

Plant secondary metabolites - isothiocyanates and the mechanisms of their effects against pathogenic bacteria.

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Isothiocyanates (ITC) belong to the wide group of plant secondary metabolites and their anticancer, anti-inflammatory and chemopreventive effects have been already demonstrated. The antibacterial action of ITC attracts recently attention due to increased antibiotic resistance amongst pathogenic bacteria. We presented evidence about antimicrobial effects of ITC against enterohemorrhagic *Escherichia coli* strains, more importantly ITC inhibited Shiga toxin harboring prophage induction and subsequent toxin synthesis in these strains. The ITC (e.g. sulforaphane, benzyl ITC, allyl ITC, phenethyl ITC) effect in *E. coli* involves the induction of general stress response, the stringent response and the accumulation of its alarmone, unusual nucleotide, (p)ppGpp. We showed also the antibacterial effect of ITC against another pathogenic bacterial species, *Vibrio cholerae*. ITC not only inhibited bacterial growth but also downregulated the expression of virulence factor genes. Most importantly, ITC reduced the toxicity of *V. cholerae* in the in vitro assays (against Vero and HeLa cells) and in vivo, using *Galleria mellonella* larvae as an infection model. In conclusion, our data indicate that ITCs might be considered promising antibacterial agents in bacterial infections.