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Agricultural and Food Science - abstract



Vol. 11 (2002), No. 3, p. 209-218

PÄÄKKÖNEN, KIRSTI,
A combined infrared/heat pump drying technology applied to a rotary dryer

Keywords *Betula*, *Beta vulgaris*, *Daucus carota*, *Epilobium angustifolium*, *Taraxacum*, infrared dryers, colour, drying curves, moisture rehydration,

Abstract

The short drying time and low product temperature makes it suitable for drying such heat-sensitive materials as herbs and vegetables. The purpose of this work was to develop a small-scale dryer for herbs and vegetables. A prototype rotary dryer combining infrared and so-called heat pump drying method was applied in drying experiments for several herbs and vegetables. The drying experiments were conducted under actual crop production conditions. The drying curves for leaves of birch (*Betula* spp.), rosebay willowherb (*Epilobium angustifolium*) and dandelion (*Taraxacum* spp.) as well as slices of red beet (*Beta vulgaris*) and carrot (*Daucus carota*) are presented. During the operation, temperature and humidity of the drying air were recorded, as well as the energy consumed in drying. The quality parameters were water content, colour and rehydration ratio. In the present rotary dryer design, intermittent irradiation and mixing of the product are enabled to avoid overheating, which is particularly important for maintaining product quality. In this dryer design the product rotates and simultaneously mixes the product. The infrared heaters are attached to a panel, allowing the product to receive infrared radiation periodically.

Contact ki.rsti.paakkonen@helsinki.fi

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Update 10.12.2002.

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