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RELATIONSHIPS BETWEEN PROTEIN COMPOSITION AND GLUTEN STRENGHT IN DIFFERENT DURUM WHEAT GENOTYPES

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Glutenins and gliadins are the most important proteins of the wheat grain from a food perspective. Their role in the kernel is considered restricted to storage function, but they are unique in providing humankind with a staple food for billions. These proteins give to the flour, when mixed with water, the ability to form a viscoelastic dough, which would later develop into various end products (bread, pasta, noodles).

Gliadins are monomeric proteins capable to confer viscosity to the gluten complex. Their coding genes are organized in *loci* (*Gli-1* and *Gli-2*) located on the short arms of the homoeologous group 1 and 6 chromosomes respectively. Glutenins are polymeric proteins joined by disulphide bonds that, when treated with a reducing agent, release high (HMW) and low (LMW) molecular weight subunits. Glutenins are the most influential components of dough strength and elasticity. The HMW-GS are encoded at the *Glu-1 loci* on the long arms of group 1 chromosomes, while the LMW-GS are controlled by genes at the *Glu-3 loci* on the short arms of group 1 chromosomes.

Protein content and gluten strength are the primary determinants of flour quality, for example, there is a general agreement that the presence of LMW-2/γ-45 allelic pattern and 6+8/7+8 HMW-GS subunits, in durum wheat, are correlated with strong genotypes and good pasta-making quality.

A number of methods have been developed for assessing flour quality: glutograph analysis, unextractable polymeric protein content (%UPP) and electrophoretic analyses. Glutenin content has been closely correlated to dough physical property in bread wheat and in durum wheat. Moreover, it has been shown for a number of durum wheat cultivar, that differences in rheological parameters are related to unextractable glutenins content, glutenins/gliadins ratio and HMW/LMW ratio.

In this study we report the relationships between protein content and composition, percentage of unextractable polymeric proteins and gluten strength, determined with the glutograph in a set of durum wheat RIL's obtained by crossing two commercial wheat *cultivars*: Svevo and Kofa, both characterised by good technological performances. Both cultivars possess the LMW-2/γ-45 combination, with the low-molecular weight glutenin subunits present in Kofa exhibiting additional components compared to those present in Svevo. Results show a correlation between the presence of the LMW glutenin subunits of Kofa, higher percentage of UPP and gluten strength. Lines with lower gluten strength show low percentage of UPP and the presence of LMW glutenin subunits as in Svevo. These data indicate that the higher number of glutenin subunits present in Kofa contribute to superior dough technological characteristics and that it is possible to get further improvement within the durum wheat germplasm possessing the LMW-2/γ-45 combination.