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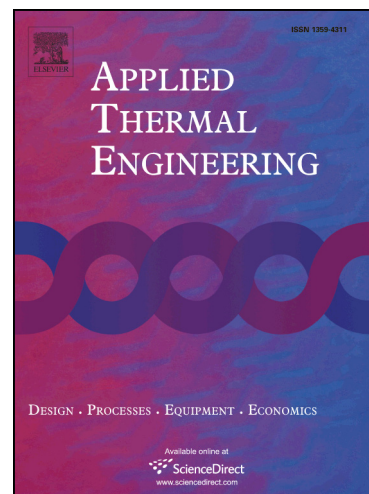
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## Energy requirements during sponge cake baking: experimental and simulated approach.

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### Abstract

Baking is a high energy demanding process, which requires special attention in order to know and improve its efficiency. In this work, energy consumption associated to sponge cake baking is investigated. A wide range of operative conditions (two ovens, three convection modes, three oven temperatures) were compared. Experimental oven energy consumption was estimated taking into account the heating resistances power and a usage factor. Product energy demand was estimated from both experimental and modeling approaches considering sensible and latent heat. Oven energy consumption results showed that high oven temperature and forced convection mode favours energy savings. Regarding product energy demand, forced convection produced faster and higher weight loss inducing a higher energy demand. Besides, this parameter was satisfactorily estimated by the baking model applied, with an average error between experimental and simulated values in a range of 8.0 to 10.1 %. Finally, the energy efficiency results indicated that it increased linearly with the effective oven temperature and that the greatest efficiency corresponded to the forced convection mode.

Keywords: Baking, Energy demand, Efficiency, Sponge cake.

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