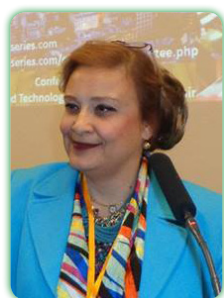


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Innovative mandarin peel effervescent tablet as antioxidant and anticarcinogen food supplement: Bioactive flavanones and phenolic acids by HPLC-DAD and LC-ESI-QTOFF-Mass spectrometry

Recently, the utilization of the potential bioactive phenolics has been the focus of attention owing to their consumption imparts health benefits including various cancer types, reduced risk of coronary heart diseases. Dietary supplements, food tablets, capsules and fortified foods based on food by-product may be alternative for healthy public nutrition. Citrus is the largest fruit crop worldwide, with an annual production of approximately 100 million tons. The main world producers are Brazil, USA and mainly Turkey in Mediterranean countries. The citrus fruit mandarin (*Citrus reticulata*) residues, which are generally discarded as waste in the environment, can act as potential nutraceutical resources. Processing of mandarin by-products potentially represents a rich source of phenolic compounds, mineral, vitamin C and dietary fibre, due to the large amount of peel produced. Owing to their low cost and easy availability wastes are capable of offering significant low-cost nutritional dietary supplements. The utilization of bioactive rich citrus residues can provide an efficient, inexpensive, and environment friendly and healthy substances for novel nutraceutical manufacturing as mandarin peel tablet. In this patented research, we aimed to obtain potential healthy components from Seferihisar mandarin peel and Seferihisar mandarin peel based food tablet and also we identified in detail as quantitatively by HPLC-DAD and LC-ESI-QTOFF-Mass Spectrometry. In mandarin peel tablet, subsequent to fundamental chemical analysis (moisture, protein, ash, fat as 3.44%;5.09%; 29.65%; 0.40%, respectively whereas dried mandarin peel powder includes moisture, protein, ash, fat as 5.24%;4.55%; 3.41%; 0.00% ,respectively. In our mandarin peel tablet; sucrose, invert sugar and total sugar was found as 10.97%; 8.30%;, 11.54%,respectively whereas dried peel powder contained 17.71%; 10.02; 18.64% of level for mentioned sugars. Total fiber, acidity (as citric acid equivalent), pH of mandarin peel tablet was found as 3.03%, 2.74%, 5.96, respectively whereas in dried peel powder, 9.24%, 1.06% and 5.52, respectively ($p < 0.05$). It was found that calcium (Ca), potassium (K), magnesium (Mg), aluminium (Al), phosphorous (P) (mg/kg) of efervescent tablet was 4616.0; 2988.4; 417.2; 4.0; 367 mg/kg,respectively whereas 21916.9; 10204.0; 3459.6; 9.7; 572 mg/kg level was determined in dried mandarin peel powder, respectively. Potassium and magnesium were major minerals in innovative tablet ($p < 0.05$). Vitamin C (ascorbic acid) was determined as 89.3 mg/100 g in mandarin peel efervescent tablet while 216.4 mg/100 g in dried peel powder. The avg.141.22 mg gallic acid equivalent phenolics [mg gallic acid equivalent (GAE) phenolic /100g] in mandarin peel effervescent tablet whereas avg.128.15 mg GAE /100 g in dried peel powder of Seferihisar mandarin ($p < 0.05$). DPPH antioxidant activity (%) was found as 27.10% in innovative efervescent tablet and it was found 26.56% was in dried mandarin peel powder ($p < 0.05$). Majorly L-ascorbic acid, citric acid, malic acid, succinic acid, galactaric acid, glucaric acid (Saccharic acid), glucaric acid lactone, p-salicylic acid as organic acids; (+)-naringenin, hesperedin, naringenin-7-O-glucoside, nobiletin, tangeretin, eupatorin (3',5-dihydroxy-4',6,7-trimethoxyflavone), gallic acid, p-coumaric acid, chlorogenic acid, caffeic acid, ferulic acid, quinic acid, rutin, diosmin flavone, casticin (methoxylated flavonol) were determined as phenolics; also sucrose, trehalose sugars and DL-phenylalanine, D-Tryptophan aminoacids were found by LC-ESI-QTOFF-Mass Spectrometry as qualitative and quantitatively. Major antioxidant phenolic was naringenin in mandarin efervescent tablet ($p < 0.05$).

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Scientific evidence shows that manufactured mandarin peel tablet can be used as dietary supplement and is beneficial for overall health and for managing some health conditions. By utilizing of Seferihisar mandarin peel, mandarin peel tablet was produced at DEPART Technopark Spil Innova LLC as industrial health innovative. We revealed the chemical characterization, functional properties, its unique bioactive features and its comprehensive antioxidative, anticarcinogenic reports of new manufactured mandarin peel efferecent tablet.

Biography

Ozlem Tokusoglu has completed her PhD at Ege University, Department of Food Engineering in 2001. She is currently working as an Associate Professor at Celal Bayar University, Department of Food Engineering. She was Visiting Scholar in Food Science and Nutrition Department at University of Florida, USA during 1999-2000 and as Visiting Professor at the School of Food Science, Washington State University, Washington, USA during April-May 2010. She has published many papers in peer reviewed journals and serving as an Editorial Board Member of selected journals. She has published two international book entitled Fruit and Cereal Bioactives: Chemistry, Sources and Applications; Improved Food Quality with Novel Food Processing and; Food By-Product Based Functional Food Powders. She also published two national books entitled Cacao and Chocolate Science and Technology and Special Fruit Olive: Chemistry, Quality and Technology. She has organized and/or administered as Conference Chair at many conferences and congress in various parts of USA, Europe and Asia-Pacific.

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