

NUTRITIONAL, PHYSICAL AND SENSORY CHARACTERISTICS OF MAIZE PRODUCED BY GREEN FERTILIZERS

Daniela De Grandi Castro Freitas¹, Juliana de Oliveira Santos¹, Epaminondas Silva Simas¹, Cristina Yoshie Takeiti¹, Renata Galhardo Borguini¹, Claudia Pozzi Jantalia²

¹Embrapa Food Technology, Av. das Américas 29501, Rio de Janeiro/RJ Brazil; ²Embrapa Agrobiologia, Seropédica/RJ Brazil. E-mail: daniela.freitas@embrapa.br

This research proposes new technologies for the utilization of fertilizers focused on proper use of nutrients in order to bring benefits to the environment and production and safety of food. Thus, the aim of this study was to evaluate the quality of the maize grown under green fertilizers regarding the aspects of nutritional composition, mineral composition (heavy metals), rheological and sensory characterization. This study compared corn production under conventional and green fertilizers. The fertilizers evaluated were granulated with gypsum (F1), natural zeolite source rock (F2), potassium chloride (F3) and humic acid (F4). Two field experiments were conducted for planting hybrid maize at city of Seropédica, Brazil; being the second one a replanting of the treatments F2 and F3, also including a conventional urea (F5) and a control treatment without urea (F6). The harvested dried corn kernels were cleaned and ground into flour before their characterization. The nutritional characterization of maize indicated a rise in protein value (except for treatment F3) and total carotenoids content in maize produced with new fertilizers studied. There were no traces of the elements chromium, cobalt, molybdenum, lead and strontium in any of the maize flours analyzed. There were significant differences in the mineral profile of flour, highlighting the element selenium present only in flour obtained from conventional urea treatment (control). The result of sensory evaluation revealed no difference in the sensory characteristics of polenta (a typical Brazilian dish made with maize flour cooked with water and salt), except for the flour obtained from F4 maize, that was slightly different ($p < 0.05$) when compared to control treatment (conventional urea trade). This difference can be attributed to the consistency of polenta, since higher starch retrogradation was observed characterizing the formation of firmer gel, further the higher acidity of this maize. The second experiment considered four repetitions of each treatment, F2, F3, F5 and no urea control (F6), by randomized planting area. There was an increase in relation to the control in the protein content of the flour obtained from maize produced with fertilizer F2, also observed in the previous experiment at the same locality. There were no traces of the elements cobalt, chromium, molybdenum and lead. In this experiment, the maize flour showed no levels of sodium and selenium present in its composition differently than those reported in previous experiment at the same locality. There was a significant reduction of the copper content and different rheological behavior of a common starch. The maize flour obtained with fertilizer F2 showed higher intensity of the yellow color than control. The results revealed as effect of green fertilizers the increase on proteins and carotenoids maize contents, their safety regarding to the absence of heavy metals and higher starch retrogradation values, besides of sensory change in the consistency of polenta made with maize from humic acid (F4) fertilizer. It was also observed in the tested conditions the highlight effect of using zeolite (F2) on quality of maize produced.

Key words: fertilizers, zeolite, maize crops, food quality