

Optimization of hot-air drying conditions on the physicochemical characteristics of torch ginger (*Etilingera elatior*).

ABSTRACT

Response surface methodology (RSM) was used to determine the effect of hot-air drying on physicochemical characteristics of torch ginger (*Etilingera elatior*). Three independent variables were time (3-5 hours), temperature (40-80°C) and loading capacity (0.5-2 kg/m²). In this research, 20 treatments were assigned based on central composite design (CCD) containing 8 factorial points, 6 centre points and 6 axial points. The quality of dried Torch ginger produced was evaluated by determining moisture content, water activity, Hunter L, a, b values and texture (brittleness). The results revealed that the linear terms exhibited significant ($P < 0.05$) effect on moisture content. The quadratic terms showed significant ($P < 0.05$) effect on water activity, texture (brittleness), colour L and colour b values; while for colour a values, the interaction terms of drying condition was the most significant ($P < 0.05$) factor. A satisfactory coefficient of determination (R^2) at 0.523, 0.807 and 0.953 was obtained for the response variables studied namely texture, moisture content and water activity, respectively. However, there are an unsatisfactory coefficient of determination (R^2) for colour- L, colour-a and colour-b. No significant ($p > 0.05$) lack of fit was indicated for the reduced models, except for the models fitted for texture. The optimization results indicated that the best response, within the range studied, was reached when the drying time was 4.1 h, the drying temperature 79°C and loading capacity 0.7kg/m², respectively. No significant ($p > 0.05$) difference was found between the experimental and predicted values, thus ensuring the adequacy of the response surface models employed for describing the effects of hot-air drying on physicochemical properties of Torch ginger.

Keyword: Torch ginger; Hot-air; RSM.