional food. It has been used as a food colouring and as a medicinal plant.

Beetroot red pigment ranges from red-purple to deep-purple with a characteristic odor.

This pigment is water-soluble and stable in acidic and neutral solutions. It becomes yellow in alkaline solutions (pH > 8). Beetroot red color is widely used for its bright tint.

Main bio-actives

Red beet has high concentration betalains and betanin that are used as food colorants and food additives due to their health promoting properties.

Betanin, obtained from the roots, is used industrially as red food colorant, to improve the color and flavor of jams, jellies and sweets.

Betalains are water-soluble nitrogenous vacuolar pigments present in flowers and fruits of many Caryophyllales with potent antioxidant properties. Betalains are composed of two structural groups: the red-violet betacyanins and the yellow-orange betaxanthins.

Functions

Antioxidant

Studies showed Beetroot supplementation delivers a high amount of bioaccessible antioxidants and might serve as a useful strategy to strengthen endogenous antioxidant defences, helping to protect cellular components from oxidative damage.

The investigation conducted in 2006 determined the pH-dependent free radical-scavenging activity of betanin in the Trolox equivalent antioxidant capacity (TEAC) assay. The report was published by Food Addit Contam suggested betanin has very good free radical scavenging ability at $\text{pH} > 4$ in the Trolox equivalent antioxidant capacity assay. The results suggest that the exceptionally high antioxidant activity of betanin.

Cardioprotective

A 2008 study published in Hypertension examined the effects of ingesting 500mls of beetroot juice in healthy volunteers and found that blood pressure was significantly lowered after ingestion. Researchers hypothesized this was likely due to the high nitrate levels contained in beet juice and that the high nitrate vegetables could prove to be a low cost and effective way to treat cardiovascular conditions and blood pressure. Another study conducted in 2010 found similar results that drinking beetroot juice lowered blood pressure considerably on a dose-dependent basis. Further support was published on British Journal of Nutrition in 2012, normotensive volunteers were randomized in two controlled, single-blind, cross-over, postprandial studies to investigate the vasoprotective ability of beetroot juice or three beetroot extract products. The data strengthen the evidence for cardioprotective blood-pressure-lowering effects of beetroot.

These studies demonstrated significant hypotensive effects of a low dose of beetroot which was unaffected by processing or the presence of betacyanins.

Antileukemia

The potential of beetroot betacyanin pigment betanin bioactivity against human chronic myeloid leukemia cell line (K562) were studied because its antiproliferative effects. The report on Phytomedicine showed dose and time dependent decrease in the proliferation of K562 cells treated with betanin with an IC_{50} of 40 μM . Agarose electrophoresis of genomic DNA of cells treated with betanin showed fragmentation pattern typical for apoptotic cells. Betanin treatment to the cells also induced the release of cytochrome c into the cytosol, poly (ADP) ribose polymerase (PARP) cleavage, down regulation Bcl-2, and reduction in the membrane potentials. Confocal microscopic studies on the cells treated with betanin suggest the entry of betanin into the cells. These studies thus demonstrate that betanin induces apoptosis in K562 cells through the intrinsic pathway and is mediated by the release of cytochrome c from mitochondria into the cytosol, and PARP cleavage.

Hepatoprotective

A study was reported on Food and Chemical Toxicology in 2012 examine the effect of long term feeding (28 days) with beetroot juice on phase I and phase II enzymes, DNA damage and liver injury induced by hepatocarcinogenic N-nitrosodiethylamine (NDEA). Result shows beetroot juice decreased the activities of enzymatic markers of cytochrome P450, CYP1A1/1A2 and CYP2E1. Moreover, Beetroot juice reduces the genotoxic effect of NDEA and the level of liver injury biomarkers. These result shows wetabolic alterations induced by beetroot juice feeding may

protect against liver damage.

Scientists suggest the mechanism of hepatoprotective activity of beetroot against N-nitrosodimethylamine (NDEA)-induced liver injury is activate the nuclear factor erythroid-2-related factor 2 (Nrf2)-antioxidant response element (ARE) pathway. Further explore the mechanism of the activity of beetroot were conducted in 2013 by evaluating the cytoprotective effects of its major component. The research showed that BET through the activation of Nrf2 and subsequent induction of the expression of genes controlled by this factor may exert its hepatoprotective and anticarcinogenic effects. Moreover, the activation of mitogen-activated protein kinases may be responsible for the activation of Nrf2 in the THLE-2 cells.

Applications

Despite traditional use of beetroot for antitumor, carminative, emmenagogue, and hemostatic properties, Data suggest a role as an antioxidant, as a natural source of nitrites, and a potential use in cardiovascular conditions, although evidence is limited.

Nowadays ,beetroot pigment is wildly used as food colorants and food additives ,scientific investigations show the potential in protecting cellular components from oxidative damage,lowing blood pressure, mediating human chronic myeloid leukemia cell line and treating liver injury .

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