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BREEDING FOR LOW-GLUCOSINOLATE IN *CAMELINA SATIVA* (L.) CRANTZ

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Camelina sativa (L.) Crantz (CS) has become attractive for the exploitation of seed oil as fuel. In particular, CS (chromosome number 2n=40, genome size 750 Mbp) is gaining interest in North America and Europe for jetfuel production (bio-kerosene). The extraction of oil from seeds makes protein-enriched flours (by-product) available as an ingredient in animal feed. However, exploitation of flours from CS may be limited by the presence of glucosinolates (GSLs). At present, the presence of CS meal in animal feed at concentrations above 10% depresses the growth of monogastric animals.

Glucosinolates are non-toxic in themselves, but after enzymatic hydrolysis by thioglucosidase or myrosinase, produce different catabolites (e.g., isothiocyanates, thiocyanates, epithionitriles and nitriles) with detrimental and antinutritional characteristics (impairment of thyroid, reduced growth and fertility, irritation of the gastro-intestinal mucosa). In CS, total GSL content ranged from 15.2 to 24.6 mmol Kg^{-1} dry weight (dw). Three main GSLs were found by HPLC in CS and are named GSL1 (9-methyl-sulfinyl-nonyl-GSL) GSL2 (10-methyl-sulfynil-decyl-GSL) and GSL3 (11-methyl-sulfinyl-undecyl-GSL), respectively. In general, GSL2 represented the most abundant GSL being between 50% - 60% of the total.

In order to reduce the GSL content we crossed two CS varieties (Ames28372 x Calena) showing different levels in one of the three molecules of GSLs. The variety Ames28372 has the lowest total GSL content (15.2 mmol Kg^{-1} dw) and is particularly low in GSL1 (1.26 mmol Kg^{-1} dw), while the variety Calena is low in GSL3 content (1.50 mmol Kg^{-1} dw). After crossing several F1 hybrids were obtained (8 with mother Ames28372 and 8 with mother Calena). Each F1 plant was self-pollinated and analysed for GSL content. Since the CS seeds are extremely small, the content of GSLs was determined on a seed pool of each silique (it contains up to 16 seeds) leaving 2 seeds from each silique for the next sowing. Seeds from siliques with the lowest GSL contents were sown and the plants self-pollinated. After four generation the total GSL content of the F4 progeny was, as average, lower than 4 mmol Kg^{-1} dw (mean of parents above 12 mmol Kg^{-1} dw) and, some siliques, exhibited GSL contents under 2 mmol Kg^{-1} dw. Seeds with the lowest GSL content have been now sowed to get F5 progenies.

Our results indicate that, in *Camelina sativa*, a reduction in GSL content might be possible by conventional breeding in relatively few generations.