EFFECT OF MALTITOL ON TECHNOLOGICAL CHARACTERISTICS OF PASTRY CREAMS WITH LOW SUGAR CONTENT

Valentina Dobreva[1*], Rajna Hadjikinova[2], Ivanka Petrova[3], Georgi Dobrev[4], Mima Hadjikinova[1]

[1]Department of Engineering Ecology, University of Food Technologies, Maritza Blvd. 26, 4002 Plovdiv, Bulgaria
[2]Department of tobacco, sugar, vegetable and essential oils, University of Food Technologies, Maritza Blvd. 26, 4002 Plovdiv, Bulgaria
[3]Department of catering and tourism, University of Food Technologies, Maritza Blvd. 26, 4002 Plovdiv, Bulgaria
[4]Department of Biochemistry and Molecular Biology, University of Food Technologies, Maritza Blvd. 26, 4002 Plovdiv, Bulgaria

[*]e-mail: valentina.dobreva@yahoo.fr

Abstract

Among polyols generally used in low sugar and energy reduced foodstuffs, maltitol provides particular functional benefits on products when replaces sucrose. Aim of current study was to evaluate the effect of this bulk sweetener (applied individually or in combination with other sweeteners) on technological characteristics, and on quality aspects of garnishing pastry creams.

Complete reductions in sucrose were made, substituting it with the same amount of maltitol (Maltisorb P90, Roquette Frères, France) - 56.12% (sample B), with mixture of maltitol - 46.72% and fructose (Valerus) - 9.4% (sample C), with mixture of maltitol - 56.12% and aspartame (Nutra Sweet) - 0.028% (sample D) and with 62.3% maltitol concentration (sample E). Samples C, D and E were formulated estimating the lower sweetness of maltitol (0.9) comparing with that of sucrose, and in order to develop suitable product composition without loss of sweetness. Physicochemical parameters of dry matter content, total sugar and reducing substances were analyzed respectively by a method of drying to constant weight at t = 105 ^{0}C and by iodine method. Density determination was made with mass-based pycnometry measurement. pH values were measured with pH-meter Hanna Instruments pH211. Water activity of samples was evaluated with a_w meter - Novasina, Switzerland. Starch gelatinization degree was analyzed by amylose iodide method. For determination of total number of microorganisms and total number of molds and yeasts under aerobic conditions were used standardized "Plate count agar" medium and a solid standardized "Chloramphenicol glucose agar" medium. Rheological flows and viscosities of samples were measured at 25 ^{0}C with rotational viscometer Rheotest 2, Germany. Energy values of pastry creams were calculated according to Regulation (EU) No 1169/2011. Glycemic indicators were determined according methodology proposed in a Patent 40623 Ukraine. Sensory characteristics of samples were estimated by descriptive sensory analysis.

In terms of dry matter content, pH, density, water activity and starch gelatinization degree, there were no significant differences between samples prepared with sucrose and maltitol containing samples. Samples B (56.12% maltitol), D (56.12% maltitol + 0.03% aspartame) and E (62.35% maltitol) had about 90% lower total sugar content than control sample A (56.12% sucrose). Therefore, according to EU Regulation No 1924/2006, pastry creams (B, D and E) can be classified as "Food with no added sugars". Microbiological analysis indicated that the sucrose substitution with maltitol in pastry cream formulation did not affect microorganisms' development in specific way regardless the storage temperature conditions. In the matter of nutritional data, samples B, D and E had more than 25% lower energy value than sample A. Samples B, C, D and E had less than 5g sugars/100 g product, which gave grounds to refer them to "Foods with low sugars", according to EU Regulation No 1924/2006. Rheological parameters and sensory evaluation on texture revealed that substitution of sucrose with maltitoll did not lead to negative changes in quality aspects of garnishing pastry creams.

Results from performed study gave grounds to consider maltitol as a suitable sucrose replacer in low sugar garnishing pastry creams with 25% lower energy value.

Key words: *Maltitol, Low sugar, Rheology, Sensory evaluation, Starchy creams.*