

STANDARDIZATION OF GLUCOSINOLATE CONTENT IN SEED OF DOUBLE LOW OILSEED RAPE CULTIVARS – PROBLEM OF INDOLYL GLUCOSINOLATE

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ABSTRACT

There are many reasons supporting exclusion of indolyl glucosinolates from the standard for double low oilseed rape and normalization the total alkenyl glucosinolate content.

Glucosinolates are one of the major factors affecting the feeding value of rapeseed meal. This feeding value depends mainly on the primary content of glucosinolates in seed because the lower level which can be obtained in meal by toasting after extraction is connected with losses in the digestibility of protein and energy.

Standardization of glucosinolate content in seed for crushing is necessary to secure the good quality rapeseed meal for animal feeding.

The standardized content of glucosinolates is expressed now on two ways:

- in Canada and Poland as $\mu\text{M/g}$ of deffated seed matter,
- in Western Europe as $\mu\text{M/g}$ of seed.

More substancial difference exists in quality of standardized glucosinolates. The total of akenyl glucosinolates is normalized in Canada and in Poland but in Western Europe total comprises also indolyl glucosinolates.

Inclusion of indolyl glucosinolate to the standard is a results of use the simple and primitive method based on determination of glucose released by hydrolysis. More sophisticated method used in the breeding works conducted in Canada and Poland allowed individual glucosinolate determination and estimation the total of alkenyl glucosinolate only.

Alkenyl glucosinolates are well known as goitrogenic and toxic constituents of rapeseed meal (Tookey et al., 1980). The situation of indolyl glucosinolates is rather different. In this case following aspects should be taken into consideration:

- feeding experiments with indolyl glucosinolates and their transformation products demonstrated non-detrimental effects on animal up to the level of $3 \mu\text{M/g}$ of diet dry matter. Diet is bellow this level even though by addition of 30 per cent of double low rapeseed meal with normal indolyl glucosinolate content (Bell, 1994);
- indolyl glucosinolates are unstable and usually they are destroyed already by seed flakes cooking befor screw pressing (Krzymański, 1993);
- the main sulphur containing split product of indolyl glucosinolates is thiocyanate. Thiocyanate can disturb iodine metabolism in thyroid gland only by insufficient supply of iodine in foot;
- the metabolism of indolyl glucosinolates is joined with synthesis of indol-3-ylacetic acid (auxine) (Feldl et al., 1994), so their level influence plant vigour and plant ability for injury regeneration;
- indolyl glucosinolates are degraded to various products of which indol-3-ylcarbinol is considered among the compounds to be cancer inhibitors (Feldl et al., 1994; Wattenberg et al., 1986);

- some experiments suggest that consumption of indolyl glucosinolates in amount considered to be normal may offer protection against breast cancer by modulation of estrone metabolism (Yannai et al., 1994).

CONCLUSIONS

- Alkenyl and indolyl glucosinolates have quite different characters and should not be standardized in one total value.

There are still possibilities for further reduction of alkenyl glucosinolate content by breeding the new improved cultivars of oilseed rape (Krzymaniński, 1993). Continuation of breeding for lower alkenyl glucosinolates is necessary because Rakowska et al found in feeding experiments (Rakowska et al., 1979) that only the meal produced from seed with total alkenyl glucosinolate content lower than 20 $\mu\text{M/g}$ deffated matter can be used in the diet for non-ruminants without limitation.

Following standards can be proposed for total alkenyl glucosinolate levels in double low rapeseed:

	μM per g deffated matter		μM per g seed	
	present	next future	present	next future
Sowing seeds:				
basic	14	10	7.8	5.6
certified	16	14	8.9	7.8
Commercial seeds	25	20	13.9	11.1

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