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Valorization of Celery Pomace Powder in Flour Fortification

[1]Stanislava Gorjanović, [2]Ferenc Pastor, [1]Darko Micić, [3]Margarita Dodevska and [1]Snežana Zlatanović

[1]*Institute of General and Physical Chemistry, University of Belgrade, Studentski trg 1, Beograd, Serbia*
[2]*Faculty of Chemistry, University of Belgrade, Studentski trg 1, Beograd, Serbia*
[3]*Institute of Public Health of Serbia, Dr Milan Jovanovic Batut, dr Subotića starijeg 5, Beograd 112113, Serbia*

Abstract

Juice from celery (Apium graveolens) leafstalks is highly popular due to health benefits. Celery pomace (CP) or pomace from a mixture of celery with various fruits and vegetables is generated in an increasing amount. Despite the high level of bioactive molecules, it is still underutilized and often ends up in landfills. In this study pomace obtained from a trustworthy local manufacturer by cold pressing was dehydrated and ground at industrial scale level, using a recently patented technological process (Zlatanović et al., 2020). Powder with low water activity and low moisture content is obtained from celery pomace (CPP) and its mixture with apple, cucumber, kale, spinach, parsley, lettuce, and ginger (CPP 1) and apple, fennel, arugula, and ginger (CPP 2). The proximate composition is determined by AOAC methods. Content of dietary fiber (DF) (CPP 46.9±1.9, CPP1 51.1±1.6, CPP2 47.7±1.1) is found superior than in flour from wheat (3.45 ± 0.01 g/100 g), rice (0.43 ± 0.15 g/100 g), buckwheat (2.18 ± 0.11 g/100 g), oat (4.05 ± 0.40 g/100 g) and maize (2.62 ± 0.45 g/100 g) (Hager et al., 2012). The ratio of total carbohydrates to total DF up to 10-to-1, the most reliable criterion to recognize good whole grain food (Mozaffarian et al., 2013) , is applied to estimate the potential of CPP to fortify flour from cereals and pseudo cereals. Carb-to-fiber ratio in CPP (1.35), CPP1 (1.37) and CPP2 (1.59) is found extremely low in comparison to rice (181), buckwheat (29), maize (28), wheat (21), oat (18), sorghum (18), spelt (17), quinoa (8) and whole wheat (6). The amount of CPPs required to reduce the ratio of various types of cereal and pseudo cereal flour to 10:1 is calculated. For example, 15, 10 or ~7 % of CPP need to be added in rice, maize or wheat flour to satisfy 10-to-1 ratio. The very good techno-functional properties of CPPs compared to cereal and pseudo cereal flour, such as high water and oil holding capacity (WHC and OHC), are noticed. Both WHC and OHC are related to DF content. Content of total polyphenolics and antioxidant activity (DPPH, FRAP), determined upon in vitro digestion of CPP, CPP1 and CPP2, is found much higher than in cereal and pseudo cereal flour. Thus, CPPs can contribute to the DF content of

bakery and confectionery products without energy overload, as well as to the content of polyphenolics and antioxidants, and should be considered in flour fortification. Exploitability of CPP in the development of functional confectionery and bakery products is under investigation currently, as well as determination of the glycemic index lowering power of CPP

Keywords: celery, pomace, carb-to-fiber, dietary fiber, antioxidant

References

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