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## Drying Technology and Energy Management in Agriculture

Under the direction of  
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**Interdisciplinary research emphasizing on adding values of agricultural products by drying process and energy technology**

- Research for decreasing Glycemic Index value of brown and white rice by high thermal treatment, acceleration aging of brown and white rice and applied new drying technology onto agricultural products.
- Verifies and analyzes the energy consumption for agricultural and food industries

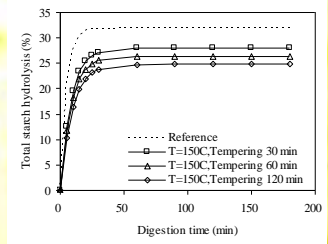
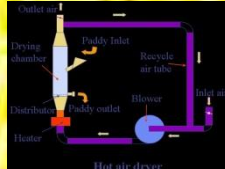


### Research Programs

#### Drying Technology

Effects of temperature and tempering time on starch digestibility of brown fragrant rice

- Brown fragrance rice, commonly referred to as jasmine brown rice, is excellent in aroma and texture. - However, glycemic index of this typical rice is high and hence it presents the risk of type 2 diabetes. A physical approach to reduce its glycemic index was thus investigated in the study. A drying process, which consists of high-temperature fluidized bed drying, tempering and ventilation, was employed to reduce the glycemic index of brown rice. The DSC thermogram showed the amylose-lipid complex formation for the treated brown rice, resulting in lowering starch hydrolysis. After processing the glycemic index of brown rice was reduced from high to low-medium level. The treated brown rice was harder than the reference rice.



Accelerated aging of jasmine brown rice by high-temperature fluidization technique-

- After being cooked, newly harvested brown rice becomes a pasty mass and swells only slightly. To modify - these undesirable brown rice properties, the paddy needs to be stored for at least 3-6 months. However, problems arise since brown rice has short shelf-life (3-6 months) due to accumulation of free fatty acids (FFA) leading to rancidity during storage. High-temperature fluidized-bed drying technique in combination with tempering step was tested to alleviate the above-mentioned problems. The experimental results showed that the cooking and eating properties of the fluidized bed dried brown rice, i.e., hardness, solid loss, volume expansion and elongation ratio, changed in a similar fashion to those of the conventionally aged brown rice. In addition, it was found for the thermally treated brown rice that the contents of free fatty acids increased only slightly during storage.

#### Energy Management

- Verified and analyzed the energy consumption for agricultural and food industries.



#### Publication

Donludee Jaisut and Somchart Soponronnarit. 2012. *Changes in the Physical and Chemical Properties of Thai Brown Rice Caused by High-temperature Treatment*. Journal of Developments in Sustainable Agriculture, Vol 7 (1), pp. 33-38.

Donludee Jaisut 2010. THE POTENTIAL of ALTERNATIVE ENERGY IN THAILAND. Alternative Energy, Vol. 17, • pp. 21-25.