

KONZUMIRANJE PIVA I ZDRAVLJE: DA LI NAPREDNA ANALITIKA MOŽE DA PRUŽI PRAVE ODGOVORE TEHNOLOZIMA I POTROŠAČIMA?

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Sažetak:

Pivo je napitak staro više od 8000-6000 godina, a proces proizvodnje se nije mnogo promenio tokom vekova, iako pivo koje se danas konzumira ima veoma drugačiji ukus od njegovih drevnih predaka.

Sadašnje vreme nudi različite tehnologije i tipove proizvodnje i kuvanja piva u cilju zadovoljenja potreba potrošača i rastuće nutritivne potrebe sa novim vrstama piva, uključujući dijetetske biljne proteine, niskokalorična piva, voćna piva, piva koja sadrže funkcionalne agense, piva bez glutena, domaća piva – u malim pivarama (u svim mogućim značenjima), nisko- i bezalkoholna piva (NAB), gde se koriste nove žitarice kao što su pirinač, sirak, proso i novi bezalkoholni kvasci (*Saccharomices* hibrids), visoko isparljivi fenoli koji proizvode *S. cerevisiae* var. *diastaticus* i cvetni ukus koji proizvodi ne-*Saccharomices* kvasac i izotoničnih piva. Pivo, bilo alkoholno ili bezalkoholno, je hranljiva materija specifičnog sastava. Rezultat je mnoštva molekula piva; neki od njih promovišu zdravlje, a neki čak i zadovoljstvo; među njima su molekuli ukusa i arome. Kvalitet piva je takođe vođen prisustvom nezdravih molekula sa negativnim senzornim atributima - među njima acetaldehida, diacetila, 3-Me-2-buten-1-tiola i biogenih amina. Biološki kvalitet piva se sastoji od njegovog senzornog profila i hemijskog sastava, čime dobija nutritivnu vrednost. Zamršeni trougao između tehnologije, nutritivne vrednosti (promovisanje zdravlja) i dopadanja potrošača (promovisanje zadovoljstva, hedonizam) mora da se garantuje i kontroliše, jer je to gradivni blok kvaliteta, originalnosti, porekla ili čak autentičnosti (*terroir*). Ako je tako – stiglo se do eudaimonije. Kako garantovati i pratiti? Uz ostavljanje ličnog otiska, koristeći hemijske, biomolekularne ili izotopske metode uz pomoć hemometrije i algoritama mašinskog učenja - uz naprednu analitiku. Napredna analitika može da nam pomogne u traženju konačnog odgovora - diskriminacije između "lošeg" i "dobrog" i u zadovoljenju i tehnologa i potrošača. Ali da bismo procenili, moramo tačno da znamo ko ili šta treba da bude vođa.

Ključne reči: napredna analitika, pivo, biološki kvalitet, hemijski sastav, ukus, originalnost, NAB



BEER CONSUMPTION AND HEALTH: CAN ADVANCED ANALYTICS DELIVER THE RIGHT ANSWERS TO TECHNOLOGISTS AND CONSUMERS?

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Summary:

Beer is a beverage with more than 8000-6000 years of history, and the process of brewing has not changed much over the centuries though the beer consumed today tastes very different than its ancient predecessors. Present times offer diverse technologies and beer manufacture and brewing types to fulfill the consumers' and growing nutritional demands with new types of beer, including dietary plant proteins, low-calorie beers, fruit beers, beers containing functional agents, gluten-free beers, craft-produced beers (in every possible meaning), low- and non-alcoholic beers (NAB), with new cereals being used like rice, sorghum, millet, and new non-alcoholic yeasts (*Saccharomyces* hybrids), high volatile phenols producing *S. cerevisiae* var. *diastaticus* and floral flavor producing non-*Saccharomyces* yeasts and isotonic beers. Beer, either alcoholic or non, is a nutrient with a specific composition. The result is a plethora of beer molecules; some of them are health-promoting, and some are even pleasure-promoting; among them are flavor–aroma molecules. The quality of the beer is also guided by the presence of non-health molecules with negative sensory attributes – among them acetaldehyde, diacetyl, 3-Me-2-butene-1-thiol, and biogenic amines. The biological quality of the beer is composed of its sensory profile and chemical composition, thus gaining nutritional value. The entangled triangle between technology, nutritional value (health-promoting), and consumer liking (pleasure-promoting, hedonia) must be guaranteed and monitored as it is a building block of quality, genuineness, origin, or even authenticity (terroir). If so – the eudaimonia is reached. How to guarantee and monitor? With fingerprinting, using chemical, biomolecular, or isotopic methods with the aid of chemometrics and machine learning algorithms – with advanced analytics. Advanced analytics can help us in seeking the ultimate answer – discrimination between “bad” and “good” and satisfy both technologists and consumers. But to assess, we have to know exactly who or what is to be the master!

Keywords: advanced analytics, beer, biological quality, chemical composition, flavor, genuineness, NAB