عنوان مقاله:

Evaluation of the effect of the moisture, temperature and velocity on the specific energy consumption and drying kinetics in the convection dryer

محل انتشار:

اولین کنگره و نمایشگاه بین المللی علوم و تکنولوژی های نوین (سال: 1397)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Rice is one of the important food items that, due to its high nutritional value and its high benefits, many people in the world use it as a main food. Drying time and production efficiency are important issues during the rough rice drying. Rough rice is obtained after harvesting. It should be dried immediately after the harvest to prevent the corruption. Conversion process of rough rice to white rice includes drying, peeling, whitening and grading. The best moisture content for storage and operation of rough rice is 10% to 13%. Water have to be transferred to the surface of the product so that the microbial damage and routine chemical reactions are kept basically at the lowest possible rate. In addition, due to the latent heat of evaporation of water and the relative efficiency of low drying, the process of drying requires high energy. The drying processes consist about 10% of the total energy consumption in the food industry. Information derived from the energy analysis of the drying process can be used to determine the energy conservation practices. The first law of thermodynamics, known as the principle of energy conservation, is generally used to analyze the performance of engineering systems. Therefore, reducing energy consumption in the drying process is important. In the drying industry, the goal is to use the minimum amount of energy for maximum moisture for the final product conditions and increase the production efficiency. Factories have always looking for reduced energy consumption, shorter drying time, and increased production. These factors are highly influenced by the type of dryers, the final moisture content of the rough rice, the operating parameters of the dryers and the initial moisture content of the rough rice. In this study we aim to investigate the effect of 3 variables including hot air temperature, drying temperature and final moisture content of the rough rice, on the specific energy consumption, and drying time and kinetics of the rough rice drying. An experimental tray dryer is used to carry out the drying experiments at hot air velocities of 0.8 m/s and 0.65 m/s and drying temperatures of 50 C and 65 C and the final moisture content of 11% and 13%. Due to the energy consumption relation, the energy consumption equation depends on the drying time, hot air temperature and velocity of hot air. The rate of drying falls sharply over time and the moisture content is difficult to remove at the end of the drying process. It was found that the amount of energy consumption decreased with the ... increase of temperature and velocity of hot

کلمات کلیدی:

Drying kinetics - Rough Rice - Specific Energy Consumption - Tray Dryer