

Dry heat treatment of wheat flour by MICRO-WAVE; application to disinfection, flour correction (alpha-amylase activity) and functional flour

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The heat treatment of dry flours has various applications. At low temperatures (LT<100°C), e.g. disinsectisation, correction of amylase activity (fall time) are targeted while maintaining gluten functionality. At high temperature (HT ~110-150°C), proteins are affected (gluten, starch's surface proteins) and functional flours are obtained (equivalent to chlorination) which can be used with partial substitution of wheat flour in bread applications to enhance texture or with full substitution in fine bakery wares applications such as sponge cake to gain in volume and texture. A comparison of LT (55-65-75-85-95°C) and HT (110-130-150°C) treatment with conventional and microwave (MW) heating was carried out on a continuous semi-industrial tunnel (SAIREM-France). Bread and sponge cake trials as well as various functionality tests used to characterize flours (Alveo, Farino, SRC etc) confirmed the interest of microwaves for these applications (faster process) while underlining the temperature thresholds not to be exceeded. The bread making quality was affected in terms of volume for treatment above 75°C; such treatment allowed full inactivation of *Tribolium castaneum* insects (treatment made on a contaminated flour). For HT processes, RVA parameters exhibited higher peak viscosity for MW HT treatment compared to conventional in particular at 110 and 130°C. The MW HT treated starches had a higher water content than conventional process (3 to 4% db), resulting in a lower energy consumption for MW treatment. As a conclusion, MW heat treatment applied to starches (under the form of wheat flour) offers promising perspectives in terms of efficiency and energy consumption.