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Symbolic Dimensions of Traditional Knowledge about Functional Nutrition

Symbolic Dimensions Of Traditional Knowledge About Functional Food

Paulo Roberto Ramos - Federal University of the São Francisco Valley - Email:

paulo.ramos@univasf.edu.br - Orcid: 0000-0003-3684-0960

Carlos Alberto Batista dos Santos - State University of Bahia - Email: carlos.alberto@uneb.br -

Orcid: 0000-0002-2049-5237

Summary

This article analyzes the symbolic dimensions of traditional knowledge about functional foods, exploring the interrelationships between culture, spirituality, and science in the construction of food meanings. The central problem lies in the fragmentation between traditional knowledge and modern scientific validation, which often disregards the symbolic and identity value of food in traditional communities. The study aims to understand how popular knowledge interacts with scientific evidence on functional foods, identifying convergences and dissonances between both epistemologies. A bibliographic research methodology and interpretive analysis were adopted, based on 30 recent national and international articles. The results indicate that the integration between tradition and science broadens the understanding of food as an element of integral health, belonging, and sustainability, demonstrating that symbolic and cultural appreciation is essential for more ethical and humanized food practices.

Keywords: Traditional knowledge. Functional food. Food culture. Symbolism. Sustainability.

Abstract

This article analyzes the symbolic dimensions of traditional knowledge on functional foods, exploring the interrelations between culture, spirituality, and science in the construction of food meanings. The central issue lies in the fragmentation between traditional knowledge and modern scientific validation, which often overlooks the symbolic and identity value of food within traditional communities. The study aims to understand how popular knowledge dialogues with scientific evidence on functional foods, identifying convergences and dissonances between both epistemologies. A bibliographic research and interpretative analysis methodology was adopted, based on 30 recent national and international articles. The results indicate that the integration between tradition and science broadens the understanding of food as an element of holistic health, belonging, and sustainability, demonstrating that symbolic and cultural appreciation is essential for more ethical and humanized eating practices.

Keywords: Traditional knowledge. Functional food. Food culture. Symbolism. Sustainability.

Introduction

Nutrition, in its broadest sense, transcends its biological function and takes on a role... central to the symbolic and identity formation of human societies. In traditional communities, The act of eating is immersed in systems of meaning, ritual practices, and inherited knowledge. expressing their own ways of life and cosmologies. Contemporary nutritional science, in turn, to investigate functional foods with the potential to promote metabolic and immunological benefits. and preventive measures, it finds fertile ground for dialogue with traditional knowledge, which for centuries They identify, classify, and use foods in a way that is integrated with health and spiritual balance. This intertwining reveals a hybrid epistemological territory, where culture and biology intertwine.

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They intertwine, reaffirming food as a mediator between the body, nature, and the sacred.

The appreciation of traditional knowledge about functional food emerges as a response.

Ethical and scientific approaches to contemporary food, health, and environmental crises. In a global context.

marked by the homogenization of eating habits and the loss of cultural biodiversity,

to recognize the role of indigenous, quilombola, and peasant communities in preserving practices.

Sustainable and symbolic food practices are fundamental. Recent evidence suggests that many

From the perspective of modern science, these practices correspond to dietary strategies rich in

bioactive compounds, fibers, and natural antioxidants, forming true food systems.

functional.

Thus, understanding food as a symbolic, nutritional, and ecological phenomenon.

It allows for the integration of popular wisdom with scientific advancement, strengthening sovereignty policies. nutrition and health promotion.

Despite advances in the science of functional foods, a gap persists between

Scientific knowledge and traditional knowledge are often treated in a marginal or empirical way.

This epistemological split reflects not only methodological distancing, but also the

A hierarchy of knowledge that privileges Western science to the detriment of epistemologies.

local.

The central problem, therefore, consists in understanding how the symbolic dimensions and

Traditional knowledge and cultural practices can engage in dialogue with modern nutritional science without loss of...

authenticity or subordination. The main objective of this study is to analyze the convergences and

Disagreements between traditional knowledge and the scientific principles of functional foods.

highlighting their symbolic, identity-related, and therapeutic meanings in food practices of traditional communities.

This is a bibliographical and analytical-interpretative research, based on a corpus. of 30 national and international scientific articles published mostly in the last seven years.

The selection encompassed empirical studies, clinical trials, and ethnographic approaches to food.

Functional aspects, traditional food practices, and cultural dimensions of nutrition.

The methodology adopts an interdisciplinary approach, integrating the areas of Nutrition, Anthropology, Ethnobotany, and Nutrition, which allows us to understand food as a phenomenon.

biocultural. The interpretative analysis was guided by symbolic, functional, and thematic categories.

epistemological, which articulate scientific discourse with the social imaginary. This is justified.

This approach aims to overcome the fragmentation between science and tradition, promoting a

A holistic view of food as a link between health, culture, and nature.

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Epistemological and Cultural Roots of Traditional Knowledge

Understanding local epistemologies is an essential starting point for...

The study of traditional knowledge in food. Such epistemologies are based on experience.

everyday life, through empirical observation and the symbolic transmission of knowledge, forming systems.

complexes that articulate the biological, the spiritual, and the social. According to Silva *et al.* (2024), the knowledge

Traditional beliefs are not simply repertoires of popular beliefs, but ways of knowing and acting upon the world.

world based on its own validation logics. This approach breaks with the notion that the

Scientific knowledge would be the only legitimate form of rationality and recognizes plurality.

Epistemic elements present in traditional food cultures.

From an anthropological point of view, food is understood as "a social and symbolic text".

which expresses values, identities, and cosmologies (Rocillo-Aquino *et al.*, 2021). In the Anthropology of

Nutrition, authors such as Fabri *et al.* (2022) and Barboza *et al.* (2025) highlight that eating is a

communicative practice, permeated by classification systems that define what is pure, healthy,

sacred or forbidden. Thus, traditional functional foods such as roots, seeds, and plants.

Medicinal properties are not limited to their nutritional composition, but involve collective representations that

They provide meaning and a sense of belonging.

In the science of Nutrition, the incorporation of the concept of functional foods emerges as an attempt to validate, through empirical methods, historical observations about therapeutic potential.

of certain foods (Jakobsen *et al.*, 2022; Cunha *et al.*, 2025). Recent studies demonstrate

that many of the products used in traditional communities such as cassava (*Manihot*

esculenta), açaí (*Euterpe oleracea*), murici (*Byrsonima crassifolia*) and baru (*Dipteryx alata*)

They contain high levels of antioxidants, fiber, and bioactive compounds that contribute to...

prevention of chronic diseases (Egidio *et al.*, 2023; Gomes *et al.*, 2025). This correspondence between

Empirical knowledge and scientific validation reinforce the argument that traditional knowledge can

to be considered a legitimate form of situated science (Müller *et al.*, 2025).

Next, we present Table 1, which summarizes the main epistemological categories.

observed in the analyzed studies, highlighting their forms of legitimization and transmission.

Table 1 – Epistemological categories of traditional knowledge about functional food

Category Epistemological	Base Knowledge	Form of Transmission	Example To feed Traditional	Main References
Empirical-observational	Sensory experience and practical use of food	Orality and everyday practice	Fermented cassava products, medicinal teas	Silva <i>et al.</i> (2024); Egidio <i>et al.</i> (2023)
Cosmological-ritual	The relationship between food, spirituality, and identity.	Rituals, myths and community celebrations	Baths and offerings made with corn (<i>Zea mays</i>) and honey.	Fabri <i>et al.</i> (2022); Rocillo-Aquino <i>et al.</i> (2021)

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Functional-scientific	Biochemical studies and clinical scientific publications on bioactive compounds	health programs	o Aguirre <i>et al.</i> (2025); Jakobsen <i>et al.</i> (2022) turmeric (<i>Curcuma longa</i>), ginger (<i>Zingiber officinale</i>)	
Ecological and sustainable	Agroecological knowledge and food biodiversity	Community education and agroforestry practices	PANCS, community gardens	Neves <i>et al.</i> (2022); Marques (2023)
Intercultural-dialogical	The connection between modern science and oral tradition.	Collaborative research and community outreach	Cassava and cassava products	Bezerra <i>et al.</i> (2022)

Source: Silva *et al* (2024), Rocillo-Aquino *et al.* (2021), Fabri *et al.* (2022), Cunha *et al.* (2025), Neves *et al.* (2022).

Table 1 shows that the production of knowledge about functional food in Traditional contexts are multifaceted and interdisciplinary. While the empirical axis emphasizes the Through practical observation and sensory results, the cosmological axis connects food to the domain. symbolic and spiritual, consolidating it as a "mediator between the human and the natural" (Fabri *et al.*, 2022, p. 213).

The functional-scientific axis, in turn, represents the meeting point between tradition and biomedicine, bridging clinical trials and ethnoscience (Cunha *et al.*, 2025; Müller *et al.*, 2025). Finally, the ecological and intercultural dimensions indicate that sustainability and dialogue of knowledge is fundamental for the recognition and continuity of these practices (Neves *et al.*, 2022; Marques, 2023).

Food anthropology proposes to understand food as a symbolic construct that It materializes the link between body, territory, and culture. As argued by Fabri *et al.* (2022), the Traditional food systems "operate simultaneously as identity codes and as "care technologies" (p. 209). This anthropological perspective complements functional nutrition, which identifies biochemical mechanisms behind empirically established practices. Barboza *et al.* (2025) and Gomes *et al.* (2025) highlight that diets based on native plants and preparations ancestral fungi exhibit antioxidant and anti-inflammatory properties validated in recent studies. confirming the relevance of symbolically based foods for metabolic health.

In Nutrition, there is a growing interest in incorporating traditional foods into clinical protocols, recognizing them as sources of phytonutrients and precursors of molecules. bioactive compounds (Jakobsen *et al.*, 2022; Oliveira & Pereira, 2017). This integration between Nutrition and Anthropology allows us to understand that traditional food is simultaneously nutritious and... Narrative, molecule and memory — a "living biography" of ecological and spiritual contexts (Motta, 2007, p. 82).

Therefore, recognizing local epistemologies as legitimate systems of production of Knowledge is an indispensable condition for expanding the scientific understanding of nutrition.

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functional. Such recognition does not imply relativizing science, but rather expanding it, incorporating plural and respectful perspectives of the cultures that have produced health and meaning for centuries through food.

Functional Nutrition and Popular Knowledge: Bridges and Dissonances

The concept of functional food emerged in Japan in the 1980s and, subsequently, It became established in Europe and the Americas, being defined as that food which, in addition to its nutritional value... Basic nutritional elements exert beneficial effects on one or more bodily functions, promoting health and reducing the risk of chronic diseases (Diplock *et al.*, 2000).

In the contemporary context, functional nutrition broadens the focus of classical nutrition to include consider the biochemical and physiological effects of food at the cellular and systemic level (Jakobsen) *et al.*, 2022). In Brazil, this definition was incorporated into regulations by the National Agency of The Brazilian Health Surveillance Agency (ANVISA), which requires scientific proof of the alleged effects, based on... clinical trials and systematic reviews (Egidio *et al.*, 2023).

The regulatory framework for functional foods has become the subject of intense debate. especially with regard to the scientific validation of bioactive compounds and the protection of scientific knowledge. traditional associated (FAO/WHO, 2025; WIPO, 2024). The modern approach seeks to balance the Food security through technological innovation, without suppressing the cultural diversity of practices. Foodstuffs. Recent studies indicate that approximately 35% of products marketed as functional foods originate from ingredients traditionally used by indigenous populations or rural areas, highlighting the interdependence between industry and ancestral knowledge.

The analysis demonstrates that, although the concept of functional food originated in a context... Technoscientific, its contemporary consolidation depends on an interdisciplinary and intercultural perspective. As Cunha *et al.* (2025, p. 6) observe, "Western science is beginning to recognize empirical validity "The use of traditional knowledge in promoting health and preventing disease." This renewed connection This reinforces the need to consider the symbolic and ecological functionality of food, which It goes beyond the mere quantification of nutrients.

Among the main compounds responsible for the functional effects are polyphenols, carotenoids, flavonoids, and essential fatty acids, which act in antioxidant mechanisms and anti-inflammatory, modulating immune and metabolic responses (Oliveira & Pereira, 2017; Jakobsen *et al.*, 2022). Recent clinical studies confirm the effectiveness of traditional Brazilian foods. such as açaí, baru, and Brazil nuts (*Bertholletia excelsa*) in glycemic and lipid regulation (Gomes *et al.*, 2025; Barboza *et al.*, 2025). These results demonstrate that ancestral practices of Consumption studies, based on observation and symbolism, anticipated discoveries of modern science.

In physiological terms, these compounds interact with the gut microbiome.

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playing a modulating role in nutrient absorption and metabolic health (Oliveira &

(Pereira, 2017; Jakobsen et al., 2022). This correlation between tradition and science shows that nutrition Contemporary functionalism, by recognizing popular knowledge, becomes more inclusive and contextualized (Neves et al., 2022).

Traditional knowledge constitutes a body of ecological and symbolic knowledge. transmitted through generations, integrating agricultural, spiritual, and medicinal practices. Several studies Ethnographic studies indicate that indigenous, quilombola (Afro-Brazilian), and riverside populations utilize food. as mediators between the physical and the spiritual, which, for nutritional science, corresponds to the role regulator of bioactive compounds (Fabri et al., 2022; Rocillo-Aquino et al., 2021). This The correspondence is visible, for example, in the use of Unconventional Food Plants (PANCs). whose chemical and cultural diversity makes them strategic sources of sustainable functional foods (Neves et al., 2022).

PANCs, such as ora-pro-nóbis (*Pereskia aculeata*), taioba (*Xanthosoma sagittifolium*) and Malabar spinach (*Basella alba*) has high concentrations of fiber, iron, calcium, and compounds. Antioxidants, being widely used in rural communities (Egidio et al., 2023). Research de Lopes et al. (2023) and Marques (2023) reveal that the agroecological management of these species integrates Traditional knowledge and technological innovation, promoting food security and diversity.

Nutritional information. Table 2 below summarizes some studied PANCs (non-conventional food plants) and their functional properties.

Table 2 – Unconventional Food Plants (PANCs) and their nutritional and symbolic properties

Species / Name Popular	Traditional use	Compounds Functional Main	Meaning Cultural / Symbolic	References
Ora-pro-nóbis (<i>Pereskia aculeata</i>)	Protein source in rural communities	Essential amino acids, fiber	Food for strength and abundance.	Neves et al. (2022); Egidio et al. (2023)
Taioba (<i>Xanthosoma sagittifolium</i>)	Ritual and everyday dish	Iron, calcium, carotenoids	Linked to care and fertility	Fabri et al. (2022)
Bertalha (<i>Basella alba</i>)	Maternal nutrition	Polyphenols, vitamin W	Purity and vital renewal	Marques (2023); Rocillo-Aquino et al. (2021)
Pequi (<i>Caryocar brasiliense</i>)	Sertanejo cuisine	Fatty acids monounsaturated	Protection and ancestry	Barboza et al. (2025); Cunha et al. (2025)

Source: own elaboration based on the references above.

Wild edible plants (PANCs) exemplify the coexistence between biological and symbolic diversity. Their uses They transcend the nutritional aspect and reaffirm narratives of territorial identity and resistance. cultural. This relationship confirms what Fabri et al. (2022, p. 211) call "ecological wisdom." "Incorporated into daily life," in which food is simultaneously an act of survival and expression. worldview.

In indigenous and Afro-descendant contexts, food plays a central role in rituals. Healing, passage, and celebration. Corn, cassava, honey, and palm oil (*Elaeis guineensis*), for example,

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They carry meanings that associate vitality, purification, and ancestry (Marques, 2023).

Recent ethnographic studies in communities of the Xingu and Recôncavo Baiano regions indicate that... The choice and preparation of food are related to symbolic systems of bodily balance and spiritual (Motta, 2007; Rocillo-Aquino et al., 2021). From a functional point of view, many of these foods have proven anti-inflammatory and antioxidant properties (Martins et al., 2024; Gomes et al., 2025).

Thus, by uniting ritual and science, traditional food establishes itself as a holistic practice. of health — a form of “symbolic nutrition” that sustains bodies, spirits, and ecosystems (Fabri et al., 2022, p. 215).

Despite the convergences, dissonances persist between scientific paradigms and existing knowledge. Traditional methods. Modern science tends to break down food into isolated nutrients, while... Traditional cultures understand it as a symbiotic whole, linked to memory and to spirituality (Silva et al, 2024; Rocillo-Aquino et al., 2021). This epistemological difference generates Tensions arise in attempts to validate and commercialize functional foods originating from practices. traditional.

Traditional populations often express resistance to standardization and commodification of their food, since scientific validation often decontextualizes the food of its symbolic and ritual value (Santilli, 2015; Cunha et al., 2025). The transposition of a Bringing food from ritual spaces to the global market implies a loss of cultural and ecological authenticity. Nevertheless, some collaborative initiatives have sought to balance scientific certification with Respect for cultural origin, through participatory research protocols (Bezerra et al., 2022; Müller et al., 2025).

The expansion of the functional foods market has raised concerns about... biopiracy and the intellectual appropriation of ancestral knowledge. According to the World Health Organization Intellectual Property, more than 120 cases of improper bioprospecting were identified between 2010 and 2023, involving compounds derived from traditional plants of Latin America and Africa (WIPO, 2024). This exploitation, without the consent of the landowning communities, threatens not only the biodiversity, but also cultural sovereignty.

The ethics of food innovation require explicit recognition of cultural origins and ecological knowledge used by industry. Thus, strengthening mechanisms of legal and cultural protection, such as geographical indications, seed banks and agreements Benefit sharing constitutes an essential strategy for guaranteeing epistemic and patrimonial justice. to traditional communities (FAO/WHO, 2025; WIPO, 2024).

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Symbolic, Identity-Based, and Spiritual Dimensions of Food

In traditional cosmologies, food transcends its biological function to become...

as a symbol of life, identity, and healing. Eating is not just about nourishing the body, but reaffirming ties to the territory, to the ancestors and to the community itself. According to Fabri *et al.* (2022, p. 210), "food expresses the balance between the body and the cosmos, revealing the symbolic unity between "Nature and culture." This integrative vision is observed among indigenous peoples and communities. quilombola and rural populations, in which food is conceived as a vital force capable of restoring harmony and collective well-being (Motta, 2007; Marques, 2023).

Brazilian food traditions, especially in Afro-descendant contexts, associate...

Food for spiritual energy (axé), reinforcing its sacred character. Palm oil, yam (*Dioscorea* spp.) and corn, for example, are considered vehicles of power and communication with the divine. (Marques, 2023; Rocillo-Aquino *et al.*, 2021). In indigenous cultures, corn, cassava and Fish appear as founding elements of life, present in origin myths and rituals. cure (Santilli, 2015; Neves *et al.*, 2022). Thus, nutrition plays a central role in regeneration. of health and in strengthening collective identities, highlighting the symbolic dimension and Therapeutic use of functional foods.

Contemporary clinical studies, when investigating the effects of bioactive compounds, Studies empirically confirm the restorative potential of these foods. Açaí and baru, for example, Traditionally recognized as revitalizing, they exhibit antioxidant and anti-proven inflammatory effects (Gomes *et al.*, 2025; Barboza *et al.*, 2025). Thus, tradition and science They converge on the understanding of food as a mediator between physical well-being and balance. spiritual, a concept that modern nutrition is gradually reclaiming by recognizing wholeness. of eating (Oliveira & Pereira, 2017; Cunha *et al.*, 2025).

The act of eating in traditional communities is marked by commensality, a process of Sharing that goes beyond the material dimension of food. Eating together is, symbolically, belonging. The table, the yard, or the bonfire become spaces for dialogue, reciprocity, and reconstruction. of social memory (Fabri *et al.*, 2022; Bezerra *et al.*, 2022). Commensality reinforces what Rocillo-Aquino *et al.* (2021, p. 8) define it as the "sacred time of sharing," a moment when food It ceases to be a substance and becomes a relationship. This relational dimension brings it closer to traditional eating. from anthropological conceptions of "rite of communion" (Motta, 2007).

In Afro-Brazilian and Indigenous rituals, food occupies a prominent position in the preparation. in the offering and in the consumption. The preparation is a ritualistic act, full of chants and codified gestures, in which cooking is intertwined with praying (Marques, 2023; Santilli, 2015). Such practices are marked based on the belief in the vital energy of ingredients, a concept that finds parallels in modern physiology, especially in the study of metabolic and hormonal functions triggered by the pleasure of eating.

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(Martins et al., 2024). Thus, ritualistic foods can also be understood as

Symbolic functional foods, acting on both the physical and spiritual planes.

Table 3 below summarizes the symbolic and physiological meanings attributed to some Traditional foods in different Brazilian communities.

Table 3 – Symbolic and physiological correspondences of traditional Brazilian foods

Traditional food	Meaning Symbolic / Ritualistic	Properties Functional and Bioactive Compounds	Reference Community	Sources
Corn (<i>Zea mays</i>)	Life, fertility, renewal	Carotenes, fiber and antioxidants	Tupi peoples Guarani	Neves et al. (2022); Santilli (2015)
Palm oil (<i>Elaeis guineensis</i>)	Energy, ancestry, spiritual strength	Monounsaturated fatty acids, tocopherols	Afro-Brazilian communities	Marques (2023); Martins et al. (2024)
Wild honey	Purity, an offering to the orishas.	Polyphenols, antimicrobial properties	Candomblé and Umbanda	Rocillo-Aquino et al. (2021); Barboza et al. (2025)
Açaí (<i>Euterpe oleracea</i>)	Vitality and resistance	Anthocyanins, phytosterols	Amazonian populations	Gomes et al. (2025); Cunha et al. (2025)
Cassava for sustenance, (<i>Manihot esculenta</i> , ancestry origin of life)		Resistant starch, soluble fiber	Quilombola and indigenous people	Egídio et al. (2023)

Source: own elaboration based on the references mentioned.

Analysis of Table 3 demonstrates that foods, in addition to providing nutrition, communicate values and Cosmologies. Corn is the seed of life; palm oil, ancestral energy; honey, the sweetness of the offering. Each food carries meaning, and its symbolic value is connected to physiological effects. recognized by nutritional science. This complementarity suggests that food can be Simultaneously an object of faith and an object of research, uniting diverse epistemologies under the same umbrella. The act of feeding.

Sharing food, as a ritual act, also strengthens social bonds and sustains... Moral economy of traditional communities. Field studies in indigenous populations and Quilombola communities indicate that food redistribution is associated with values of solidarity. Reciprocity and justice (Bezerra et al., 2022). These practices inspire food security policies. and sustainability, by reintroducing ethical principles into the contemporary food chain. (FAO/WHO, 2025).

Gustatory memory constitutes one of the deepest dimensions of food symbolism. The taste, the smell, and the method of preparation are guardians of cultural memory, preserving narratives and... belongings that resist being forgotten (Fabri et al., 2022). As Motta (2007, p. 83) points out, "Remembering the taste of a food is to reconstruct a part of our collective history." This memory Sensory interaction connects the individual to their ancestry and strengthens community identities, functioning... as an instrument of social cohesion and cultural resistance in the face of food globalization.

Traditional communities meticulously reproduce their recipes and culinary techniques.

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Symbolic, perpetuating spiritual and ecological values. Cassava, for example, is more than just a staple food — it is a symbol of origin and continuity, present in founding myths of Amazonia (Neves *et al.*, 2022; Lopes *et al.*, 2023). Similarly, the ritual use of black-eyed peas (*Vigna unguiculata*) and palm oil in Candomblé reinforce Afro-Brazilian identities and give new meaning to Cooking as a space of resistance (Marques, 2023; Santilli, 2015).

The link between food territoriality and collective identity is also evident in the studies.

about Mediterranean and indigenous diets, in which local food acts as a cultural marker and protector of biodiversity (Martins *et al.*, 2024). In both cases, food is simultaneously Nutrient, narrative, and territory. This symbolic triad reinforces that functional food should be... understood not only as a biochemical phenomenon, but also as a cultural practice and spiritual, sustained by memories and affections (Fabri *et al.*, 2022; Rocillo-Aquino *et al.*, 2021).

Scientific and Clinical Perspectives on Traditional Functional Foods

In recent decades, nutritional science has turned with increasing intensity to Validation of traditional foods that exhibit functional potential. This approach between tradition and the laboratory has produced significant results, revealing that many foods used Empirically, indigenous and quilombola communities have found bioactive compounds with proven physiological action.

Clinical trials conducted by Barboza *et al.* (2025) and Oliveira and Pereira (2017), by For example, they demonstrated positive effects of regular consumption of açaí (*Euterpe oleracea*) and beans-Black-eyed pea (*Vigna unguiculata*) is shown to reduce LDL cholesterol and modulate blood glucose levels. These findings... They engage directly with ancestral knowledge that associates such foods with strength and vitality. and to the prevention of diseases.

The most frequently studied bioactive compounds in traditional functional foods They include anthocyanins, flavonoids, polyphenols, monounsaturated fatty acids, and soluble fiber. (Jakobsen *et al.*, 2022; Egidio *et al.*, 2023). These substances exhibit antioxidant properties, anti-inflammatory and immunomodulatory, acting on metabolic pathways that prevent diseases cardiovascular diseases, type II diabetes, and neurodegenerative disorders (Oliveira & Pereira, 2017).

Studies by Cunha *et al.* (2025) show that foods originating from the Amazonian tradition, like baru, cupuaçu (*Theobroma grandiflorum*) and tucumã (*Astrocaryum aculeatum*), They show high levels of phenolic compounds and essential fatty acids, confirming empirically what local populations had already recognized empirically for centuries. In the context Afro-Brazilian, Marques (2023) and Santilli (2015) highlight that ingredients such as palm oil, yam And the sacred corn used in African-based rituals also presents specific lipid and vitamin profiles. beneficial, validating the concept of "functional spiritual nutrition," in which food and faith are...

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inseparable dimensions of healing.

This evidence reinforces the idea that scientific validation should not invalidate traditional wisdom, but to confirm and expand its epistemological legitimacy. As summarized by Fabri *et al.* (2022, p. 214), "Science that listens to tradition broadens its field of truth and humanizes its language about the body." and the food."

The dialogue between empirical knowledge and contemporary nutritional science constitutes a challenge. methodological, as it involves distinct forms of knowledge production and legitimization. Traditionally, popular knowledge is based on observation, repetition, and symbolic efficacy. while modern science relies on experimental, quantifiable, and replicable evidence (Silva *et al.*, 2024; Rocillo-Aquino *et al.*, 2021). The convergence between these paradigms has been made possible through integrative methodologies, capable of transitioning from ethnography to clinical trials, according to demonstrate Müller *et al.* (2025).

Ethnography provides the symbolic and cultural context of food use, allowing to understand not only "what we eat," but "why we eat." From this basis, the essays Clinical studies analyze the physiological effects of the same foods in target populations. The Clinical Study NCT06674642 (2025) on traditional Indigenous diets in Canada exemplifies this integration, revealing improvements in lipid profile and gut microbiota after 12 weeks of a traditional diet. (Williams, 2025). In Brazil, Neves *et al.* (2022) and Bezerra *et al.* (2022) applied the methodology. similar to investigating the consumption of unconventional edible plants (PANCs) in rural contexts, combining ethnographic interviews, bromatological analyses, and parameters biochemists.

Table 4 presents examples of integrative methodologies that have guided research. Recent findings on traditional functional foods.

Table 4 – Integrative approaches in research on traditional functional foods

Step Methodological	Description / Objective	Instruments Used	Results Observed	References
Food ethnography	Identifying practices, myths, and ritual uses of food.	Interviews, participant observation	Symbolic and cultural contextualization	Fabri <i>et al.</i> (2022); Neves <i>et al.</i> (2022)
Bromatological analysis	Determine biochemical composition and bioactive compounds.	Chromatography, spectrophotometry	Identification of antioxidants and functional fibers	Egídio <i>et al.</i> (2023); Cunha <i>et al.</i> (2025)
Randomized clinical trial	Testing metabolic and physiological effects	Biochemical and anthropometric markers	Lowering cholesterol and improving the immune system.	Oliveira and Pereira (2017); Jakobsen <i>et al.</i> (2022)
Interdisciplinary synthesis	Cross-referencing ethnographic and laboratory data	Qualitative analysis and multivariate statistics	Cultural and scientific validation of food.	Muller <i>et al.</i> (2025)

Source: own elaboration based on the cited references.

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These approaches, represented in Table 4, reveal the integration between science and tradition.

It requires an epistemology of listening and collaboration. The application of mixed methods, such as...

Food Ethnoscience makes it possible to reinterpret local knowledge in the light of science without diluting its origins.

symbolic meanings. As Rocillo-Aquino *et al.* (2021, p. 9) observe, "scientific research that

"Ignoring the cultural context of food means losing an essential part of its social truth."

Traditional knowledge plays a strategic role in sustainable food innovation.

Companies and research centers have been turning to ingredients of traditional origin, such as pequi,

cupuaçu and babassu (*Attalea speciosa*), for the development of functional products and

nutraceuticals (WIPO, 2024). However, ethical innovation requires recognition mechanisms and

benefit sharing, avoiding unfair commercial exploitation. According to FAO/WHO (2025), the

The integration between science and tradition should be "collaborative, not extractive," guaranteeing communities...

The right to participation and authorship.

This shared innovation model also strengthens food sovereignty policies and
of local development, linking scientific advancement to the preservation of biocultural diversity.

(Bezerra *et al.*, 2022; Marques, 2023).

The interface between functional food and public health expands as nutrition...
recognizes the preventive value of traditional foods. Recent literature demonstrates that diets
Based on local, minimally processed, and culturally significant foods, they reduce the
These reduce the risk of metabolic diseases and strengthen the resilience of communities (Martins *et al.*, 2024).
The findings support the notion of self-care in food, where traditional knowledge is a tool.
of empowerment and collective well-being.

In indigenous and quilombola communities, the revaluation of traditional cuisine has been...
demonstrated as an effective form of nutritional prevention and recovery, combating the replacement of
Local foods are being replaced by ultra-processed foods (Neves *et al.*, 2022; Marques, 2023). Therefore, food...
It becomes an act of resistance and holistic health.

The sociocultural dimension of nutrition should be understood as a fundamental determinant of...
health. Public policies that integrate traditional knowledge — such as community gardens, farmers' markets
Agroecological products and food education programs not only improve indicators
They are nutritional, but they also promote a symbolic reconnection with the territory and ancestry.
(Bezerra *et al.*, 2022; FAO/WHO, 2025).

As Fabri *et al.* (2022, p. 216) summarize, "food is the first medicine and the first
"Language of belonging." This understanding, by uniting science and culture, redefines public health.
as a field of interaction between biology, ethics, and spirituality, consolidating the role of food.
Traditional functional groups as instruments of healing, identity, and sustainability.

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Contemporary and Ethical Paths of Traditional Functional Nutrition

Contemporary reflection on traditional functional nutrition is intrinsically linked to discussions about sustainability and food sovereignty. These concepts, although originating in different contexts, they converge in defending the right of communities to produce, consume and to transmit their own food systems, in harmony with nature and their cosmologies. (FAO/WHO, 2025; WIPO, 2024). Food sovereignty presupposes that food is recognized. not only as a commodity, but as a common and symbolic good, sustained by biodiversity and through collective memory.

Traditional Brazilian indigenous, quilombola, and riverside communities have developed food models that reconcile ecological sustainability and ancestral knowledge. Neves *et al.* (2022) and Bezerra *et al.* (2022) highlight that agroecological practices, the use of plants Unconventional food plants (PANCs) and crop rotation shape productive systems of low environmental impact and high symbolic density. These practices are also instruments of Cultural resistance against the advance of agribusiness and food monoculture.

Biodiversity, as a symbolic and scientific foundation, is expressed in the plurality of cultivated species and the preservation of local biomes. Research by Lopes *et al.* (2023) and Marques (2023) demonstrate that agroforestry backyards and community farms function as archives. Living beings of knowledge and health, where the nutritional function and spiritual value of food are considered. They coexist.

Internationally, the study by Martins *et al.* (2024) reveals that the Mediterranean diet traditional, recognized as cultural heritage by UNESCO, shares principles similar to those of Brazilian communities — biological diversity, local consumption and commensality. This comparison reinforces the idea that traditional food systems can serve as planetary sustainability models, since they balance human nutrition with regeneration. environmental.

As Fabri *et al.* (2022, p. 216) summarize, "eating well is also about taking care of the place that "Food." Thus, food sustainability goes beyond the field of ecology, constituting itself... also in a symbolic and political act, where respect for the territory and ancestry is transformed into A strategy for cultural and planetary survival.

The symbolic economy of food translates into the tension between the commodification of knowledge. Traditional and their cultural heritage. The global market for functional foods drives... billions of dollars annually and has incorporated, often asymmetrically, ingredients and practices originating from traditional peoples (WIPO, 2024). The problem lies in the fact that the The commercial appropriation of this knowledge often occurs without due recognition. or benefit sharing, constituting practices of food biopiracy (FAO/WHO, 2025;

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Santilli, 2015).

Attempts at "scientific translation" of foods like açaí, maca, or turmeric.

Indians exemplify this dilemma. As Rocillo-Aquino *et al.* (2021) observe, "the logic of the market it tends to extract food from its symbolic context, transforming it into a product and erasing its... cultural biography" (p. 10). However, recent initiatives to preserve knowledge as heritage

Food policies, such as those of IPHAN (National Institute of Historic and Artistic Heritage) and geographical indication programs, have sought to reverse this trend. this logic, valuing food as a cultural expression and not just as a commodity (Santilli, 2015; Marques, 2023).

In the field of ethical innovation, researchers such as Cunha *et al.* (2025) and Müller *et al.* (2025) They highlight the importance of collaborative networks between science and local communities, in which the Traditional knowledge is recognized as a co-participant in the formulation of new products. functional. These partnerships have inspired the concept of a solidarity bioeconomy, in which technology It acts in service of culture, not in substitution for it (Bezerra *et al.*, 2022).

Below, Table 5 summarizes the main tensions and strategies for achieving equilibrium between the market, Culture and symbolic protection.

Table 5 – Tensions and strategies between the commodification and heritage-making of traditional food.

Dimension	Challenges Observed	Risks / Impacts	Strategies of Balance	References
Commercial	appropriation of knowledge without recognition.	Biopiracy and food homogenization	Fair distribution of benefits, participatory certification	WIPO (2024)
Cultural	Detaching food from its symbolic context.	Loss of identity and devaluation of the community.	Heritage preservation and cultural education	Santilli (2015); Marques (2023)
Scientific	Reduction of food to its biochemical value	Making traditional knowledge invisible	Collaborative research and participatory science	Cunha <i>et al.</i> (2025); Müller <i>et al.</i> (2025)
Social	Inequality of access and economic valuation	Marginalization of producing communities	Solidarity bioeconomy and local markets	Bezerra <i>et al.</i> (2022)

Source: own elaboration based on the cited references.

Analysis of Table 5 demonstrates the cultural and economic value of food.

Traditional justice requires the integration of three complementary dimensions: economic justice, Symbolic recognition and scientific legitimacy. This triad forms the foundation of an ethics. intercultural food, in which food ceases to be a commodity and reassumes its role as social, spiritual and ecological connection.

Food education is the main driver for the continuity of traditional knowledge and... Transforming contemporary practices. Incorporating ancestral knowledge into schools. Universities and health programs are essential to ensure their preservation and updating. According to

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Silva *et al.* (2024) argue that traditional knowledge constitutes a living educational system, transmitted through practice and oral tradition. The institutionalization of this cultural heritage must, therefore, respect its... Unique learning styles, based on observation, listening, and community.

In recent years, various public policies in Brazil and abroad have sought to integrate the Traditional knowledge in nutrition and food security policies. The National Program of The National School Feeding Program (PNAE), for example, includes guidelines for the purchase of food from... Family farming and traditional communities, strengthening local economies and cultural habits. (Bezerra *et al.*, 2022; FAO/WHO, 2025). Similar initiatives are observed in countries such as Canada and Australia, where programs promoting indigenous diets and intercultural education have been promoted. a rapprochement between science and tradition (Pereira *et al.*, 2025).

Food co-education, a concept advocated by Fabri *et al.* (2022), proposes learning mutual understanding between researchers and communities, so that science is also educated by knowledge. local contexts. This perspective broadens the role of collaborative research, integrating ethnographic observation, experimental nutrition and intercultural dialogue. Studies such as those by Neves *et al.* (2022) and Marques (2023) demonstrate that participatory food education programs increase adherence to diets They are healthy and reinforce a sense of community belonging.

Beyond the pedagogical dimension, the transmission of knowledge also involves recognition. legal and collective intellectual property protection. WIPO (2024) highlights the importance of Community records of traditional knowledge, which function as legal instruments of Defense against misappropriation. These records, combined with seed banks and inventories. cultural initiatives strengthen the protagonism of communities in the management of their biocultural resources (Lopes *et al.*, 2023; Marques, 2023).

The incorporation of traditional knowledge into public policies and educational practices requires an epistemological shift: understanding food not as an isolated technical area, but as a field of intercultural knowledge and ethics. As Cunha *et al.* (2025, p. 7) state, "science needs "Relearning to listen to food as a narrative of the world." This listening constitutes the path to a Functional nutrition that is truly human, the kind that nourishes the body, memory, and planet.

The contemporary trajectory of traditional functional nutrition demonstrates that... Sustainability, ethics, and education are inseparable dimensions of the nutrition of the future. By recognizing the centrality of traditional knowledge and its symbolic power, science expands its... ethical and civilizational horizon. Building bridges between tradition and innovation therefore represents, not just a technical advancement, but a cultural reconciliation between knowing and feeling, between the land and the body that feeds on it.

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Conclusion

This study demonstrated that the symbolic dimensions of traditional knowledge about Functional nutrition constitutes a fertile field for dialogue between science, culture, and spirituality. Throughout the five chapters, it became evident that contemporary nutrition, by opening itself up to Non-hegemonic epistemologies find in traditional knowledge a legitimate source of innovation. scientific and ethical. The research revealed that traditional functional foods originating from Indigenous, quilombola, and rural communities combine proven nutritional effectiveness with symbolic meanings and rituals that structure collective identities, self-care practices and food cosmologies.

From a scientific point of view, the analysis of clinical and biochemical evidence confirmed the presence of bioactive compounds with antioxidant, anti-inflammatory and Immunomodulatory agents in foods such as açaí, pequi, cassava, and palm oil. These findings They empirically corroborate ancestral knowledge that recognizes these foods as instruments of Strength, healing, and vitality. However, scientific validation does not replace empirical knowledge: it It complements and legitimizes it, expanding its visibility and relevance in public policies and practices. clinics.

From an anthropological perspective, it has been observed that food, in traditional cultures, is Simultaneously nutrient, symbol, and spiritual link. Commensality, ritual, and memory. Gustatory experiences create dimensions of belonging that resist food homogenization and... loss of cultural diversity. This perspective reveals that functional food cannot be reduced to the biochemistry of compounds, but should include the symbolic biography of foods and the sociocultural context of its use.

The integration between science and tradition therefore demands interdisciplinary methods and collaborative. The combination of ethnography and clinical trials, as evidenced in recent studies, This demonstrates that it is possible to combine scientific rigor and cultural respect, building epistemological bridges. which strengthen the social validity of functional nutrition. Furthermore, public policies on Food and health, by incorporating local and agroecological knowledge, broaden the concept of health. comprehensive, promoting sustainability, food sovereignty and equity.

On an ethical and socioeconomic level, the work highlighted the challenges of commodification and Biopiracy of traditional foods, as opposed to heritage preservation initiatives and the bioeconomy. Solidarity, which reaffirms the right of communities over their knowledge and territories. The appreciation The cultural and legal aspects of traditional food thus reveal themselves as an ethical imperative of epistemic justice. and sustainability.

Finally, it is concluded that traditional functional nutrition should be understood as a An integrated system of biological, symbolic, and spiritual knowledge that connects science and ancestry.

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for the benefit of planetary health. By recognizing that food is simultaneously medicine and

In summary, the present study reaffirms the need for a humanized nutritional science, capable of...

To nourish bodies, cultures, and ecosystems.

The appreciation of traditional knowledge about functional food, therefore, does not represent
A return to the past, but a civilizational advance, an invitation for science to reconcile with
the wisdom that precedes it and the land that sustains it.

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