Proceedings of the XLIX Italian Society of Agricultural Genetics Annual Congress
Potenza, Italy – 12/15 September, 2005
ISBN **88-900622-6-6**

Poster Abstract - F.07

PRELIMINARY RESULTS ON IDENTIFICATION AND CHARACTERIZATION OF LOW MOLECULAR WEIGHT GLUTENIN SUBUNITS IN TETRAPLOID WHEATS

M. URBANO, G. COLAPRICO, B. MARGIOTTA

Institute of Plant Genetics – CNR, Via Amendola 165/A Bari, Italy – marcella.urbano@igv.cnr.it

gluten proteins, LMW-GS, tetraploid wheats, RP-HPLC, PCR

The gluten proteins strongly affect the viscoelastic properties of dough. They consists of monomeric gliadins (alfa, beta, gamma and omega) characterized by intra-molecular disulphide bonds when present and polymeric glutenins formed by high (HMW-GS) and low (LMW-GS) molecular weights possessing both intra- and inter-chain bonds. In the group of polymeric glutenins the LMW-GSs play a key role in the glutenin polymer formation. They have been classified, according to their biochemical properties into B, C and D-types, with the B-types represented by a large number of subunits with apparent molecular weights ranging from 30.000 up to 70.000 and C- and D-types which consist of modified gliadins which have been incorporated into the glutenin polymer because possess an odd number of cysteine residue. On the basis of these different structural characteristics the LMW-GS can be classified as chain extenders and chain terminators. This complex protein mixture, composed by a high number of polypeptides differently assembled in the gluten polymers, and a corresponding high number of genes at *Gli-1* and *Glu-3* loci, have not been completely isolated and characterized. Recently, studies carried out on the B-, C- and D-type LMW-GS present in hexaploid wheats, have demonstrated as electrophoretic and chromatographic techniques coupled with new techniques such as mass spectrometry represent efficient tools to characterize the gluten complex.

In order to study the role of specific polypeptides and corresponding genes, as those included in the C glutenin fraction and to evaluate the effects produced by the loss of specific proteins on the functional properties of flour and semolina, total proteins extracted from different varieties and lines of tetraploid wheats, have been analysed by electrophoretic (SDS-PAGE) and chromatographic (RP-HPLC) techniques and polymerase chain reaction (PCR) using specific primers. In particular gliadin and glutenin fractions present in wild wheats *T. dicoccoides*, tetraploid wheats *T. turanicum*, *T. polonicum*, *T. carthlicum*, have been evaluated and compared to varieties and biotypes in order to identify genotypes with different allelic variants at *Gli-B1*/*Glu-B3* loci. The LMW-GS fraction of above mentioned have been submitted to fractionated precipitation with hydro-alcoholic extracts to obtain enriched B and C-type LMW-GSs and subsequently analysed by RP-HPLC. Comparison of chromatograms have permitted a preliminary identification of B- and C-type LMW-GS, with the designation of corresponding genes, and of unknown putative C-type LMW-GSs in different tetraploid species included in the analyses. The structural/quantitative variation of the glutenin polymers in wheat semolina, induced by presence/absence of particular LMW-GS in particular genotypes and lines, will be also discussed.