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Effects of the Gut microbiota on Amygdalin and its use as an anti-cancer therapy: Substantial review on the key components involved in altering dose efficacy and toxicity

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Abstract

Conventional and Alternative Medicine (CAM) is popularly used due to side-effects and failure of approved methods, for diseases like Epilepsy and Cancer. Amygdalin, a cyanogenic diglycoside is commonly administered for cancer with other CAM therapies like vitamins and seeds of fruits like apricots and bitter almonds, due to its ability to hydrolyse to hydrogen cyanide (HCN), benzaldehyde and glucose. Over the years, several cases of cyanide toxicity on ingestion have been documented. In-vitro and in-vivo studies using various doses and modes of administration, like IV administration studies that showed no HCN formation, point to the role played by the gut microbiota for the commonly seen poisoning on consumption. The anaerobic Bacteroidetes phylum found in the gut has a high β -glucosidase activity needed for amygdalin hydrolysis to HCN. However, there are certain conditions under which these HCN levels rise to cause toxicity. Case studies have shown toxicity on ingestion of variable doses of amygdalin and no HCN side-effects on consumption of high doses. This review shows how factors like probiotic and prebiotic consumption, other CAM therapies, obesity, diet, age and the like, that alter gut consortium, are responsible for the varying conditions under which toxicity occurs and can be further studied to set-up conditions for safe oral doses. It also indicates ways to delay or quickly treat cyanide toxicity due to oral administration and, reviews conflicts on amygdalin's anti-cancer abilities, dose levels, mode of administration and pharmacokinetics that have hindered its official acceptance at a therapeutic level.

Keywords: Amygdalin; Bacteroidetes; Gut microbes; Hydrogen cyanide; Rhodanese; β -glucosidase.

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Figures

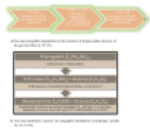


Fig. 1 a One step amygdalin degradation...



Fig. 2 Detoxification of cyanide in the...

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