COMPARATIVE STUDY BETWEEN SOLAR DRYER AND OPEN-AIR DRYING ON THE DRYING RATE CONSTANT, DRYING EFFICIENCY AND NUTRITIONAL QUALITY OF SELECTED FOOD INGREDIENTS


Abstract
The effects of solar drying and open-air sun drying on four food ingredients were investigated. The food ingredients were cleaned, sorted and spread evenly to enhance effective drying. Equal samples of each ingredient were dried under two different conditions: solar drying and open air method. The proximate and organoleptic analyses of the samples were carried out using standard techniques. The weight losses were used to determine the reduction in moisture contents. Drying was assumed to have been effected in the falling rate period which made it possible the use of only one drying rate constant. Graphs of ln (M₀ – M) versus time were plotted in each case to obtain the drying rate constant (K) for the two drying conditions. This procedure is critical for linking a given level of moisture content to the period of drying under the same conditions. Graphs of free moisture versus time showed that the assumptions of one falling rate period is justifiable. Chemical analysis of the samples revealed that using solar dryer resulted in improved nutrients than open air method. The organoleptic evaluation of the samples indicated that solar dryer produced better and acceptable products. The findings of the study showed that solar drying significantly (P<0.05) improved both the chemical and organoleptic qualities of the dried products. The technique has the potential of eliminating/reducing the microbial load and insect infestation associated with open-air sun drying as well as help mitigate climate change by replacing fossil fuel drying method that result in carbon dioxide emissions that cause climate change or global warming.

Keywords: Food ingredients, solar drying, open-air drying, nutritional quality, organoleptic attributes, climate change.