

FNL.AGR.2

## **COLOR DEVELOPMENT AND CHANGES OF THE GELATINIZATION PERCENTAGE OF RICE FLOUR GELATINIZED BY FAR-INFRARED RADIATION**

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Starch gelatinization is a phenomenon which causes textural and structural changes in starch molecules due to the loss of birefringence. The product quality depends on the gelatinization percentage and development of the color of rice flour. The purpose of this study was to compare the gelatinization percentage and colour changes of rice flour and to examine the correlation between colour and gelatinization of rice flour.

Gelatinization of rice flour using far-infrared (FIR) radiation was studied under different radiation intensities and exposure times. Several physical properties related to the quality of gelatinization were measured and the intensity and exposure time combinations for achieving different gelatinization percentages are presented.

The polished rice (*Oriza zativa indica*) was ground and sieved with a 150  $\mu\text{m}$  sieve and roasted with FIR produced by electric infrared emitters having 1950 W. The gelatinization percentage of rice flour was measured with the Iodomatric method. The colour changes during roasting were measured using a colorimeter (Minolta CR 300, Japan) in L, a, b values.

The gelatinization percentage and the browning reaction increases with the FIR intensity and exposure time. When the combination of FIR intensity and exposure time was higher, a higher gelatinization percentage and brown colour development were observed. The whiteness reduction ( $\Delta L^*$ ) increased exponentially and the total color change ( $\Delta E^*$ ) increased linearly with the degree of gelatinization. Maximum gelatinization (100%) could be achieved by exposing rice flour to 9000  $\text{W}/\text{m}^2$  for 6 min.

Therefore it can be concluded that the FIR intensity and exposure time increase the gelatinization percentage and brown colour development and there is a strong positive relationship between colour development and degree of gelatinization of rice flour gelatinized with FIR radiation.