Sangay Lhendup 2009: Development and Evaluation of a Corn Roasting Machine for a Small Scale Production of Cornflake (Tengma) in Bhutan. Master of Engineering (Agricultural Engineering), Major Field: Agricultural Engineering, Department of Agricultural Engineering. Thesis Advisor: Associate Professor Mongkol Kwangwaropas, Ph.D. 119 pages.

Corn roasting machine is one of the necessity typical machine to roast the corn in Bhutan. The roasted kernels were pounded instantaneously to produce a peculiar cornflake. In this research, the corn roaster using an electric heater (2750W) as the source of heat energy was developed for a small scale production. Stainless steel was used for roasting chamber and agitation unit. Similarly, insulation cover and frame were fabricated from the mild steel. The other prominent machine components used were thermostat, overload relay, insulation and unloading mechanism. Performance of the roaster was evaluated by roasting at three weight levels of 500, 1000 and 2000 g with combination of four temperature levels of 176, 210, 250 and 260ºC (average thermocouple temperature in the mid loci of roasting chamber) respectively. It was a factorial experiment of completely randomized design and statistical analysis of the collected data was performed by using analysis of variance (ANOVA) at the significance level of 0.05.

Performance evaluation results of the developed roasting machine showed that the mean optimum machine capacity was 6.08 kg/h and the mean maximum power efficiency was 52.33%. It required only one operator and the minimum mean electric power consumption was 0.20 kW-h/kg. Subsequently, other performance was characterized by the mean percentage of weight lost after roasted as 25.35%. Furthermore, the performance evaluation and the visual examination were found out that 79.01 % of the mean roasting efficiency, 13 minutes of the most appropriate time and 260°C of the best temperature level corresponding to weight level of 1000 g. These perhaps suggested a choice for the best treatment combination of the developed corn roaster.

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