Sandra Guerrero et al., J Food Process Technol 2019, Volume 10
DOI: 10.4172/2157-7110-C1-110

Development of a tangerine-orange juice added with yerba mate (*Ilex paraguariensis*) extract and processed by UV-C light

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UV-C light (254 nm) assisted by other stress factors may be a good alternative to traditional thermal treatment for reducing microbial contamination in turbid juices, thus overcoming the UV-C processing limitations imposed by suspended matter which can harbor microbial cells. Yerba Mate (YM) has been largely studied due to antioxidant and antimicrobial properties, among others, attributed to its Phenolic Compounds (PC). The aim of this study was to develop a tangerine-orange juice (1:1, pH:3.9±0.1, 11.6±1.0 °Brix, 1309±20 NTU, absorption coefficient:0.41 %v/v, D3,2: 24.0±1.4 μm, D4,3: 330.0±27.7 μm) processed by UV-C (0.87 m-long annular reactor, 2 serially connected UV-C lamps; 30 watts, 1.8 L/min; 15min; 13.1 kJ/m2; 20°C) added with Yerba Mate Extract (YME). For the YME, leaves were sonicated (20 kHz; 95.2 μm; ethanol; 25°C), freeze-dried and subsequently added to the juice (0.4 %w/v). UVC/H+YME treated samples were periodically examined for native flora. PC by Folin-Ciocalteau reaction, Flavonoid Content (FC), Total Antioxidant Activity (TAA) by DPPH and ABTS, color (CIELab values), turbidity, °Brix and pH were also assessed before and after treatment. Unprocessed juice with or without YME (controls) exceeded the recommended limit for total coliforms since day 0 of storage. UV-C treatments was highly effective as it reduced native flora by 4.0- 5.1 logs whitout being able to recover during 15 days of storage. FC, PC TAA_{DPPH}, TAA_{ABTS} were increased up to 4.0, 2.0, 1.5 and 2.1 times after YME addition of processed juice, respectively, compared to control juice (FC= 0.15±0.06 mg Catequin Eq/mL, TAA_{DPPH}= 3.69±0.14 mg Trolox Eq/mL, TAA_{ABTS}=0.58±0.40 mg Trolox Eq/mL, PC=0.63±0.10 mg GAE/mL). UV-C+YME treated juice showed higher turbidity, °Brix and lower a* values, indicating that samples were less red, but greener than control; whereas, pH was not altered by the treatment. Consumer profiling studies revealed that the UVC/H+YME treated juice was well accepted by a group of consumers interested in sour products with herbal taste and strong aroma. This study expands the use of UV-C processing to turbid systems obtaining promising results as regards to the development of an innovative beverage.

Biography

Sandra Guerrero works as a Researcher and Professor at the Natural and Exact Science School, University of Buenos Aires and at the National Council of Scientific and Technical Research (CONICET) as Principal Researcher in Buenos Aires, Argentina. In 2014, she received the Certified Food Scientist credential given by the International Food Science Certification Commission, USA. She is a coauthor of one book edited by FAO and translated to four languages devoted to the implementation in rural areas of hurdle strategies for tropical fruit preservation. During the last 25 years, her research activity has been focused on the use of emerging technologies for food preservation. She has published numerous papers in high impact peer-reviewed journals, 19 chapters in books, and 180 presentations in scientific events. Her latest projects had to deal with the use of the non-thermal technologies under a hurdle approach to enhance food safety as well as organoleptic and nutritional quality.

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