

Amygdalin

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Amygdalin, derived from the Ancient Greek word 'almond', is a naturally occurring cyanogenic glycoside that is present in over 1,200 different foods. It is most notably found in the seeds of stone fruit, such as apricot, peach and plum kernels. Isolated in 1830, amygdalin was first used as a cancer treatment in Russia in 1845 and in the 1920s made its way to the United States. Due to its toxicity, a semi-synthetic preparation of amygdalin, called laetrile, was patented and marketed as a safer cancer treatment.

PREPARATIONS: Amygdalin is naturally found in raw food products such as apricot kernels. Some manufacturers crush the apricot kernels into a powder and sell the powder in the form of tablets and capsules; others extract amygdalin from apricot kernels and formulate these into tablets, capsules and solutions for intramuscular or intravenous injection. Skin lotions and liquids for rectal insertion are also available.

COMMON NAMES: Vitamin B17, amygdalina, puransin, nitriloxide, mandelonitrile. Although

laetrile is often used synonymously with amygdalin, it is a semi-synthetic compound synthesised from amygdalin by hydrolysis.

ACTIVE CONSTITUENTS: Amygdalin (D-mandelonitrile- β -D-glucoside-6- β -glucoside) is hydrolyzed to glucuronic acid and mandelonitrile. The latter compound is decomposed to yield benzaldehyde and hydrocyanic acid. Cyanide is thought to selectively target cancer cells.

MEDICAL CLAIMS: Advocates claim amygdalin has anticancer effects and can ameliorate symptoms in advanced stages of cancer, prolonging survival. This effect is purported to be due to the selective action of cyanide on cancer cells. It was erroneously believed that malignant cells have higher levels of β -glucosidase and lower levels of rhodanese, which results in rapid intracellular release of cyanide, and prevention of cyanide conversion to thiocyanate. Another theory suggests that amygdalin is vitamin B17, the absence of which is the cause of cancer. Amygdalin is also purported to have analgesic and anti-inflammatory activity, boost immunity, balance

Summary message

No controlled clinical trials with amygdalin have been conducted. While recent *in vivo* studies show promising anticancer activity, pre-clinical studies on animals did not show statistically significant effects. In human studies, evidence suggests amygdalin is not effective in the treatment of cancer. Variations in dosages, formulations, routes and duration of administration, as well as concomitant cancer therapy, complicates evaluation of the data. Cyanide toxicity, with oral doses in particular, is a major concern and several case studies report toxicity following oral doses of amygdalin or after consuming raw products such as apricot kernels or bitter almonds. Vitamin C potentiates the conversion of amygdalin to cyanide and reduce cysteine, which detoxifies cyanide, potentiating the risk of toxicity, and concomitant use should be avoided.

Herbal medicines are a popular health care choice, but few have been tested to contemporary standards. **POTION OR POISON?** summarises the evidence for the potential benefits and possible harms of well-known herbal medicines.

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blood pressure, maintain overall health, and treat metabolic conditions.

EVIDENCE: Several recent *in vitro* studies have shown that amygdalin can induce apoptosis and/or inhibit proliferation of cancer cells such as that of prostate, renal and colon cancers, which warrants further investigation. *In vivo* studies are far less promising, however. No statistically significant increase in survival was found in animal trials, and findings from only two clinical human trials using amygdalin have been published. While some objective responses to treatment have been noted, eg decreased adenopathy and/or reduction in tumour size, there is currently no evidence available that substantiates the cancer claims made for amygdalin or laetrile.

ADVERSE EFFECTS: Several case reports of cyanide toxicity have been reported with amygdalin and ingestion of apricot kernels, with oral administration associated with much greater toxicity than parenteral administration. Adverse effects can be potentiated with concurrent administration of raw products such as apricot kernels. Acute toxicity can occur in adults who consume 20 or more apricot kernels.

DRUG INTERACTIONS: A potentially life-threatening interaction can occur if amygdalin is taken concurrently with high doses of vitamin C. People taking amygdalin or laetrile should avoid eating other foods rich in amygdalin.

Key references

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