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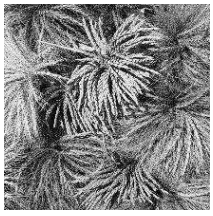

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SUGAR CONTENT IN SWEET MAIZE KERNEL AS A RESPONSE TO COVER CROPS AND BIO-FERTILIZER

Željko Dolijanović[1*], Milena Simić[2], Nebojša Momirović[1], Margarita Dodevska[3], Biljana Janošević[1], Vesna Dragičević[2]

[1]University of Belgrade, Faculty of Agriculture, Belgrade-Zemun, Serbia
[2]Maize Research Institute, Zemun Polje, Slobodana Bajića 1, 11185 Belgrade, Serbia
[3]Institute of Public Health of Serbia „Dr Milan Jovanovic Batut", Center for Hygiene and Human Ecology, Belgrade, Serbia

*Corresponding author e-mail address: dolijan@agrif.bg.ac.rs

Systems that include cover crops are an important low-input strategy in sustainable and organic agricultural production. The impact of different cover crops (common vetch, field pea, winter oats and fodder kale), their combinations (common vetch + winter oats and field pea + winter oats), control treatments (dead organic mulch and fallow), and the application of bio-fertilizer on the concentration of sugars in sweet maize kernel was evaluated. A field experiment was carried out in 2013/14–2015/16 growing seasons, at the Maize Research Institute in Zemun Polje. After cutting, green biomass of the cover crops was immediately incorporated in the soil. Half of the elementary plot was infested with the bio-fertilizer (BF) - Uniker, containing the strains of cellulolytic and proteolytic bacteria to support the mineralization of crop residues. In both experimental years, the preceding crop was winter wheat. The main crop (ZPSC 421*su*) was sown in the middle of May. The seeds were sown at the arrangement of 70 cm between rows and 22 cm between plants in the row (65,000 plants ha^{-1}). The content of sucrose, D-glucose and D-fructose was determined from the fresh samples spectrophotometrically, using the enzymatic assay kit R-BIOPHARM AG (Cat. Nr. 10 716 260 035) and then calculated as percent of dry weight. Concentration of sugars in sweet maize kernel across the three-year period varied significantly under the influence of cover crops, bio-fertilizer, meteorological conditions (year) and their interaction. Only concentration of fructose was not statistically significant under the influence of the biofertilizer and interaction of year × biofertilizer. The content of sucrose was the highest in maize kernel in variants with leguminous crops, both individually and in mixtures with oats. It is especially important to point out the increased efficiency of biofertilizer application in individual cover crops on increase of sucrose content. The highest glucose content was measured in the fodder kale variant and mixtures of legumes and oats (without

biofertilizer), while in other variants this trend was absent. The highest fructose content was measured in mixtures (without the use of biofertilizers), while the efficiency of biofertilizers was most pronounced in individual cover crops and the control variant. Organic mulch also enhanced concentration of sugars in sweet maize kernel, but in a lesser degree. Results indicate that in semi-arid climate, under rain-fed conditions, cover crops can enhance sugar concentration in sweet maize kernel, serving as an important part of a sustainable cropping system to facilitate food security.

Key words: *cover crops, microbiological fertilizer, sugars, sweet maize.*