

## ABSTRACT

---

This work is focused on studying of hyperspectral and structured light based tridimensional image analysis about their application on quality and process control of cereal flour industry and derived products. The structured light based tridimensional image analysis has been used to develop a bread dough dynamic fermentation control system. Descriptors obtained from dough shape evolution were used to describe differences between wheat flour batches during fermentation process. In the same way, that system was used to characterize the effect of new ingredients on fermentation process. Those behaviors were analyzed joint to the internal structure of dough during the process, establishing relationships between it and the tridimensional information. Differences in fermentation process were also studied using hyperspectral image analysis. Flours were analyzed using the obtained diffuse reflectance spectra, which contained information within 400-1000 nm of wavelength range. Differences in several spectral bands were correlated with fundamental components of flours such as gluten. That spectral characterization of flours was used to detect adulterations with different grains. Adulterations until 2, 5% of oat, sorghum and corn were detected both flour and bread crumb. The hyperspectral image analysis was also used to control the heat treatment of wheat and oat flours, where spectral information was related to properties of end products.