

## Improved x-ray spectrometric method for determining glucosinolates

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Glucosinolates are the most detrimental components in oilseed rape; their breakdown products in the high protein meal after oil extraction can adversely affect animal growth. The Australian oilseeds industry has adopted the Canola standard, i.e. <30 pmol/g of four particular glucosinolates in meal. A rapid method for determining glucosinolates in seed and meal of rapeseed and other oilseed brassicas is essential for screening cultivars in breeding programs and for analysing batches delivered for crushing.

### Methods

A recently developed X-ray fluorescence spectrometric (XRFS) method (1) for determining oxidised S ( $S^{6+}$ ) and carbon bonded S ( $S^c$ ) in plant material utilizes the small SK wavelength shift with change in chemical bonding (oxidation number). A glucosinolate molecule contains two S atoms, one  $S^{6+}$  and one  $S^c$  (Fig. 1). Protein contains only  $S^c$  atoms. Analysis for  $S^{6+}$  provides an estimate of glucosinolate content (Fig. 1).

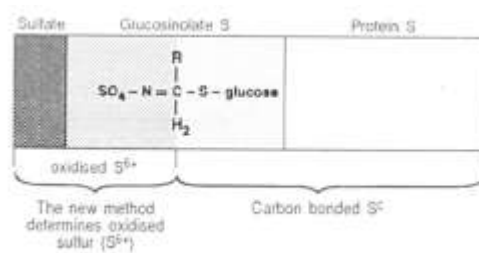


Figure 1. Principal S fractions in rapeseed.

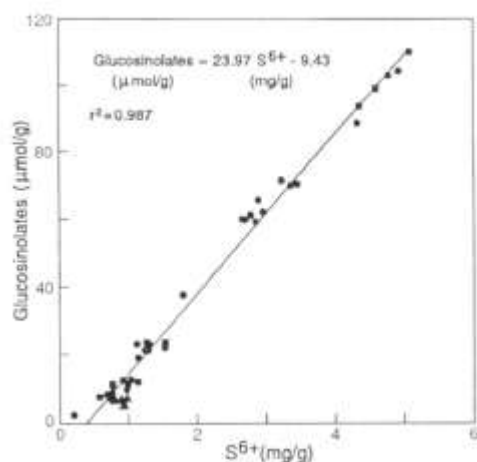


Figure 2. Linear relationship between  $S^{6+}$  in rapeseed and total glucosinolates determined by glucose release (2).

### Results and discussion

$S^{6+}$  is highly linearly correlated with glucosinolate contents determined by chemical Methods (Fig. 2). Errors from inclusion of sulfate are small because sulfate, a small fraction of total S, is correlated with glucosinolates. The  $S^{6+}$  method is superior to an existing XRFS method (2) which uses total S because protein S, a large fraction of total S, is not correlated with glucosinolates.

### References

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