

Performance of an Improved Fluidized System for Processing Green Tea

Authors : Nickson Kipng'etich Lang'at, Thomas Thoruwa, John Abraham, John Wanyoko

Abstract : Green tea is made from the top two leaves and buds of a shrub, *Camellia sinensis*, of the family Theaceae and the order Theales. The green tea leaves are picked and immediately sent to be dried or steamed to prevent fermentation. Fluid bed drying technique is a common drying method used in drying green tea because of its ease in design and construction and fluidization of fine tea particles. Major problems in this method are significant loss of chemical content of the leaf and green appearance of tea, retention of high moisture content in the leaves and bed channeling and defluidization. The energy associated with the drying technology has been shown to be a vital factor in determining the quality of green tea. As part of the implementation, prototype dryer was built that facilitated sequence of operations involving steaming, cooling, pre-drying and final drying. The major findings of the project were in terms of quality characteristics of tea leaves and energy consumption during processing. The optimal design achieved a moisture content of $4.2 \pm 0.84\%$. With the optimum drying temperature of 100°C , the specific energy consumption was $1697.8 \text{ kJ.Kg}^{-1}$ and evaporation rate of $4.272 \times 10^{-4} \text{ Kg.m}^{-2}.\text{s}^{-1}$. The energy consumption in a fluidized system can be further reduced by focusing on energy saving designs.

Keywords : evaporation rate, fluid bed dryer, maceration, specific energy consumption

Conference Title : ICEE 2016 : International Conference on Energy Engineering

Conference Location : Toronto, Canada

Conference Dates : June 13-14, 2016