Lutein content of yellow-fleshed potatoes grown in Alberta

Functional Foods are defined as foods that contain health-promoting compounds beyond calories, minerals and nutrients. A class of compounds called carotenoids imparts the color of yellow-fleshed potatoes. Carotenoids are anti-oxidant compounds that may protect against a variety of chronic diseases and certain cancers. Lutein is a specific carotenoid compound associated with a reduced incidence of age-related macular degeneration and cataract formation. Research initiated in 2004 by AAFRD scientist, Dr. Michele Konschuh, is aimed at making a functional food claim for yellow-fleshed potato varieties as a way of promoting potatoes to consumers. Twenty potato varieties were grown at CDCN (Edmonton) and CDCS (Brooks) and screened for lutein and zeaxanthin, another carotenoid compound. Potatoes were stored, boiled or fried, and assessed for lutein once again. Results from the first year of the study confirmed that lutein is present in yellow-fleshed potatoes grown in Alberta, even after storage, and that lutein is not destroyed during the boiling or frying process. Additional work was needed to establish the quantity of lutein available in a serving of Alberta-grown yellow-fleshed potatoes.

Ag & Food Council agreed to augment industry funding to further study lutein in yellow-fleshed potatoes in 2005 and 2006. The current project involves growing ten yellow-fleshed potato varieties in three Alberta locations, harvesting at three different times and analyzing them for tuber flesh color intensity, total carotenoid content and lutein concentration. Armed with this information, we envision that partners from the potato industry will use the information to promote potatoes to health conscious consumers and retailers. While yellow-fleshed potatoes may not be the richest source of lutein, the knowledge that potatoes contain another health promoting compound may encourage potato consumption or provide good reasons to continue including potatoes in a balanced diet.

Results are now available from the 2005-growing season. Total carotenoid content ranged from 17 to 250 mcg per 100 g FW and was positively correlated with tuber flesh color intensity, especially when tubers were harvested 100 days after planting. Lutein accounted for approximately 25% of the total carotenoid content in many varieties and ranged from 3.2 mcg per 100 g FW in one variety (Sinora) to over 50 mcg per 100 g FW in the variety Satina. Lutein concentration was influenced most by variety, but varied with time of harvest and between locations. Satina and Victoria had consistently higher concentrations of lutein than most of the varieties studied. An average serving of Satina potatoes would provide approximately 100 mcg of dietary lutein. The trial will be repeated in 2006 to provide additional data to support a functional food claim. Potato varieties with significant concentrations of lutein may be marketed in the future as functional foods.

The Potato Growers of Alberta, ConAgra Foods, HZPC Americas, Parkland Seed Potatoes, Solanum International, Edmonton Potato Growers and The Little Potato Company provided the industry funding for the 2005-2006 research project.