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Expression of Carbohydrates Biosynthetic Genes in Developing Soybean Seeds

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ABSTRACT

An essential part of livestock diets is soybean meal, which is a major source of protein, but which also consists of antinutritional carbohydrates. Antinutritional carbohydrates such as raffinose and stachyose lead to irritation to the gut for monogastric livestock as well as unhealthy weight gain. A major objective of soybean genetics is to reduce these antinutritional carbohydrates within the seed and increase the levels of good carbohydrates. This will lead to healthier livestock and better meat quality. To select genes potentially responsible for variation in carbohydrate levels in seeds, the expression of genes encoding several biosynthetic enzymes was measured during soybean seed development. Genes were selected on the basis of working knowledge of the raffinose/sucrose biosynthetic pathways. Soybean plants were grown in controlled conditions within the growth chamber and seeds were collected at five defined intervals during seed development. RNA was extracted from the seeds and expression of genes of interest were measured using quantitative RT-PCR. Expression of these genes were compared between wild type soybean and the lab's carbohydrate composition mutants and from lines from the soybean genetic stock center that differ from commodity soybean by having higher levels of sucrose.

KEYWORDS

Soybean, Carbohydrates, Stachyose, Raffinose