

Soybean from the farm to the table

Soybean in Japan

Soybean, one of the most important crops in Japan, is processed and consumed in different forms. Mature soybean is used in several traditional Japanese food products such as tofu, natto, miso, and soy sauce.

Cultivation

Soybean is a temperate legume. Thus, the crop is sown from May to July to avoid frost damage and is harvested from October to December.

Processing and cooking

Almost all soybean produced in Japan is used as ingredients of processed foods. Tofu is a major product that is made by concentrating soy protein. Other important traditional soybean products such as miso and soy sauce are produced through fermentation.

< Main uses of soybean produced in Japan >



NARO
National Agriculture and Food Research Organization
Tohoku Agricultural Research Center
Food Research Institute

Countermeasures against Radioactive Contamination of Food (in Japanese)
<http://www.naro.affrc.go.jp/disaster/higashinihon201103/index.html>



New approaches in food safety with respect to radiocesium

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, where radioactive materials are present in the environment, to breeding and cultivation, and consumption as food.

Studies to monitor and remove radioactive materials from the environment



Studies to curb the transfer of radiocesium to agricultural and livestock products



Studies to investigate the changes in content and concentration of radiocesium that occur during food processing and cooking



Unit of radiocesium concentration

[Bq/kg]

The unit that represents the measure of radioactivity is becquerel (Bq). "Bq/kg" (Becquerels per kilogram) is used to indicate the concentration of radiocesium in food.



Reducing radiocesium during cultivation

Countermeasures for reducing the transfer of radiocesium from the soil to soybean, such as removal of the contaminated surface soil and use of potassium fertilizers, were conducted in fields after the accident at the TEPCO Fukushima Daiichi nuclear power plant. By adopting these measures, the radiocesium concentration in harvested soybeans has not exceeded the present limit (100 Bq/kg) since 2015.

The use of the fertilizer increases the exchangeable K (Ex-K₂O)* content in the soil and reduces the transfer of radiocesium to soybean (Fig. 1).

*Ex-K₂O is absorbable by crops.

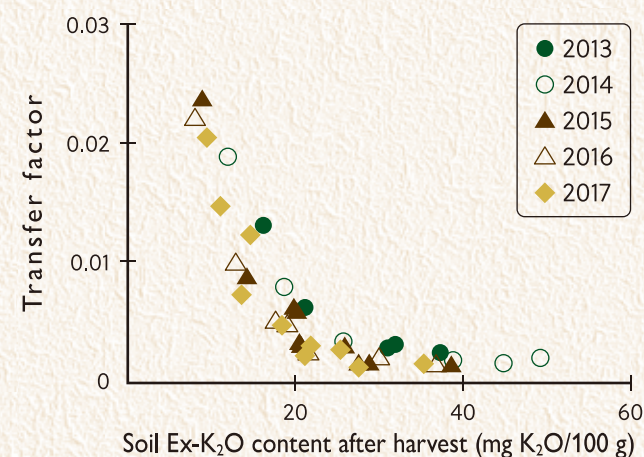


Fig. 1 Relationship between Ex-K₂O in the soil after harvest and the transfer factor of soybean

$$\text{Transfer factor} = \frac{\text{radiocesium concentration of soybean}}{\text{radiocesium concentration in soil}}$$

In soybean cultivation, an Ex-K₂O content of ≥25 mg K₂O/100 g in the soil prior to the use of a basal fertilizer at a conventional rate is widely recommended*.

In addition, the amount of the fertilizer does not affect the soybean taste and quality.

*In the case of initial cultivation after a nuclear accident or if the field is considered to have a high transfer factor, the recommended application level is increased up to 50 mg K₂O/100 g.



NARO and Fukushima prefecture: Cultivation guide to reduce radiocesium concentration in soybean (in Japanese)

http://www.naro.affrc.go.jp/publicity_report/publication/pamphlet/tech-pamph/130461.html



Reducing radiocesium through processing and cooking

When a part of the raw material in radiocesium-containing food products is discarded, the radiocesium in that part is removed. In addition, some radiocesium in food is transferred to the water used for boiling or steaming food. This process reduces the radiocesium content in the prepared food.

When soybeans are processed into natto, boiled beans, or tofu, the content and concentration of radiocesium changes as shown in the illustration below. *

*Soybeans used in commercially processed foods and distributed soybeans are guaranteed to be safe for consumption below the limit.

Changes in the content and concentration of radiocesium through processing and cooking of soybean

