PAKOVANJE PIVA – TRENDOVI ZA BUDUĆNOST

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Sažetak:
Pivo se najčešće pakuje u staklenu, metalnu i polimernu (PET) ambalažu, koja predstavlja samo pasivnu barijeru u njegovoj zaštiti od spoljašnjih uslova sredine (kiseonik, svetlost, vlaga, mikroorganizmi). Trendovi u pakovanju pića podrazumevaju promenu strukture ambalažnih materijala i primenu novih aktivnih, inteligentnih i ekološki prihvatljivih rešenja. Proizvođači ambalaže i industrija piva sve više ulažu u održive tehnologije kako bi smanjili potrošnju energije i ugljenični otisak (upotreba laganog stakla, recikliranog aluminijuma, biorazgradive plastike, recikliranog papira, kartona, eko dizajn ambalaže). Aktivno pakovanje (AP) se odnosi na sisteme u kojima su ambalaža, proizvod i okruženje u interakciji, a dizajnirano je tako da se u tradicionalnu ambalažnu jedinicu na različite načine inkorporiraju odgovarajuće aktivne supstance. Za industriju piva značajni su apsorberi kiseonika, koji se mogu ugrađivati u strukturu jednoslojnih PET boca (ugrađuju se u polimernu smolu koja formira zid boce) ili se inkorporiraju u višeslojne boce (u sendviču između slojeva). Takođe, aktivne supstance se mogu umetati u unutrašnju stranu krunskih zatvarača, sa ulogom da "hvataju" kiseonik u parovazdušnom prostoru (headspace-u) sprečavajući neželjene oksidativne reakcije, koje dovode do degradacije kvaliteta piva. U proizvodnji limenki razvijaju se tzv. samohladeće limenke, sa duplim zidovima, u kojima se izaziva endotermna reakcija koja treba da oduzme toplotu od proizvoda (piva) i tako ga ohladi. Inteligentno pakovanje (IP) kreirano je sa namerom da nadgleda stanje upakovanog proizvoda, kako bi dalo informaciju o njegovom kvalitetu i bezbednosti, tokom roka trajanja. Sistemi IP podrazumevaju primenu različitih indikatora, senzora i identifikaciju pomoću nosača podataka (čipova). U industriji piva u primeni su indikatori ciljane temperature, koji se postavljaju na etiketu ambalaže sa svrhom da informišu potrošače kâda je pivo na optimalnoj temperaturi za piće. Trendovi u pakovanju pića pokazuju jasan pravac ka održivosti uz primenu ekoloških rešenja i ambalažnih materijala koji se mogu reciklirati. Očekuje se da će potražnja za aktivnom i inteligentnom ambalažom biti u porastu u budućnosti, jer može doprineti smanjivanju bacanja hrane i pića i poboljšavanju njihovog kvaliteta i bezbednosti.

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Ključne reči: Održivost, aktivno i inteligentno pakovanje, pivo, kvalitet, bezbednost.

BEER PACKAGING – TRENDS FOR THE FUTURE

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Summary:
Beer is most commonly packaged in glass, metal and polymer (PET) packaging, which in turn provides a passive barrier for protection against external environmental conditions (oxygen, light, moisture, microorganisms). Trends in the beverage packaging sector include a change in the structure of packaging materials and the use of active, intelligent and environmentally friendly solutions. Packaging manufacturers and the beer industry are increasingly investing in sustainable technologies to reduce energy consumption and the carbon footprint (use of lightweight glass, biodegradable plastic, recyclable aluminum cans, recycled paper, cardboard, eco-design in packaging). Active packaging (AP) refers to systems in which packaging, product and environment interact and are designed to integrate appropriate active ingredients into a conventional packaging unit in different ways. For the beer industry oxygen absorbers are important and can be integrated into the structure of single-layer PET bottles (they are incorporated into the polymer resin that forms the bottle walls) or into multi-layer bottles (in a sandwich between the layers). Active ingredients can also be placed to the inside of crown caps to "scavenger" oxygen in the headspace, preventing unwanted oxidative reactions that lead to a deterioration in beer quality. One trend in can production is so-called self-chilling cans with double walls, which trigger an endothermic reaction that removes heat from the product (beer) and thus cools it down. Intelligent packaging (IP) has been developed with the aim of monitoring the condition of the packaged product to provide information on its quality and safety during the shelf life. IP systems involve the use of various indicators, sensors and identification by data carrier (tags). In the beer industry, target temperature indicators are used, which are placed on the packaging label in order to inform the consumer when the beer has reached the optimum drinking temperature. The trends in beverage packaging are clearly moving towards sustainability with the use of ecological solutions and recyclable packaging materials. The demand for active and intelligent packaging is expected to increase in the future as it can help reduce waste and improve quality and safety of food and beverages.

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