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## Combining Radio Frequency Drying with Hot Air Oven for Energy Reduction in GABA Rice

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### Abstract

Fresh GABA rice contains high moisture content approximately 38 % wet basis (wb). Most of fast drying process require high energy consumption and affect negatively to its quality. Beside that, the microorganisms are easily grown in the wet grain. Therefore, immediately drying to prevent the growing of microorganisms is also needed. This study has been conducted in order to compare the effectiveness of different drying methods in order to decrease the moisture content (MC) of the fresh GABA rice (36 % MC) to 14 % MC wet basis and the control the microorganisms on the dried product. The treatments were hot air drying (50°C and 60°C), solely radio frequency (RF) drying at 27.12 MHz for 65°C, 75°C and 85°C and combination of hot air drying and RF drying by applied first the hot air drying at 50°C until they decreased their moisture to 30 %, 25 % and 20 % and thereafter apply RF drying at 65°C, 75°C and 85°C until the final moisture reached to 14 %. The specific energy consumption (SEC) was calculated. The moisture content, the cooking quality were determined followed by their viscosities as well as disease decontamination was also detected regarding to Bacteriological Analytical Manual (BAM) and the GABA content were also determined. The results showed that RF solely drying took significantly shorter period of time than other methods. SEC value completely confirmed that hot air drying consumed higher energy (52.56–17.37 MJ kg<sup>-1</sup>) than combination with RF (between 12.43–6.21 MJ kg<sup>-1</sup>) while solely RF drying expressed the SEC between 0.81–0.42 MJ kg<sup>-1</sup>. Drying with RF treatments decreased the number of microorganism contamination effectively. Furthermore, their treated rice provided better cooking qualities. However, the highest number of GABA content was found in the treatment of combined hot air oven method to 20 % followed by RF 65°C, 75°C and 85°C treatments. Therefore, it can be concluded that RF drying combine with conventional hot air drying is an alternative way for saving energy consumption in GABA rice process and the microorganism decontamination could be achieved with positive improvement on their cooking qualities.

**Keywords:** Cooking qualities, drying, GABA rice, radio frequency