



Tropentag, October 9-11, 2007, Witzenhausen

“Utilisation of diversity in land use systems:  
Sustainable and organic approaches to meet human needs”

## Experimental Determination of Desorption Isotherms for Lemon Balm (*Melissa officinalis* L.)

SANDRA PATRICIA CUERVO, OLIVER HENSEL

*University of Kassel, Agricultural Engineering, Germany*

### Abstract

The knowledge of the Equilibrium moisture content (EMC), is important for modelling and planning of the drying process and to select the conditions for storage of the product. In this work the desorption isotherms for *Melissa officinalis* L. (Lemon Balm) were determined at four different temperatures (25, 40, 50 and 60°C). In the experiment the method recommended by the project COST 90 (Spieß and Wolf. 1983) was used. This method is based on maintaining a known mass of sample to an atmosphere generated by the use of saturated saline solutions until achieving the balance. The saline solutions were prepared according to DIN 50008 for a range of relative humidity among 10 and 85 %. For the experiment cylindrical containers of glass were used, which were filled until a fourth part with the saturated saline solution. Each sample of 0,5 grams of whole leaves of *Melissa officinalis* L. var. Citronella was placed in a perforated bin of stainless steel, positioned inside the container of glass and sealed tightly. The weight of the samples was registered twice per day, per periods between 10 and 18 days until the samples achieved the balance. It was observed that the moisture content decreases when the temperature for a given water activity is increased. The obtained experimental data were fitted using the following mathematical models: BET, GAB, Halsey, Lagmuir, Oswin, Peleg, Henderson and Chung & Pfoest. Using the procedure of non linear Regression and the method of Marquardt with the programme Xact, the experimental data were fitted to the considered models. The chi-square test and the coefficient of determination were used to evaluate the obtained fit. The Halsey's model was found to be the most suitable for describing the desorption curves at temperatures of 25°C and 40°C and BET's model was most suitable for describing the data at temperatures of 50°C and 60°C.

**Keywords:** *Melissa officinalis* L., desorption isotherms, Equilibrium moisture content EMC, water activity