Researching the Hypcholesterolemic Effects of Buckwheat Protein

Buckwheat (*Fagopyrum esculentum Moench*) grown on the Standard Process Farm is used as either the flowering whole plant or as the seed. Both stages have noted health benefits. Flowering buckwheat provides a rich source of phytonutrients including flavonoids, such as rutin, and other phenolic acids. Buckwheat seed, considered a pseudo-cereal, is noted for its high nutritional quality based upon digestibility, available lysine, and protein bioavailability.

Japanese researchers have previously shown that buckwheat protein has potent hypocholesterolemic activity in hamsters.\(^1\) In this model, a diet rich in buckwheat reduced plasma and liver cholesterol concentrations to a greater extent than either soy- or casein-based diets. In addition, fecal sterol excretion, the only route of whole body cholesterol excretion, was significantly higher in the hamsters fed buckwheat protein.

There are many ways that buckwheat may modify cholesterol, including through cholesterol bioavailability. Absorption of cholesterol is dependent upon its solubility in lipid-rich aggregates called micelles. Micelles allow for an efficient presentation of cholesterol to the intestinal wall for absorption. Experiments with buckwheat protein at Standard Process have indicated a significant reduction in the amount of soluble cholesterol incorporated into micelles, thus theoretically limiting the amount of cholesterol absorption. This effect was further investigated in Caco-2 cells, a cultured cell line similar to intestinal cells in the gut. Incubation of these cells with micelles made in the presence of several proteins including albumin (control), casein, gelatin, and buckwheat indicated reduced absorption of cholesterol with buckwheat treatment. Continuing research will investigate the mechanisms by which buckwheat exhibits its hypocholesterolemic effect on micelle formation and absorption in intestinal cells.

It remains to be determined whether reduced cholesterol absorption due to buckwheat impacts cholesterol levels but there is precedence for this effect in the plant sterol reduction of serum cholesterol.

**Figure 1.** Cholesterol uptake in Caco-2 cells in the presence of proteins including bovine serum albumin (BSA), casein, gelatin and buckwheat (BWP). Amounts applied were 0.2% (w/v), and plotted as mean ± standard error (n = 4).