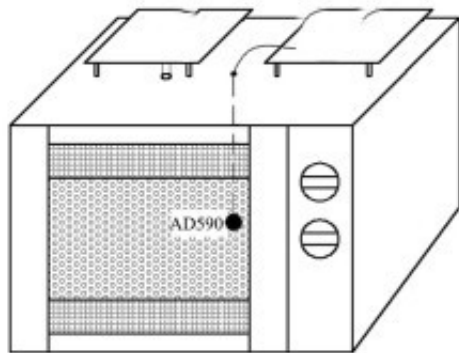


# Enrichment of Selenium in Germinated Brown Rice and Optimization of Microwave Drying and Extruding Process

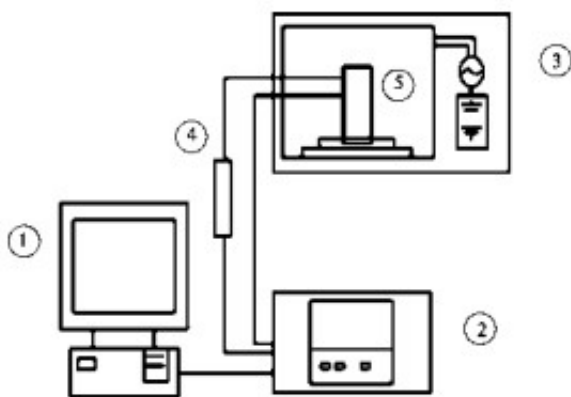
Abstract: The effects of selenium-enriched germinated brown rice and [microwave drying equipment](#) and extrusion on the nutritional quality of selenium-enriched germinated brown rice were investigated by using common japonica rice as raw material.



Schematic diagram of microwave drying temperature control system

It was found that when the mass concentration of selenium was 10 mg/L, a higher quality selenium-enriched germinated brown rice could be obtained. Under this condition, the germination rate of brown rice was 97.9%, and the organic selenium content was 977.6  $\mu$ g/kg (mass fraction 98.5%). The content of  $\gamma$ -aminobutyric acid is 445.9 mg/kg; the microwave drying at 40  $^{\circ}$ C is beneficial to maintain the content of selenium and  $\gamma$ -aminobutyric acid in germinated brown rice; the content of organic selenium and  $\gamma$ -aminobutyric acid in extruded products Compared with brown rice, it increased to 29 times and 5 times respectively.

Studies have shown that sodium selenite can be used as a selenium-enriched reagent to achieve effective selenium-enriched germinated brown rice, and selenium-enriched germinated brown rice can be used to develop related nutrient-expanded foods.



Key words: [germinated brown rice microwave drying](#); selenium enrichment;  $\gamma$ -aminobutyric acid; extrusion

Selenium is an essential trace element in the human body. It has biological functions such as

anti-oxidation, protection of visual organs, detoxification and detoxification, and prevention and treatment of liver diseases. Lack of selenium can lead to diseases such as liver cancer, tumors, cardiovascular and cerebrovascular diseases, and Keshan disease. In addition, because there is no organ or tissue that stores selenium for a long time in the body, it must be continuously obtained from the diet to meet the body's demand for selenium. At the same time, due to the lack of selenium in the soil in most parts of China, selenium enrichment in a nutrient-enhanced manner can ensure selenium intake in selenium-deficient areas.

Brown rice germinates under certain process conditions, activates related enzymes, converts inorganic selenium into organic selenium, and also increases the content of  $\gamma$ -aminobutyric acid (GABA). At present, the research on germinated brown rice mainly achieves the effective enrichment of selenium or GABA by process optimization. Based on the previous research, this study fully considers the development of brown rice products through drying and expansion process, and focuses on the effects of drying and expansion process on the nutritional quality of selenium-enriched germinated brown rice, and provides a theoretical basis for the development of nutritious brown rice products.