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Amino Acid Content and Genetic Control in Brassica napus L.

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Developing canola with enhanced protein and nutritional qualities could revolutionize canola meal utilization and functionality. Canola meal has historically been a by-product and utilized only for animal feed, even though it has very similar available energy compared to soybean meal. This provides an immense opportunity to expand the utilization of canola in Canada. The Canadian canola industry contributes approximately $26 billion to the economy annually; only about $600 million of this is composed from meal production and utilization. This value could grow several fold if high-quality protein products were developed for use in human food products. Protein-related traits can include protein, amino acid, cruciferin and napin contents. A doubled haploid (DH) population of 143 DH lines was developed and evaluated (2014 - 2016) for seed quality traits including oil and protein content using near-infrared spectroscopy and amino acid content using ANKOM hydrolysis procedures. The population was also genotyped using the Brassica 60K Illumina InfiniumTM SNP genotyping array. Seed oil content ranged from 32 – 49% and seed protein content ranged from 26 – 36%. Mean amino acid content for this population exceeded the national canola meal average for each amino acid. Mean amino acid content for several amino acids including alanine, cysteine, glycine, methionine exceeded the national mean amino acid levels of United States soybean meal. Several quantitative trait loci for protein content and amino acid content were found on A3, C1, C2 and C5. If the genes controlling amino acid content and seed storage protein type were known, genotypes high in specific amino acids or seed storage proteins could be developed and utilized in specialty food products. Genetic insight into these traits will provide the resources necessary to tailor canola genotypes for use in specialty, high-value protein products.