

# Processing Effects on the Cholesterol-Lowering Benefits Associated with Eating Beans

Cooking method and milled particle size influenced the cholesterol-lowering ability of black beans. Micronization (infrared heating) and coarse milling were better at lowering blood cholesterol.

**EATING WHOLE PULSES** and soybeans helps lower blood cholesterol. However, the North American population typically does not consume large amounts of whole pulses and soybeans (consumption by Winnipeggers was estimated at less than a one-third cup per month). Instead, they prefer easy-to-use recipes or prepared foods that utilize processed ingredients. But it remains unclear whether processing affects the health benefits of the whole food.

If pulses are processed to flour or different fractions, we need to know which part of the seed contains the compounds responsible for the health benefits. We also need to know if different methods of cooking or heat treatment might affect these compounds. For example, new foods are being developed that contain pulse flour or fractions of the whole seed, micronization (infrared heating) is being used to expedite the cooking process and extrusion is being used to develop snacks containing pulses.

The goal of this project was to determine whether processing methods affect the cholesterol-lowering properties of black beans. Black beans were chosen, as a previous research project demonstrated that whole black beans prepared by conventional methods (overnight soaking and boiling) lowered blood cholesterol.

*Black beans were prepared using five different methods:*

1. conventional preparation including overnight soaking and boiling, followed by freeze-drying and milling to a fine powder
2. the same method as (1) but milling to a coarse powder

3. extrusion into a Cheetos-like product then fine milling
4. micronization then fine milling
5. dehulling with a pearler, followed by the same method as (1).

These bean powders were subjected to a nutrient analysis then incorporated into rodent diets and compared with a bean-free control diet.

Processing method affected the cholesterol-lowering properties of black beans. More specifically, both cooking method (type of heat treatment) and particle size (milling) played important roles.

Black beans prepared by micronization, but not extrusion, lowered total cholesterol and low-density lipoprotein (LDL) cholesterol (i.e., “bad” cholesterol). Micronizing black beans resulted in lower insoluble fibre and total dietary fibre, yet they were effective at lowering cholesterol. This suggests that the amount of insoluble fibre and total dietary fibre (as they would appear on a food label) does not necessarily predict the degree of cholesterol lowering.

Coarse vs. fine particle size plays a role in the cholesterol-lowering ability of black beans. In this study, the conventional preparation of beans (soaking and boiling) plus milling to a coarse powder lowered LDL-cholesterol, whereas milling to a fine powder did not. All other preparation methods were followed by fine milling and it is possible they may have been more effective at cholesterol-lowering if coarse milling had been used.

Dehulled, cooked black beans lowered total cholesterol, indicating that the bioactive components for cholesterol-



*A – black beans prepared by extrusion and fine milling*

*B – cooked and freeze-dried black beans*

*C – uncooked whole black beans*

*Changes in physical characteristics due to processing are usually visible, but modifications to the chemical characteristics that determine their ability to affect health cannot be determined without testing.*

lowering are present in the cotyledon part of the seed. Isolated fractions or flours that contain primarily cotyledon would be expected to have cholesterol-lowering properties as well.

In summary, the method used for bean processing can affect the cholesterol-lowering ability of black beans. This must be taken into account when new food products are being developed that utilize different methods of heat treatment or milling, or those that produce isolated fractions of the whole seed.

Unfortunately, a universal conclusion cannot be reached regarding which processing method is the best and it will be necessary to perform a similar study for every health benefit that is expected to be present in new products containing black beans. ▀