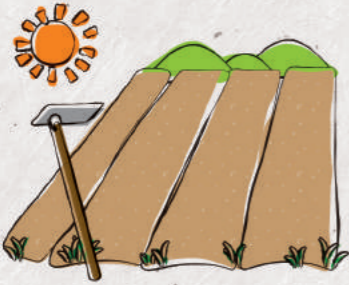


## Soba (buckwheat) production -from farm to table-

### Buckwheat cultivation

Buckwheat is cultivated in well-drained sunny fields. There are summer buckwheat, which is sown in spring and harvested in summer, and fall buckwheat, which is sown in summer and harvested in fall.



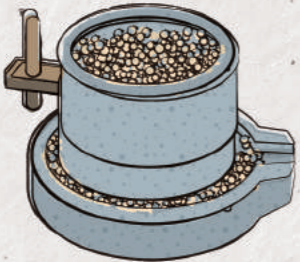
### Buckwheat harvesting and processing

Pebbles, sand, and stalks mixed in with the harvested buckwheat, and dust and dirt on the surface of the buckwheat are removed.



### Buckwheat milling

The processed buckwheat is milled, with the endosperm making up most of the soba flour.



### Making soba noodles and cooking with boiling water

Water is mixed with the soba flour to make fresh soba noodles. Soba is made by boiling the fresh soba noodles.



# S O B A

## NARO

National Agriculture and Food Research Organization  
Agriculture Radiation Research Center  
Food Research Institute

Countermeasures against Radioactive Contamination of Food (in Japanese):  
[http://www.naro.affrc.go.jp/disaster/higas\\_hinihon201103/index.html](http://www.naro.affrc.go.jp/disaster/higas_hinihon201103/index.html)



## Buckwheat from the farm to the table

New approaches in food safety  
with respect to radioactive cesium

## Research by NARO on countermeasures against radioactive materials

NARO is engaged in research on measures to reduce radioactive materials in food, at each stage of production; starting from the farm, with radioactive materials in the environment, continuing during breeding and cultivation, and through to the table.

Studies to monitor and remove radioactive materials from the environment



Studies to curb the transfer of radioactive cesium to agricultural and livestock products

Studies to investigate changes in radioactive cesium content and concentration during food processing and cooking



Unit of radioactive cesium concentration:

**Bq/kg**

The unit that represents the measure of radioactivity is the Becquerel (Bq). "Bq/kg" (Becquerel per kg) is used to indicate the concentration of radioactive cesium in food.

# Cultivate

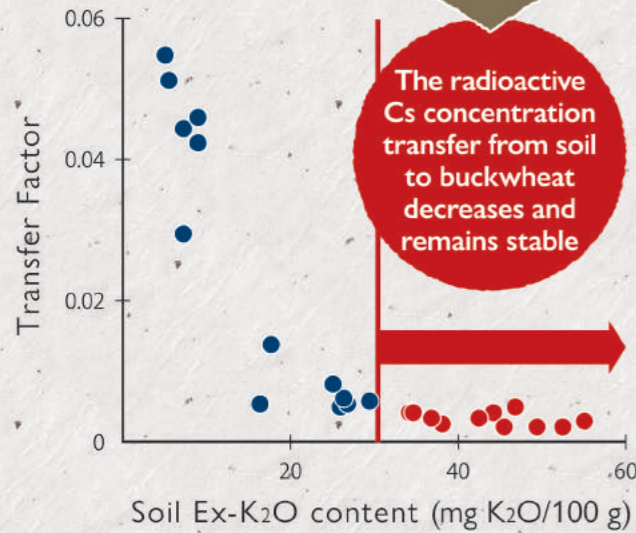
Reducing radioactive Cs with potassium addition in soil

The concentration of radioactive cesium (Cs) in unhusked buckwheat is largely dependent on the amount of potassium in the soil. (This is called exchangeable potassium (Ex-K<sub>2</sub>O) by experts).

If the amount of Ex-K<sub>2</sub>O in the soil after cultivation is 30 mg K<sub>2</sub>O/100 g or higher, then the concentration of radioactive Cs in unhusked buckwheat is curbed.



When the amount of Ex-K<sub>2</sub>O in the soil is increased with potash...



The radioactive Cs concentration transfer from soil to buckwheat decreases and remains stable

$$\text{Transfer factor} = \frac{\text{radioactive Cs concentration of unhusked buckwheat}}{\text{radioactive Cs concentration of the soil}}$$

# Polish

Reducing radioactive Cs with buckwheat polishing

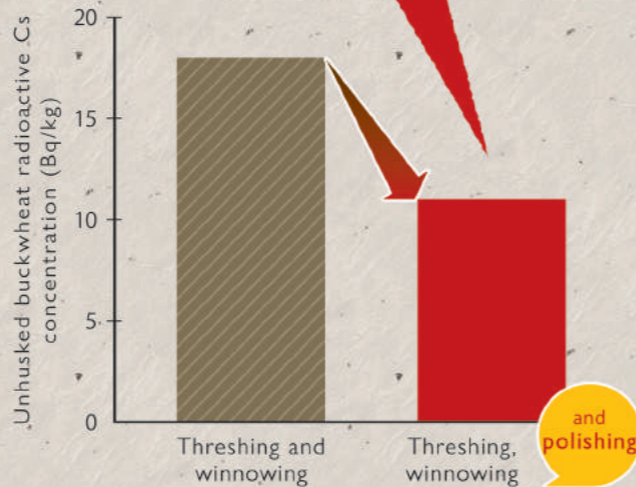
Harvested buckwheat sometimes has soil attached to the surface due to the lodging during cultivation. Careful polishing of unhusked buckwheat removes the deposits from the surface and can reduce the radioactive Cs concentration.



Unhusked buckwheat before (left) and after (right) polishing

Polishing removes soil particles from the surface of unhusked buckwheat

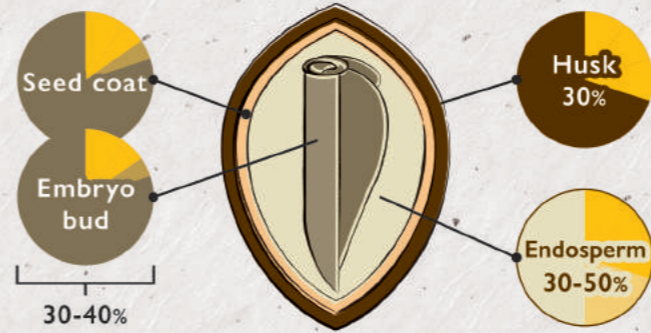
Can reduce the radioactive Cs concentration of unhusked buckwheat



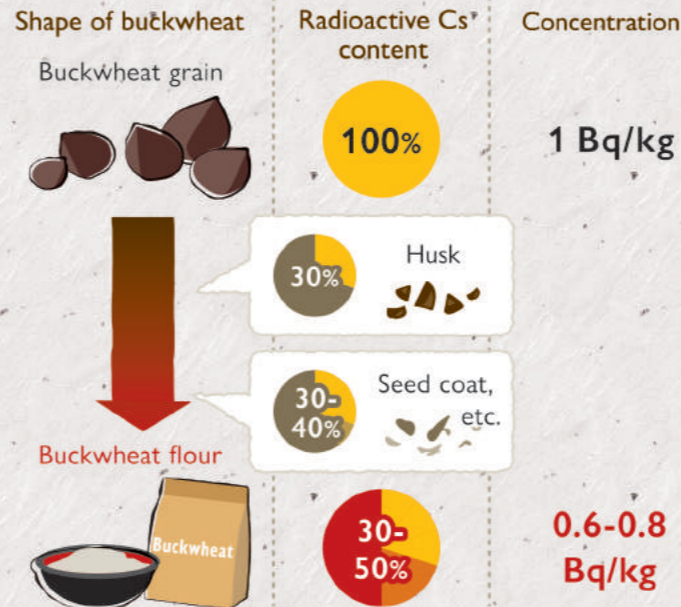
# Mill

Reducing radioactive Cs with buckwheat milling

Approximately 50%-70% of the radioactive Cs in unhusked buckwheat is removed by elimination of the husk and the seed coat. The radioactive Cs in the buckwheat flour (endosperm) consumed by humans is 30%-50% of that present in unhusked buckwheat.



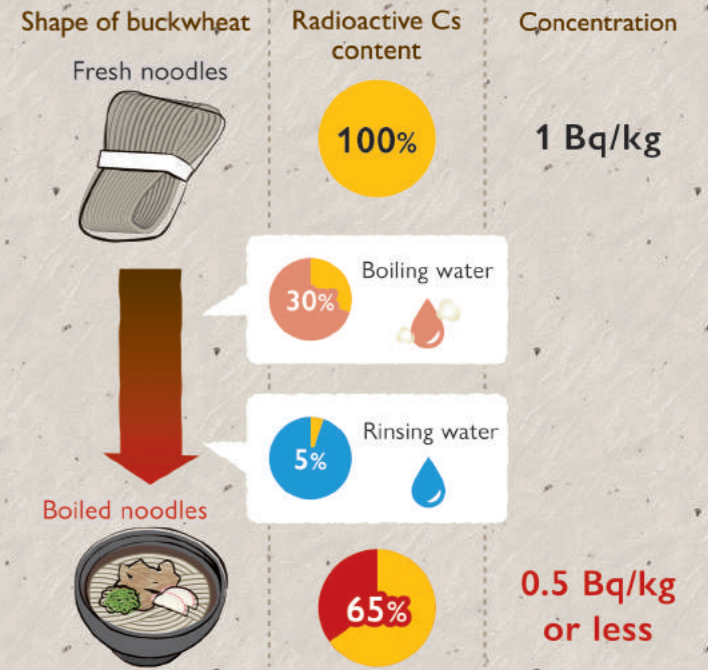
The radioactive Cs concentration in buckwheat flour after milling unhusked buckwheat is lower than that before milling. The radioactive Cs concentration in buckwheat flour is approximately 60-80% of that in unhusked buckwheat.



# Boil

Reducing radioactive Cs by boiling soba noodles

Boiling soba (buckwheat) noodles transfers approximately 30% of the radioactive Cs from the boiled noodles to the water used for boiling and approximately 5% into the rinsing water. Approximately 65% of the radioactive Cs in fresh noodles exists in the boiled noodles.



The radioactive Cs concentration in boiled soba noodles is reduced to approximately half of that in fresh noodles before boiling.

What is the concentration in the water used for boiling soba?

The radioactive Cs concentration in the water used for boiling soba noodles is approximately one twentieth of that in boiled noodles. However, repeatedly using the same water for boiling may increase the concentration.

