**Electrophoretic characterization and rheological properties of two wholemeal organic commercial spelt flours cultivated in Argentina**

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RESUMEN

Spelt is an ancient grain that presents health benefits as a source of fiber, minerals, and vitamins. This hulled grain with a physical barrier would provide protection against some pathogens, making it possible to get wholemeal flours with nutritional potential, guaranteeing its food safety and adaptability for organic agriculture. The Dinkel EcoFauno (DK) and Oberkulmer Rotkorn (OR) are the only two wholemeal commercial flours certified as organic cultivated in Argentina. This work aimed to evaluate the electrophoretic characterization, protein, gluten contents of wholemeal commercial organic (spelt versus wheat) flours, and their effect on rheology properties. Ten microliters of gliadins and glutenins extracts of the three flours were loaded and characterized electrophoretically on 10% SDS-PAGE with post-processing scan images by IMAGEJ software. Also, the rheological flours tests were performed through farinograph and alveograph equipment. In DK, the values of total protein (12,46%±0,27), Wet Gluten (24,77%±0,32) and Gluten Index (95±1) contents were higher and showed significant differences (p<0,05) respect to OR (9,98±0,02; 21,07±0,12; 93±1) and Wheat (11,55±0,3; 20,63±0,8; 98,33±0,58).

The electrophoretic pattern revealed a major intensity gliadins fraction observed between 16-36kDa, another fraction of 41-55kDa, and also two distinct gliadins light bands with an apparent molecular mass of 63-64 and 74-75kDa for DK and RO, respectively. Wholemeal wheat showed a similar pattern except for heavier bands. Regarding spelt glutenins, the SDS-PAGE showed a low molecular weight profile between 29-70kDa bands, while another group was resolved at an apparent high molecular mass between 85-115kDa, similar to Wheat. The alveograph tests showed a maximum value of strength and P/L ratio in wheat (183,33±6,81Jx10-4; 4,3±0,7), followed by DK (107,33±1,15Jx10-4; 3,26±0,11) and OR (86,33±3,51 Jx10-4; 2,22±0,13). The swelling index, in ml, ranged between 12,9 and 13,3 for DK and OR compared to Wheat (14,4). Dough development time showed that Wheat and DK flours required 7,13 min and 5,7 min to hydrate 67,7% and 55% for obtaining specified maximum dough consistency, while OR presented the lowest peak value (2,77 min) and similar water absorption to DK. Stability is an indicator of flour tolerance of mixing. Higher values for DK (7,57min) and Wheat (5,3 min) suggest stronger doughs, meanwhile OR flour exhibited the lowest stability (3,53 min), which shows a shorter mixing time. In addition, OR flour showed 71 FU as a markedly higher softening degree, than dough made from Wheat (32FU) and DK (34FU) flours. The criteria studied the strength, P/L ratio, swelling, and the dough development time depending on the amount and quality of the gluten flour and its water-binding capacity. Stronger flours with higher protein content have a longer development time than weaker flours. In this sense, glutenin gel-proteins seem to present an essential role in DK and Wheat flour functionality and the peak time, while swelling and extensibility are the major quality characteristics influenced by the gliadins. This study increased understanding of the relationships between the electrophoretic spectrum of gliadins and glutenins from two wholemeal organic commercial spelt flours and their rheological potential quality compared to wholemeal wheat.

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Palabras Clave: wholemeal, organic, spelt, flour, Argentina