Effect of wheat puroindoline alleles on functional properties of starch

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Abstract  Puroindoline a and b (Pina, Pinb) form the molecular basis of bread wheat grain hardness. Varieties with a softer endosperm and a wild genotype, in which both Pina and Pinb were present, seemed to produce less damaged starch flour than hard varieties, where Pin mutations occurred and changed the starch rheological properties. The functional property of starch samples extracted from wheat varieties with different Pin alleles was evaluated. Starch morphology was characterized by scanning electron microscopy and laser light scattering. Thermal properties were evaluated by differential scanning calorimetry. Amylose content, starch damage and rapid visco-analyzer (RVA) parameters were also determined. Significant variations (P < 0.05) were identified between different Pin variants for the distribution pattern of starch granule volume, amylose content, starch damage, RVA viscosity breakdown and retrogradation, gelatinisation transition temperatures and enthalpies. Hard genotypes presented higher medium diameter granules and lower enthalpic values. However, the differences detected are more evident among varieties that present both Pina and Pinb, than among those presenting only one of the two (a or b).

Keywords  Wheat starch · Puroindolines · Hardness · RVA · DSC · SEM

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