



# Beer and Non-Alcoholic Beer in Food Pairing: A Scoping Review of Sensory Experience, Consumer Perspectives, and Gastronomic Potential

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## Abstract

*This scoping review maps the current landscape of research on beer and non-alcoholic beer in food pairing contexts, examining sensory principles, consumer behavior, and cultural positioning. The review identifies five thematic areas: (1) sensory characteristics and pairing principles, (2) non-alcoholic beer production and perception, (3) consumer preferences and behavior, (4) cultural and social dimensions, and (5) innovation and sustainability. Findings show that while beer pairing is gaining culinary legitimacy, empirical studies are often narrow in scope and overlook the role of non-alcoholic beer. Technical limitations, consumer bias, and sociocultural framing continue to influence acceptance and performance. The review calls for further interdisciplinary research integrating sensory science, cultural analysis, and sustainable gastronomy to unlock beer's full potential as a meal beverage.*

## Key Words

*Non-alcoholic beer; Food and beverage pairing; Ethical consumption; Sustainable gastronomy; Gastronomic experience*

## Track

*3. Ethically Driven Innovations*

## Focus of the Paper

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## Type of Submission

*Paper*

## Introduction

The art of food and beverage pairing has long been central to gastronomy, with wine traditionally occupying a dominant role. However, beer, especially craft and non-alcoholic variants, has gained increasing attention as a gastronomic companion. This scoping review investigates how beer and non-alcoholic beer function in food pairing contexts, considering sensory principles, consumer behavior, and cultural framing. The goal is to identify trends, highlight research gaps, and provide a foundation for future culinary and scientific exploration. Non-alcoholic beer (NA beer) is of particular interest due to its growing market relevance and the sociocultural and technical challenges it presents. While alcoholic beer has been explored in sensory pairing contexts, NA beer remains underrepresented, both in practice and research. Given the rise of health-conscious dining and inclusive beverage programs, understanding how NA beer performs in gastronomic settings is timely and essential. In the context of ethically driven innovations, understanding NA beer as a gastronomic beverage is crucial. The growing demand for inclusive dining experiences and health-conscious alternatives has positioned non-alcoholic beer at the intersection of ethics, sustainability, and social responsibility. Promoting non-alcoholic beer in food pairing not only supports responsible drinking but also challenges exclusionary norms that equate gastronomic value with alcohol content. As hospitality and tourism industries seek to implement ethical strategies, integrating NA beer into pairing frameworks represents an opportunity to reduce alcohol-related harm, enhance guest inclusivity, and align with broader wellness and sustainability goals, thereby contributing to the long-term well-being of both individuals and communities.

## Aim

The aim of this scoping review is to map and synthesize existing research on the role of beer and non-alcoholic beer in food pairing contexts, with a particular focus on sensory interactions, consumer perceptions, and gastronomic applications.

## Method

This review adopts a scoping methodology based on the frameworks of Arksey and O'Malley (2005) and PRISMA-ScR guidelines (Tricco et al., 2018). The aim was to map the breadth of existing research on beer and food pairing, with special attention to non-alcoholic beer. Searches were conducted in Web of Science, Scopus, PubMed, and Google Scholar using combinations of keywords such as 'beer pairing', 'non-alcoholic beer', 'sensory evaluation', 'food and beverage combinations', and 'craft beer'. Searches were limited to English-language publications from 2000 to 2025. Studies were included if they examined beer or NA beer in food pairing contexts, addressed sensory or consumer aspects, or discussed cultural positioning. Data from 25 relevant articles were extracted into a charting form capturing study type, methodology, beer style, pairing focus, and key findings. Thematic analysis was then used to group findings into five categories: sensory principles, non-alcoholic beer characteristics, consumer behavior, cultural narratives, and sustainability.

## Analysis

The analysis is presented in table 1, and is an overview of the papers included after the search and screening process following the PRISMA-ScR guidelines. A total of 125 records were identified through database searches and additional sources. After duplicate removal and title/abstract screening, 35 full-text articles were assessed for eligibility. Of these, 25 met the inclusion criteria and were included in the final synthesis, focusing on beer, non-alcoholic beer, and their role in food pairing contexts.

**Table 1. PRISMA-ScR Flowchart of included studies**

Author(s), Year	Country	Type of Beer	Study Aim	Methodology	Food Pairing Focus	Key Findings	Notes / Relevance
Arellano-Covarrubias et al., 2019	International	Alcoholic	Explore cross-cultural beer pairing	Social media analysis	General beer pairing	Identifies cultural differences in pairing	Links sensory experience to cultural communication

<b>Martinez et al., 2017</b>	USA	Alcoholic	discourse on social media Compare subjective and objective beer-pairing knowledge between young adults and experts	Survey and expert evaluation	General beer and food pairing	expressions and flavor references Significant knowledge gaps exist among consumers; experts stress taste balance	Highlights educational gap in beer pairing knowledge
<b>Donadini et al., 2013</b>	Italy	Alcoholic	Investigate consumer preference for cheese and beer pairings	Consumer testing	Cheese pairing	Mild cheeses preferred with lighter beers; stronger cheeses with malty or bitter beers	Reinforces complementary pairing principle
<b>Donadini et al., 2008</b>	Italy	Alcoholic	Evaluate ideal Italian food and beer pairings	Consumer and expert evaluation	Everyday Italian food	Traditional matches confirmed; pairing preferences influenced by familiarity	Supports regional pairing approaches
<b>Donadini et al., 2015</b>	Italy	Alcoholic	Match bottom-fermented red beers with cheeses	Consumer and sensory study	Cheese pairing	Red beers pair best with medium-aged cheeses; sensory balance key	Explores niche beer styles in pairing
<b>Bassus et al., 2004</b>	Germany	Non-alcoholic	Assess physiological effects of NA beer consumption on hemostasis	Clinical trial	Not food-specific	Dealcoholized beer does not impair coagulation	Medical/health relevance, not gastronomic
<b>Schmelzle et al., 2013</b>	Germany	Non-alcoholic	Analyze sensory descriptors and consumer acceptance of NA beer	Descriptive analysis + consumer test	Not food-specific	NA beer perceived as less full-bodied and aromatic	Useful for understanding sensory limitations
<b>Ghasemi-Varnamkhasti et al., 2009</b>	Iran	Non-alcoholic	Validate sensory consistency in bitterness evaluations of NA beer	Sensory panel with statistical validation	Not food-specific	Significant panel variability in bitterness perception	Highlights challenge of sensory accuracy
<b>Catarino &amp; Mendes, 2011</b>	Portugal	Non-alcoholic	Describe new process for NA beer production	Technical/industrial process study	Not food-specific	Improved dealcoholization method preserving flavor	Relevant for production-focused innovation
<b>Parker, 2012</b>	UK	Both	Overview of beer production and sensory attributes	Book chapter/literature	General overview	Covers styles, sensory dimensions, and pairing potential	Background for beer sensory understanding
<b>Zhao et al., 2023</b>	China	Alcoholic (Fruit Beer)	Examine sensory and gastronomic outcomes when beer is infused with fruit	Experimental sensory and pairing study	Fruit-infused beer with food	Fruit-infused beers show diverse potential in enhancing food pairing experiences	Relevant for innovation in beer flavor and pairing dynamics
<b>Ghasemi-Varnamkhasti et al., 2012</b>	Iran/Spain	Non-alcoholic	Classify NA beers based on aftertaste using sensory and chemometric tools	Sensory evaluation and chemometrics	Not food-specific	Identifies sensory profiles and consumer clustering for NA beers	Supports technical profiling for better food pairing applications

<b>Rivaroli et al., 2022</b>	Italy/Spain	Craft (Alcoholic)	Understand Millennials' attitudes towards craft beer	Survey using Food Choice Questionnaire	Not food-specific	Craft beer perceived as aligned with personal identity and social values	Useful for understanding market trends and consumer motivations
<b>Villacreces et al., 2022</b>	Spain	Craft (Alcoholic)	Review production characteristics and evolution of craft beer	Review	Not food-specific	Emphasizes process innovation and flavor diversity in craft beer	Sets technological context for pairing potential
<b>Aquilani et al., 2015</b>	Italy	Craft (Alcoholic)	Explore determinants of craft beer preferences during tasting	Exploratory consumer study	General preferences	Flavor and naturalness strongly influence consumer choices	Reinforces importance of sensory quality in pairing acceptance
<b>Carvalho et al., 2018</b>	Brazil	Craft (Alcoholic)	Characterize consumer market and motivations for craft beer consumption	Survey-based market research	Not food-specific	Consumers value quality, local origin, and differentiation	Supports craft beer's alignment with gastronomic trends
<b>Jaeger et al., 2020</b>	USA	Craft (Alcoholic)	Segment craft beer consumers based on preferences and attitudes	Consumer segmentation analysis	General	Consumers differ in preference for craft vs. traditional flavors	Useful for targeting beer types for food pairing experiences
<b>Johnston, 2018</b>	USA	Craft (Alcoholic)	Examine cultural role of craft production jobs	Ethnography	Not food-specific	Craft producers seen as artisans reviving traditional work	Sociocultural context for authenticity in food pairing narratives
<b>Ocejo, 2018</b>	USA	Craft (Alcoholic)	Explore cultural dimensions of craft beer	Sociological fieldwork	Not food-specific	Craft beer linked to urban taste culture and identity	Key reference for sociocultural framing of pairing experiences
<b>Ocejo, 2022</b>	USA	Craft (Alcoholic)	Analyze 'righteous' values in artisanal production	Theoretical chapter	Not food-specific	Craft businesses embrace slow, ethical values	Contextual relevance for sustainable pairing models
<b>Thurnell-Read, 2022</b>	UK	Craft (Alcoholic)	Examine gender narratives in craft drink cultures	Sociological analysis	Not food-specific	Craft beer perceived through masculine identity lenses	Adds critical lens on inclusion in beer pairing culture
<b>Thurnell-Read, 2019</b>	UK	Craft (Alcoholic)	Explore how authenticity is narrated in craft drink production	Qualitative interviews	Not food-specific	Authenticity used as storytelling tool in craft drink marketing	Supports narrative-based food pairing approaches
<b>Salanță et al., 2020</b>	Romania	Non-alcoholic & Craft	Review challenges in NA and craft beer production	Technical review	Not food-specific	Highlights flavor and perception issues in NA beer	Broad reference on production challenges and opportunities
<b>Staub et al., 2022</b>	Switzerland	Alcoholic & Non-alcoholic	Investigate stereotypes about beer drinkers	Survey and social perception analysis	Not food-specific	Alcoholic beer associated with masculinity, NA beer with health-consciousness	Frames social context of beverage pairing and consumer identity
<b>Blackmore et al., 2022</b>	UK	Alcoholic & Non-alcoholic	Analyze how expectations affect sensory perception of beer	Experimental sensory and expectation manipulation	Not food-specific	Expectation strongly influences taste ratings for both beer types	Important for understanding consumer bias in pairing evaluations

## **Results and Discussion**

### **Sensory Characteristics and Pairing Principles**

Several studies emphasized the importance of core sensory attributes—such as bitterness, sweetness, carbonation, and body—in shaping beer’s performance in food pairing contexts (Donadini et al., 2008, 2013, 2015; Klosse et al., 2004). Research on cheese and beer combinations indicated that pairing intensity and sensory balance are key to creating pleasurable gastronomic experiences. Complementary strategies, such as matching malty beers with roasted foods, and contrasting strategies, like pairing hoppy beers with creamy dishes, were both identified as effective. These findings are supported by Martinez et al. (2017), who further noted the significance of beer’s texture and carbonation in palate cleansing and enhancing overall harmony.

The centrality of taste structure in pairing supports the growing view of beer not just as a beverage but as an active gastronomic agent. Yet, the majority of empirical studies still focus on basic food categories, leaving more complex or multi-course pairing contexts underexplored. Moreover, few studies investigate how advances in brewing technology—such as flavor-preserving filtration or late-stage hop additions—translate into improved pairing performance. This points to a clear research gap in understanding beer's full culinary potential.

### **Non-Alcoholic Beer: Production and Perception**

A growing body of literature has focused specifically on non-alcoholic beer, highlighting its market relevance and the technical challenges it presents in achieving desirable sensory quality. Multiple studies (Schmelzle et al., 2013; Ghasemi-Varnamkhasi et al., 2012; Salanță et al., 2020) show that NA beers often lack the fullness, complexity, and aromatic lift associated with alcoholic beer—limitations that can negatively affect their performance in food pairing contexts. Although dealcoholization techniques have improved (Catarino & Mendes, 2011), these innovations have not yet been comprehensively assessed from a culinary or pairing-focused perspective.

Furthermore, Blackmore et al. (2022) demonstrate that expectations significantly influence sensory perception, particularly in the case of NA beer. These findings underscore the importance of framing and presentation in influencing how NA beer is received in gastronomic experiences. Reframing NA beer through narratives of craftsmanship, sustainability, or wellness may enhance its acceptance as a serious and sophisticated pairing alternative.

### **Consumer Preferences and Behavior**

Consumer studies reinforce the idea that preferences are shaped not only by sensory experiences but also by cultural familiarity and perceived value. Martinez et al. (2017) highlighted a clear gap between expert and consumer knowledge, with experts emphasizing taste balance and interaction, while consumers often relied on heuristics or familiarity. Meanwhile, studies on craft beer consumption (Aquilani et al., 2015; Carvalho et al., 2018; Jaeger et al., 2020) reveal that authenticity, locality, and quality are major drivers of preference.

Zhao et al. (2023) also suggest that fruit-infused and flavored beers may appeal to new and younger consumer groups, particularly those interested in novelty or health-conscious choices. These developments support the idea that beer pairing is evolving beyond traditional formats, opening up opportunities to integrate non-traditional styles and audiences into food pairing strategies.

### **Cultural and Social Dimensions**

Several sociological studies provide insight into how beer functions as a symbolic and identity-forming product, particularly within the craft beer movement (Johnston, 2018; Ocejo, 2018; Thurnell-Read, 2019, 2022). Craft beer is often positioned as a form of resistance to mass production, linked to authenticity, artisanal values, and self-expression. These associations can strongly influence how beer is received and interpreted in gastronomic settings, especially when food and beverage experiences are designed to tell a story or convey ethical commitments.

At the same time, cultural framings present barriers to inclusivity. Staub et al. (2022) found that alcoholic beer is associated with masculinity, while NA beer is often coded as health-conscious or even socially inferior. Such

framings can limit the perceived appropriateness of NA beer in formal or celebratory contexts, despite its growing relevance and improved quality.

### **Innovation and Sustainability**

Several sources highlight that beer pairing—especially when involving non-alcoholic or craft beers—has untapped potential within the context of sustainable gastronomy. Fruit-infused beers and local sourcing practices (Zhao et al., 2023; Villacreces et al., 2022) show how flavor innovation is being used to align beer production with seasonal, place-based values. Salanță et al. (2020) and Ocejó (2022) further emphasized the role of slow food ideals and ethical branding in shaping consumer perceptions of craft and NA beer.

Yet despite these trends, few pairing frameworks capitalize on beer's ecological advantages or explore its potential to support sustainable food narratives. This suggests a missed opportunity in both research and culinary practice.

### **Conclusion**

This scoping review highlights the emerging complexity and opportunity within the field of beer and food pairing, with a particular emphasis on the underexplored role of non-alcoholic beer in gastronomic settings. While beer has long played a role in informal dining cultures, it is increasingly positioned as a legitimate and versatile partner in formal and fine dining contexts. Sensory principles such as balance, intensity, and texture interaction are well established for alcoholic beers, but their application to non-alcoholic beers remains limited by technical, perceptual, and cultural barriers.

The literature also demonstrates that beer pairing is not purely a matter of taste—it is deeply shaped by consumer knowledge, values, and social identity. Craft beer's rise has introduced new narratives around authenticity, locality, and sustainability, all of which could be leveraged to reposition beer, including non-alcoholic varieties, as a gastronomically rich and inclusive choice.

To fully realize this potential, future research must bridge the gap between brewing science and food pairing practice, embracing both sensory rigor and cultural context. This includes designing and evaluating new pairings, educating both consumers and professionals, and challenging existing biases in the framing of beer—alcoholic and non-alcoholic alike—as a meaningful part of the meal experience.

### **References**

- Arksey, H., & O'malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, 8(1), 19-32.
- Aquilani, B., Laureti, T., Poponi, S., & Secondi, L. (2015). Beer choice and consumption determinants when craft beers are tasted: An exploratory study of consumer preferences. *Food Quality and Preference*, 41, 214–224.
- Blackmore, H., Hidrio, C., & Yeomans, M. R. (2022). How sensory and hedonic expectations shape perceived properties of regular and non-alcoholic beer. *Food Quality and Preference*, 99, 104562.
- Catarino, M., & Mendes, A. (2011). Non-alcoholic beer—A new industrial process. *Separation and Purification Technology*, 79(3), 342–351.
- Carvalho, N. B., Minim, L. A., Nascimento, M., Ferreira, G. H. D. C., & Minim, V. P. R. (2018). Characterization of the consumer market and motivations for the consumption of craft beer. *British Food Journal*, 120(2), 378–391.
- Donadini, G., Fumi, M. D., & Lambri, M. (2013). A preliminary study investigating consumer preference for cheese and beer pairings. *Food Quality and Preference*, 30(2), 217–228.
- Donadini, G., Spigno, G., Fumi, M. D., & Pastori, R. (2008). Evaluation of ideal everyday Italian food and beer pairings with regular consumers and food and beverage experts. *Journal of the Institute of Brewing*, 114(4), 329–342.

- Donadini, G., Fumi, M. D., & Newby-Clark, I. R. (2015). An investigation of matches of bottom fermented red beers with cheeses. *Food Research International*, 67, 376–389.
- Ghasemi-Varnamkhasti, M., Mohtasebi, S. S., Rodriguez-Mendez, M. L., Lozano, J., Razavi, S. H., Ahmadi, H., & Apetrei, C. (2012). Classification of non-alcoholic beer based on aftertaste sensory evaluation by chemometric tools. *Expert Systems with Applications*, 39(4), 4315–4327.
- Jaeger, S. R., Worch, T., Phelps, T., Jin, D., & Cardello, A. V. (2020). Preference segments among declared craft beer drinkers: Perceptual, attitudinal and behavioral responses underlying craft-style vs. traditional-style flavor preferences. *Food Quality and Preference*, 82, 103884.
- Johnston, J. (2018). *Masters of craft: Old jobs in the new urban economy*. Routledge.
- Klosse, P. R., Riga, J., Cramwinckel, A. B., & Saris, W. H. (2004). Subjective and objective measurement of food appreciation in sweet and savoury dishes. *Food Quality and Preference*, 15(6), 489–503.
- Martinez, D. C., Hammond, R. K., Harrington, R. J., & Wiersma-Mosley, J. D. (2017). Young adults' and industry experts' subjective and objective knowledge of beer and food pairings. *Journal of Culinary Science & Technology*, 15(4), 285–305.
- Ocejo, R. E. (2018). *Untapped: Exploring the cultural dimensions of craft beer*. Princeton University Press.
- Ocejo, R. E. (2022). Slow production, less consumption: Righteous approaches to the paradox of craft businesses. In *The Artisan Brand* (pp. 177–192). Edward Elgar Publishing.
- Rivaroli, S., Calvo-Porrall, C., & Spadoni, R. (2022). Using food choice questionnaire to explain Millennials' attitudes towards craft beer. *Food Quality and Preference*, 96, 104408.
- Salanță, L. C., Coldea, T. E., Ignat, M. V., Pop, C. R., Tofană, M., Mudura, E., ... & Zhao, H. (2020). Non-alcoholic and craft beer production and challenges. *Processes*, 8(11), 1382.
- Schmelzle, A., Lindemann, B., & Methner, F. J. (2013). Sensory descriptive analysis and consumer acceptance of non-alcoholic beer. *Brewing Science*, 66(9-10), 144–153.
- Staub, C., Contiero, R., Bosshart, N., & Siegrist, M. (2022). You are what you drink: Stereotypes about consumers of alcoholic and non-alcoholic beer. *Food Quality and Preference*, 101, 104633.
- Thurnell-Read, T. (2019). A thirst for the authentic: Craft drinks producers and the narration of authenticity. *The British Journal of Sociology*, 70(4), 1448–1468.
- Thurnell-Read, T. (2022). Gender and craft drinks. *Sociology Compass*, 16(9), e13018.
- Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., ... & Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Annals of internal medicine*, 169(7), 467-473.
- Villacreces, S., Blanco, C. A., & Caballero, I. (2022). Developments and characteristics of craft beer production processes. *Food Bioscience*, 45, 101495.
- Zhao, X., Yin, Y., Fang, W., & Yang, Z. (2023). What happens when fruit married with beer? *International Journal of Gastronomy and Food Science*, 32, 100716.