

Maize-Based Gluten-Free Bread: Influence of Processing Parameters on Sensory and Instrumental Quality

Carla Brites · Maria João Trigo · Carla Santos ·
Concha Collar · Cristina M. Rosell

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Abstract The performance of maize bread with spongy texture is still a technological challenge due to the absence of a natural network required for holding the carbon dioxide released during the fermentation process. The objective of this research was to investigate the influence of different maize varieties (regional and hybrid), milling process (electric and water mill), formulation and processing variables on the sensory and instrumental (specific volume, texture and colour) quality attributes of corn bread. For that purpose, the traditional breadmaking process applied to the development of the ethnic Portuguese bread (*broa*) obtained from composite maize-rye-wheat flour was modified to produce gluten-free *broa*. Significant differences ($P < 0.05$) between regional and hybrid maize were detected in terms of protein, amylose, and maximum, minimum and final viscosities as evaluated by Rapid Visco Analyser. Concerning the effect of milling process, the grinding in a water mill occurs at slower rate than it does in the electrical mill, in consequence the flour from water milling had lower ash content and higher maximum, minimum and final viscosities than the one obtained from electrical milling. An important point in the breadmaking process was the flour blanching that resulted in doughs with higher consistency, adhesiveness, springiness and stickiness as measured by texture analyser, due to the partial

gelatinisation of the corn starch. Baking assays demonstrated sensory preference for regional in detriment of hybrid maize varieties for traditional *broa* production. Breadmaking technology could be satisfactorily applied to produce gluten-free *broa*.

Keywords Maize flours · Blanching · Rheology · *Broa* · Maize bread · Gluten-free bread

C. Brites (✉) · M. J. Trigo · C. Santos
Instituto Nacional dos Recursos Biológicos, I.P., L-INIA,
Unidade Tecnologia Alimentar, Quinta do Marquês,
2784-505 Oeiras, Portugal
e-mail: carlabrites@mail.telepac.pt

C. Collar · C. M. Rosell
Institute of Agrochemistry and Food Technology (IATA-CSIC),
P.O. Box 73, 46100 Burjasot, Valencia, Spain