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## Studies on the effect of different cooking procedures of *Brassica* vegetables on the formation of *isothiocyanates* and their antimicrobial activities

Sameer Khalil Ghawi  
University of Reading, UK

Sulforaphane, a naturally occurring cancer chemo preventive, is the hydrolysis product of glucoraphanin, the main glucosinolate in broccoli. The hydrolysis requires myrosinase isoenzyme to be present in an active state; however, cooking leads to its denaturation. In order to ensure glucoraphanin hydrolysis, broccoli must either be mildly cooked or active sources of myrosinase can be added post-cooking. In this study, mustard seeds as exogenous source of myrosinase were added to cooked broccoli as a condiment with a view to intensify the formation of sulforaphane. Thermal inactivation of myrosinases from broccoli and mustard seeds was studied. Thermal degradation of broccoli glucoraphanin was also investigated. The inhibition activity of sulforaphane was assessed against a variety of Gram-negative and Gram-positive bacteria using the disk diffusion method. For comparative purpose, a number of antibiotics were also tested against the same set of microorganisms. In addition, the effect of mustard seeds addition on sensory profiling and consumer acceptability was assessed. Mustard seed myrosinase showed higher thermal stability than broccoli myrosinase. Limited thermal degradation of glucoraphanin (about 10%) was observed when broccoli was sous vide cooked. Addition of mustard seed powder to cooked broccoli reinitiated the formation of sulforaphane. The antimicrobial assays demonstrated that sulforaphane extracted from broccoli had a wide spectrum of inhibition against both Gram positive and Gram-negative bacteria. Several pathogens that were resistant to ampicillin, such as *Salmonella Typhimurium* DT104 T10, *E. coli* O157:H7 VT and *E. coli* K-12 and to tetracycline, such as *Salmonella hadar*, were sensitive to sulforaphane. Addition of mustard seed powder significantly changed sensory attributes of broccoli samples and affected consumer liking. Despite the significant increase in pungency and burning sensation in samples with added mustard seeds, a considerable number of consumers (32%) liked it. This suggests that optimised addition of *Brassica* condiments (e.g. mustard seeds, rocket, horseradish, watercress) to cooked broccoli may be a route to enhance bioactivity of cooked broccoli without compromising consumer acceptability.

s.khalilghawi@reading.ac.uk

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