PHYSICAL, PHYSICO-CHEMICAL AND NUTRITIONAL EVALUATION OF RICE SUBMITTED TO IRRADIATION

Luís F. Polesi¹, Manoel D. Matta Junior², Silene B. S. Sarmento², Solange G. Canniatti-Brazaca².
¹Center of Nuclear Energy in Agriculture; ²Department of Agroindustry, Food and Nutrition, College of Agriculture Luiz de Queiroz, University of Sao Paulo (USP), Av. Pádua Dias 11, 13418-900 Piracicaba, São Paulo, Brazil.

Rice is one of the most consumed cereals in the world and its shelf life after harvest can be extended using irradiation. This process, however, may influence the original characteristics of these grains in several aspects. The aim of this study was to evaluate physical, physico-chemical and nutritional changes of irradiated rice. Two rice cultivars were chosen, having medium and high amylose content. They were submitted to gamma radiation doses of 0, 1, 2 and 5 kGy at a rate of 0.37 kGy.h⁻¹. Irradiation affected some of the rice properties. The grain showed increase in parameter b* (yellowing). The pasting properties showed reduction in viscosity values. There was increasing solid loss in cooking water, while expansion volume and water absorption decreased. The cooked grains presented increase in stickiness. These results evidenced the breakdown of starch molecules. The total dietary fiber content for the medium amylose rice was higher at 1 and 2 kGy and for the high amylose rice was lower at 5 kGy. The starch digestibility of medium amylose rice was changed at 5 kGy, with higher values of resistant starch (RS) and of slowly digestible starch (SDS). The high amylose rice showed increase in RS at 1 kGy and at higher doses there was an increase in SDS with reduction in RS contents. Irradiation changed all characteristics studied in rice. Such modifications may be due to structural and chemical alterations in starch molecules with irradiation.