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Detection and quantification of ergot in cereals by near infrared hyperspectral imaging

Ph. Vermeulen¹, J.A. Fernández Pierna¹, H. van Egmond², A. Swinkels³, P. Dardenne¹, V. Baeten¹

¹ Walloon Agricultural Research Centre (CRA-W), Gembloux, Belgium

² RIKILT-Institute of Food Safety, Wageningen UR, P.O. Box 230, 6700 AE Wageningen, The Netherlands

³ NUTRECO, The Netherlands

E-mail: vermeulen@cra.wallonie.be



In the last years, hyperspectral imaging has proven its good performance for quality and safety control in the cereal sector by allowing the collection of spectroscopic images at single kernel level, which is of great interest for cereal control laboratories. Contaminants in cereals concern, among others, impurities such as straw, grains coming from other cultures or insects but also undesirable substances such as ergot (*Claviceps purpurea*). For the cereal sector, the presence of ergot involves high toxicity risk for animal and human due to its content in alkaloids. To reduce the risk of poisoning, the European directive 2002/32/EC on



undesirable substances in animal feed fixed a limit of 0.1% for ergot in all feedingstuffs containing unground cereals. The regulation EEC No 689/92 restricted to 0.05% the concentration of ergot bodies in cereals for humans. The current work, performed in the framework of the CONffIDENCE project (<http://www.confidence.eu>), aims to detect and quantify the presence of ergot bodies in cereals using NIR hyperspectral imaging.

For this study, several instrumentation approaches (plane and line scan) and chemometrics tools have been tested at the laboratory level and further transfer to an industrial setting for testing, validation and demonstration.

The results obtained have shown that NIR hyperspectral imaging and chemometric tools could be used as control method to assess the presence and the quantity of contaminants such as ergot bodies in cereals, and that such a system can be easily integrated in an automatic cereal control scheme.

Keywords ergot;contaminant;kernel analysis;hyperspectral NIR imaging;feedsafety

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