PP20.3. EKSTRAKTI VINOVE LOZE DOBIJENI ZELENIM TEHNOLOGIJAMA: OD NUSPROIZVODA DO FUNKCIONALNIH SASTOJAKA

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Proizvodnja vina predstavlja značajnu agroindustrijsku granu tokom koje nastaju velike količine organskog otpada. Odlaganje ovih nusproizvoda predstavlja značajan izazov, ali i mogućnost za razvoj održivih rešenja. Ostaci nastali preradom grožđa, poput komine, semenki, pokožice i peteljki, su izvor brojnih biološki aktivnih jedinjenja koja mogu imati primenu u različitim industrijskim oblastima. Posebnu pažnju privlače polifenoli, poput flavonoida, antocijana i fenolnih kiselina, zbog svojih antioksidativnih, antiinflamatornih i drugih povoljnih bioloških efekata. Ekstrakti bogati ovim jedinjenjima mogu predstavljati izvor prirodnih antioksidanasa i funkcionalnih sastojaka za razvoj inovativnih prehrambenih proizvoda, dodataka ishrani i kozmetičkih formulacija. Umesto posmatranja nusproizvoda vinske industrije kao otpada, savremeni pristupi usmereni su ka njihovoj valorizaciji i dobijanju proizvoda sa dodatnom vrednošću.

Poslednjih nekoliko decenija sve veća pažnja posvećuje se primeni zelenih tehnologija ekstrakcije koje omogućavaju efikasno izdvajanje bioaktivnih jedinjenja uz smanjen uticaj na životnu sredinu. Metode poput ultrazvučne, mikrotalasne i pulsne ekstrakcije, ekstrakcije superkritičnim fluidima, kao i primena ekološki prihvatljivijih rastvarača, doprinose razvoju održivih procesa. Ovi pristupi doprinose smanjenju energetske potrošnje, poboljšanju procesa ekstrakcije i očuvanju funkcionalnih svojstava izdvojenih komponenti.

Valorizacija nusproizvoda nastalih preradom grožđa kroz primenu zelenih tehnologija predstavlja značajan primer cirkularne ekonomije, jer omogućava smanjenje otpada, racionalnije korišćenje resursa i razvoj funkcionalnih sastojaka sa potencijalnom primenom u različitim industrijskim oblastima.

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PP20.3. GRAPEVINE EXTRACTS OBTAINED BY GREEN TECHNOLOGIES: FROM BY-PRODUCTS TO FUNCTIONAL INGREDIENTS

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Wine production is an important agro-industrial sector that generates large amounts of organic by-products. The management of these residues represents a significant challenge, but also an opportunity for the development of sustainable solutions. By-products generated during grape processing, such as pomace, seeds, skins, and stems, are valuable sources of diverse bioactive compounds with potential applications in various industrial fields. Particular attention has been given to polyphenolics, including flavonoids, anthocyanins, and phenolic acids, due to their antioxidant, anti-inflammatory, and other beneficial biological properties. These compounds can serve as a source of natural antioxidants and functional ingredients for the development of innovative food products, dietary supplements, and cosmetic formulations. Rather than being considered waste, these residues are increasingly recognized as valuable resources that can be valorized into high-value products.

In recent decades, growing interest has been focused on the application of green extraction technologies that enable the efficient recovery of bioactive compounds while reducing environmental impact. Techniques such as ultrasound-assisted, microwave-assisted, and pulsed extraction, supercritical fluid extraction, as well as the use of more environmentally friendly solvents, contribute to the development of sustainable processes. These approaches lead to lower energy consumption, enhanced extraction performance, and preservation of the functional properties of the recovered compounds.

The valorization of grape by-products through the application of green technologies represents an important example of circular economy principles, as it promotes waste reduction, more efficient resource utilization, and the development of functional ingredients with potential applications across various industrial sectors.

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