



## ISTITUTO NAZIONALE DI RICERCA METROLOGICA Repository Istituzionale

### HUMIDITY AND MOISTURE MEASUREMENTS IN FOOD PROCESSING APPLICATIONS

This is the author's submitted version of the contribution published as:

*Original*

HUMIDITY AND MOISTURE MEASUREMENTS IN FOOD PROCESSING APPLICATIONS / Smorgon, D.; Tabandeh, S.; Cavallarin, L.; Lamberti, C.; Nebbia, S.; Giannattasio3, A.; Negro, S.; Fernicola, V.. - (2019). ((Intervento presentato al convegno Tempmeko 2019.

*Availability:*

This version is available at: 11696/61148 since: 2020-02-06T16:50:57Z

*Publisher:*

*Published*

DOI:

*Terms of use:*

Visibile a tutti

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

*Publisher copyright*

(Article begins on next page)

<i>Topic</i>	Measurements for humidity and moisture
<i>Oral or Poster Presentation</i>	Poster

## **HUMIDITY AND MOISTURE MEASUREMENTS IN FOOD PROCESSING APPLICATIONS**

D. Smorgon <sup>1</sup>, S. Tabandeh <sup>1</sup>, L. Cavallarin <sup>2</sup>, C. Lamberti <sup>2</sup>, S. Nebbia <sup>2</sup>, A. Giannattasio <sup>3</sup>,  
S. Negro <sup>3</sup>, V. Fericola <sup>1</sup>

<sup>1</sup> *Istituto Nazionale di Ricerca Metrologica, Torino, Italy*

<sup>2</sup> *CNR-ISPRA, Torino, Italy*

<sup>3</sup> *GBV – BROVIND Impianti srl, Cortemilia (CN), Italy*

*E-mail (corresponding author): d.smorgon@inrim.it*

In the framework of the EMPIR Project 14IND11 HIT (Metrology for humidity at high temperatures and transient conditions), a method for estimating in real time the water loss in a hazelnuts roasting process, through humidity measurements, and its correlation with food quality parameters was demonstrated in an industrial application.

At the industrial plant of a manufacturer of food processing systems, two separate measurement setups were designed and implemented on laboratory-scale roasting ovens, based on infrared and hot-air heating, in order to estimate both the water loss and the volume temperature distribution in real time during roasting tuning processes. In such a roasting process, air temperature and dew point temperature were associated with the detailed roasting protocol which in turns produces different quality of the final processed product. To perform such in-process measurements, the above quantities were measured by several PRTs and by a chilled-mirror hygrometer at temperatures between 120 °C to 180 °C and dew-point temperatures up to 35 °C, respectively.

This work reports on the measurement set-up, the details about preventing volatile organic contamination of the chilled-mirror hygrometer and the validation of real-time humidity measurements by comparison against a gravimetric (water-loss) method. Suitable data processing methods of humidity measurements were implemented in order to the estimate water loss from dew-point measurements and correlate it with selected food-quality parameters. The overall results of the study are presented.