

IMPACT OF BIOTIC STRESS ON WHEAT PROTEINS PROFILE AND STRUCTURE

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The aim of this work is to assess the effect of biotic stress induced by *Fusarium* infection on the protein profile and structure of soft wheat (*Triticum aestivum*) that may affect the functional properties of the flour.

The main protein fractions were separated, by sequential extraction according to the Osborne method^[1], from two different cultivars of *Fusarium*-infected (stressed) and respective controls (non-stressed). Protein quantification showed only minor stress-related variations in the amounts of protein in each fraction. Profiles obtained by mono- and bi-dimensional electrophoresis, highlighted differences only in the glutenin family, with a decrease in HMW species and a concomitant appearance of LMW ones, likely due to selective proteolytic cleavage by fungal proteases. The amount of Wheat Germ Agglutinin, detected by indirect competitive ELISA, decrease under severe infection compared to the control, suggesting that *Fusarium* infection decrease the content of this lectin, consistent with the role of lectins in plant response to biotic stress ^[2]. Front-face fluorescence spectroscopy was employed to assess protein structural features in flour and dough, highlighting a different organization in the protein network and in solvent accessibility between samples. Together with thiol accessibility data, the fluorescence data point to a higher sensitivity of proteins in the stressed grains to the structural changes promoted by the addition of water during processing^[3], that impair proper formation of the gluten network upon mixing. In conclusion, our findings demonstrate that *Fusarium*-induced modifications in wheat protein profile and structure may impact quite seriously on technological properties.

[1] T. B. Osborne (1924), Longmans, Green and Company.

[2] P. Bhaglal, P. Singh, S. S. Bhullar, S. Kumar, Journal of plant physiology (1998), 153(1-2), 163-166.

[3] F. Bonomi, G. Mora, M. A. Pagani, S. Iametti. Analytical Biochemistry (2004), 329(1), 104-111.