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Sorption Isotherms of Celery Leaves (*Apium graveolens* L. var. *secalinum*)

FRANZ ROMÁN, OLIVER HENSEL

University of Kassel, Agricultural Engineering, Germany

Abstract

Celery (*Apium graveolens* L.) is a plant species of the family Apiaceae. Leaf celery (*Apium graveolens* L. var. *secalinum*), also known as cutting celery, is a variety in which the usable parts are the dark-green, glossy leaves. They may be eaten fresh or processed, mainly frozen or dried.

In general leaves require less time and energy for drying than other parts of plants, which makes celery leaves more suitable for the drying process compared to the stalk or root parts commonly used in the other varieties.

Sorption isotherms define the hygroscopic equilibrium between relative humidity and moisture content at a given temperature, thus providing important information for the drying process and the storage of foodstuffs.

In this work the desorption isotherms of celery leaves were determined at 25, 40 and 50°C, and the adsorption isotherm at 25°C. The static gravimetric method was employed. Eight glass containers were partially filled with saturated salt solutions for a range of relative humidity from 11 to 84%. For relative humidities above 60% a test tube with thymol crystals was added to the jars to avoid microbial spoilage. The celery leaves' samples were placed in a perforated stainless steel container above the solutions, and the jars were hermetically sealed. Samples were weighed every three days until equilibrium was reached. The following models were fitted to the experimental data using nonlinear regression: Halsey, Oswin, Henderson, GAB, Peleg and BET. The coefficient of determination, the mean relative deviation and the standard error of the estimate were used to determine the models' goodness of fit, and the Peleg model was found to be the best.

The results of this study will serve to model the thin-layer drying of this product under variable conditions.

Keywords: *Apium graveolens*, celery leaves, sorption isotherms