

A glucosinolate-rich extract of Japanese Daikon perturbs carcinogen-metabolizing enzyme systems in rat, being a potent inducer of hepatic glutathione S-transferase.

ABSTRACT

Purpose: Glucosinolates/isothiocyanates are an established class of naturally occurring chemopreventive agents, a principal mechanism of action being to limit the generation of genotoxic metabolites of chemical carcinogens, as a result of modulation of cytochrome P450 and phase II detoxification enzymes. The objective of this study was to assess whether a glucosinolate-rich extract from Daikon sprouts, containing glucoraphasatin and glucoraphenin, is a potential chemopreventive agent by modulating such enzymes in the liver and lung of rats. **Methods:** Rats were exposed to the glucosinolate-rich Daikon extract through the diet, at three dose levels, for 14 days, so that the low dose simulates dietary intake. **Results:** At the low dose only, a modest increase was noted in the hepatic dealkylations of methoxy-, ethoxy-, pentoxyresorufin and benzyloxyquinoline that was accompanied by elevated expression of CYP1 and CYP3A2 apoprotein levels. In lung, only a modest increase in the dealkylation of pentoxyresorufin was observed. At higher doses, in both tissues, these increases were abolished. At the same low dietary dose, the Daikon extract elevated markedly glutathione S-transferase activity paralleled by rises in GST α , GST μ and GST π protein expression. An increase was also noted in quinone reductase activity and expression. Finally, glucuronosyl transferase and epoxide hydrolase activities and expression were also up-regulated, but necessitated higher doses. **Conclusion:** Considering the ability of Daikon glucosinolates to effectively enhance detoxification enzymes, in particular glutathione S-transferase, it may be inferred that consumption of this vegetable may possess significant chemopreventive activity and warrants further evaluation through epidemiology and studies in animal models of cancer.

Keyword: Daikon; Glucosinolates; Glucoraphasatin; Isothiocyanates; Chemoprevention; Glutathione-S-transferase.