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Effect of Drying Air Temperature and Slice Thickness on the Colour, Texture and Rehydration Parameters of Dried Beef

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Abstract

There is an increasing demand for beef in sub-Saharan Africa; driven by an increase in population growth and disposable income. However, beef is highly perishable and its commercialisation by the pastoral communities of Kenya is challenging due to high temperatures and the absence of cold chain. Sun drying has been done for many years to preserve meat during excess supply. However, with an increasing demand for high quality dried products, solar drying is gaining a lot of interest. Therefore, in order to optimise the drying process under tropical conditions, information on dried product quality in conditions close to those encountered in the real processes is needed. The objective of this work therefore, was to determine the effect of drying temperature and slice thickness on the physical quality of dried beef.

Fresh beef was dried in a cabinet dryer "Hohenheim HT mini" at 30–60°C air temperatures and 0.25–1.0 cm slice thickness. Air flow was generated by a fan operating at 24 V and thin layer drying done to 20 % moisture content (dry basis). L*(lightness), a*(redness) and b*(yellowness/blueness) colour measurements were done using a colorimeter (Minolta Chroma Meter CR-200). The rehydration ratio (RR) was calculated as the ratio of weight after to weight before immersion in a hot water bath (100°C for 10 min). Texture measurements were done using Volodkevich bite jaws (HDP/VB*) fixture of a TA.XT.plus Texture Analyzer. Drying time ranged between 2.5 and 30 h for different samples. There was a significant decrease ($P \leq 0.05$) in the L* a* and b* values with increase in temperature and beef thickness. The RR was higher ($P \leq 0.05$) at 60°C for samples with 0.5–1.0 cm thickness and decreased ($P \leq 0.05$) with increase in beef thickness. The firmness values increased ($P \leq 0.05$) with increase in temperature from 30 to 50°C then decreased at 60°C and were significantly lower ($P \leq 0.05$) at 0.25 cm beef thickness. In conclusion; with view of drying process optimisation with respect to time and physical quality of beef, heating temperature zone of 60°C and a lower meat thickness was recommended.

Keywords: Cabinet drying, colour, dried beef, rehydration, texture

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