Rev Esp Nutr Hum Diet. 2025; 29(1).

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

Freely available online - OPEN ACCESS

Revista Española de Nutrición Humana y Dietética

Spanish Journal of Human Nutrition and Dietetics

RESEARCH – *post-print* version

Esta es la versión revisada por pares aceptada para publicación. El artículo puede recibir modificaciones de estilo y de formato.

Knowledge, Attitudes, and Practices (KAPs) of nutrition and dietetics professionals regarding the role of yogurt in healthy and sustainable dietary patterns: a cross-sectional study

Conocimientos, actitudes y prácticas de profesionales de la nutrición y dietética sobre el papel del yogur en la alimentación saludable y sostenible: un estudio transversal

Exploration of the role of yogurt in healthy and sustainable eating patterns

Eduard Baladia[a], Manuel Moñino[a, b, *], Martina Miserachs[a], Giuseppe Russolillo[a]

[a] Área de Gestión del Conocimiento, Academia Española de Nutrición y Dietética, Pamplona, España.

[b] Centro de Investigación Biomédica en Red-Fisiopatología de la Obesidad y Nutrición, Instituto Carlos III, Madrid, España.

* mmonyino@academianutricion.org

Received: 17/10/2024; Accepted: 12/12/2024; Published: 07/03/2025

Assigned editor: Macarena Lozano Lorca. Departamento de Medicina Preventiva y Salud Pública, Facultad de Ciencias de la Salud de Melilla, Universidad de Granada, Melilla, España.

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

CITE: Baladia E, Moñino M, Miserachs M, Russolillo G. Knowledge, Attitudes, and Practices (KAPs) of nutrition and dietetics professionals regarding the role of yogurt in healthy and sustainable dietary patterns: a cross-sectional study. Rev Esp Nutr Hum Diet. 2025; 29(1). doi: 10.14306/renhyd.29.1.2332[ahead of print]

ABSTRACT

Introduction: Perceptions and practices of healthcare professionals regarding the nutritional and dietary value of yogurt can play a crucial role in developing effective strategies to promote healthier and more sustainable dietary patterns. The aim of this study was to investigate the perceptions, attitudes, and practices of nutrition professionals regarding yogurt and its role in a healthy diet.

Methods: A descriptive cross-sectional study involving 355 nutrition professionals in Spain was conducted. The survey was administered online and explored professionals' knowledge, attitudes, and practices regarding yogurt. Statistical analysis included descriptive and correlational techniques, with a significance level set at $p < 0,05$ to validate observations.

Results: The study revealed that 62,8% of participants recognized yogurt as a key food in a healthy diet, while 31,8% adopted a neutral position. In addition to its nutritional contribution, over 80% associated yogurt consumption with the prevention or treatment of some health outcomes. The most important factors for recommending yogurt consumption were its nutritional value and demonstrated health benefits (96,1% and 70,1%, respectively). Knowledge about yogurt was significantly associated ($p < 0,05$) with a greater willingness to include it in the diet, and a positive attitude correlated with more intensive recommendation practices.

Conclusions: The study unveils a predominantly positive attitude towards yogurt among nutrition professionals, supported by knowledge of its nutritional value and health benefits. The need for specific national guidelines and greater ongoing education to guide professionals and the population towards healthier and more sustainable practices was highlighted. Additionally, there is a future interest in considering the environmental sustainability of yogurt as an important factor for decision-making.

Funding: This research has been funded by DANONE.

Keywords: Yogurt; Cultured Milk Products; Dietitians; Nutritionists; Health Knowledge, Attitudes, Practice; Diet, Healthy

PROTOCOL REGISTRATION: The research protocol was registered on the platform Open Science Framework (OSF): https://osf.io/ef97b

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

RESUMEN

Introducción: Las percepciones y prácticas de profesionales sanitarios respecto al valor nutricional y alimentario del yogur pueden desempeñar un papel fundamental en el desarrollo de estrategias efectivas para promover patrones alimentarios más saludables y sostenibles. El objetivo del presente estudio fue investigar las percepciones, actitudes y prácticas de los profesionales de la nutrición en relación con el yogur y su papel en una alimentación saludable.

Metodología: Se realizó un estudio descriptivo de corte transversal con una muestra de 355 profesionales de la nutrición en España. La encuesta, administrada en línea, exploró conocimientos, actitudes y prácticas de los profesionales sobre el yogur. El análisis estadístico incluyó técnicas descriptivas y correlativas, y se consideró significativo un valor de $p < 0,05$ para validar observaciones.

Resultados: El estudio reveló que el 62,8% valora el yogur como alimento clave en una alimentación saludable, mientras que el 31,8% adoptó una posición neutral. Además de su aporte nutricional, más del 80% vinculó el consumo de yogur con la prevención o tratamiento de alguna condición de salud. Los factores más importantes para recomendar el consumo de yogur fueron su valor nutricional y sus beneficios demostrados para la salud (96,1% y 70,1%, respectivamente). Los conocimientos sobre el yogur se asociaron significativamente ($p < 0,05$) con una mayor disposición hacia su inclusión en la dieta, y la actitud positiva se correlacionó con prácticas de recomendación más intensas.

Conclusiones: El estudio reveló una actitud mayoritariamente positiva hacia el yogur entre los profesionales de la nutrición, respaldada por conocimientos sobre su valor nutricional y beneficios para la salud. Se destacó la necesidad de pautas nacionales específicas y una mayor formación continua para orientar a profesionales y población hacia prácticas más saludables y sostenibles. Asimismo, se vislumbra el interés futuro en considerar la sostenibilidad ambiental del yogur como factor decisor de importancia.

Financiación: Esta investigación ha sido financiada por DANONE.

Palabras clave: Yogur; Productos lácteos fermentados; Dietistas; Nutricionistas; Conocimientos, Actitudes y Prácticas en Salud; Dieta, Saludable

REGISTRO DEL PROTOCOLO: El protocolo de investigación fue registrado en la plataforma Open Science Framework (OSF): https://osf.io/ef97b

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

KEY MESSAGES

- A survey targeting 355 nutrition professionals was conducted to assess their perceptions, attitudes, and practices regarding yogurt and its relevance in a healthy diet.
- 62% considered yogurt consumption as important in a healthy eating pattern. Factors such as its nutritional value and potential health benefits were highlighted, influencing recommendation practices.
- More than 80% associated yogurt consumption with the prevention or treatment of certain health outcomes, such as osteoporosis prevention, diarrhoea management, and improvement of gut health.
- Positive attitudes towards yogurt correlated with higher consumption and more frequent recommendations to patients, emphasizing its role in promoting healthy eating habits.

INTRODUCTION

The adoption of healthier and more sustainable dietary patterns has become a critical focus for nutrition and dietetics professionals, who shapeshape food choices that directly impact individual and collective well-being. Among various dietary components, yogurt holds a unique position due to its nutritional value and probiotic properties. Developing effective strategies for promoting healthier and more sustainable food systems, requires understanding the perceptions and practices of both consumers and healthcare professionals[1].

Theories linking knowledge, attitudes, and behaviours highlight the importance of how these factors influence consumer choices. Identifying knowledge gaps about the effects of yogurt, whether positive or negative, can guide targeted educational interventions or continuing professional development. This approach is crucial to overcoming challenges such as low dairy intake in certain populations and promoting healthier eating practices. Perceptions and knowledge about yogurt vary among consumers and nutrition professionals, influencing both personal choices and professional dietary advice[2]. Lack of awareness regarding dairy's nutritional value, especially as a calcium source, underscores the need to improve food literacy[3–5].

Understanding yogurt's nutritional value and health benefits, particularly its probiotic effects, influences consumption behaviour and promotes its dietary recommendation. Literature supports that informed individuals and healthcare professionals are more likely to make confident and healthier dietary choices[6,7]. Exploring attitudes, beliefs, and practices related to yogurt among nutrition professionals helps identify knowledge gaps and evaluate how these discrepancies affect dietary recommendations.

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

This study addresses the lack of information on the knowledge, attitudes, and practices of nutrition and dietetics professionals regarding yogurt and its role in healthy and sustainable diets. Understanding these perspectives enables development of effective strategies to promote yogurt as part of a healthy diet. This research offers valuable insights into issues related to nutrition, health, and sustainability in today's society.

METHODS

Study Population

A descriptive, cross-sectional study using ad hoc self-administered online survey targeted professionals of the Academia Española de Nutrición y Dietética. Designed between June and July 2023, the survey was open from July to September, with data analyzed between October and November 2023. This study adhered to the STROBE-nut guidelines[8], and was registered on the Open Science Framework (OSF): https://osf.io/ef97b

Participants and sampling

The required sample size was estimated at 335 nutrition professionals (N: 1544; margin of error +/- 5%, 95% confidence interval). Eligible participants included all nutrition professionals from the Academia who agreed to active communication. Personalized invitations were sent to 1877 professionals. Participation was voluntary and required informed consent.

Data sources and study variables

Data collection employed a Knowledge, Attitudes, and Practices (KAP) survey recommended by the FAO[9]. The 31 closed-ended questions were distributed across three domains: knowledge (7 items), attitudes (14 items), and practices (10 items).

Knowledge questions: Multiple-choice questions assessed yogurt's nutritional value and role in health. Correct responses were assigned one point, generating a cumulative knowledge score ranging from 0 to 7.

Attitudes section: Explored perceptions about yogurt's role in health contexts and sustainable eating, use in lactose intolerance diets, and potential for disease prevention or treatment. Perceptions were assessed using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) or multiple-choice questions with closed-ended responses tailored to each item.

Practices questions: analysed professional recommendations on yogurt consumption, including types and situations where its use was discouraged.

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

Sociodemographic variables such as age, gender, region, profession, and education level were included.

Pilot Test

The survey was digitized using SurveyMonkey, piloted with 10 participants, and revised for clarity and feasibility. Minor adjustments improved question phrasing. The pilot data were excluded from final analysis. Estimated completion time was under 15 minutes.

Statistical analysis

Descriptive and inferential analyses were conducted. Categorical variables were reported as frequencies and percentages, while for continuous variables were analyzed using means and standard deviations. Associations between knowledge levels, attitudes, and practices were explored using Chi-square test for categorical variables and Pearson's correlation or non-parametric tests for continuous variables (normality was tested using the Kolmogorov-Smirnov). Statistical significance was set at $p < 0.05$.

Analyses were conducted using IBM SPSS Statistics version 20.

Ethical considerations

This study adheres to ethical principles guiding scientific research. Participants received informed consent detailing objectives, procedures, potential risks and benefits of participation. Confidentiality, anonymity, and voluntary participation were emphasized. Researchers certify scientific integrity, with no fabrication or manipulation, and disclosed conflicts of interest. Ethical recruitment encouraged informed participation.

RESULTS

Participants and sample characteristics

Of 644 professionals who consented, 355 completed the survey response rate: 74.1%), which is considered sufficient and representative. Most participants were women (85.9%) and dietitian-nutritionists (86.2%), with high educational levels: 52.1% held master's degrees and 12.1% held PhDs. The majority practiced in clinical nutrition (58.3%), while smaller proportions in teaching (17.7%) and research (16.9%). Omnivorous dietary patterns dominated (81.4%), with limited vegetarians (3.7%) and vegans (0.6%) representation. Sample characteristics are detailed in Table 1.

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

Table 1. Participant sample characteristics.

Characteristics	n (%)
Women	305 (85,9)
Men	50 (14,1)
Profession	
Dietitians-Nutritionists	306 (86,2)
Other healthcare professionals	27 (7,6)
Other professions	22 (6,2)
Highest level of education completed	
Bachelor's degree or equivalent	355 (100)
Master's degree	185 (52,1)
Phd	43 (12,1)
Main activity*	
Nutrition and Dietetics practicing	207 (58,3)
Teaching	63 (17,7)
Research	60 (16,9)
Clinical and Hospital Nutrition	56 (15,8)
Food services	41 (11,5)
Food Industry	28 (7,9)
Community Nutrition	19 (5,3)
Dietary pattern+	
Omnivorous	289 (81,4)
Flexitarian	51 (14,3)
Vegetarian	13 (3,7)
Vegan	2 (0,6)
Diet modification: Lactose exclusion	31 (8,7)

* Participants could select more than one option; percentages do not sum to 100%

Knowledge and general perceptions about yogurt

The average correct response rate was 62% (SD = 16%), with a mean score of 5,6 points, indicating a moderate level of understanding.

Regarding the importance of dairy for bone health, 62% of participants considered this aspect important or very important (37.2%; n=132 and 24.8%; n=88 respectively). Additionally, 11,8% (n=42) identified dairy as essential, 6,5% (n=23) as non-essential, and 16,9% (n=60) were neutral. Almost 62,8% of participants considered yogurt consumption as important it or very important (44,8%; n=159 and 18,0%; n=64 respectively), in a healthy diet. Professionals who excluded lactose tended to rate yogurt as less important (16,1% vs. 4,3%; p=0.006). The knowledge score was significantly associated with considering yogurt as important in a healthy diet (p=0.002).

Most participants identified its beneficial microorganisms/probiotics (91,0%; n=323), its role in improving of gut microbiota (79,4%; n=282), and its higher lactose digestibility (73,5%; n=261) as

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

main as nutritional characteristics of yogurt that distinguish it from other dairy products. The knowledge score was associated with the improvement of lactose digestibility (p<0,001), its probiotic effect (p=0,043), microbiota improvement (p=0,020), bowel movement improvement (p=0,007), and as a source of vitamin D (p=0,017), B vitamins (p=0,035), and proteins (p=0,026) (Figure 1.A). Regarding the most important factors for recommending yogurt consumption, the majority pointed to its nutritional value (96,1%; n=341) and its proven health benefits (70,1%; n=249) (Figure 1.B).

Knowledge and general perceptions about yogurt

The average correct response rate was 62% (SD = 16%), with a mean score of 5,6 points, indicating a moderate level of understanding.

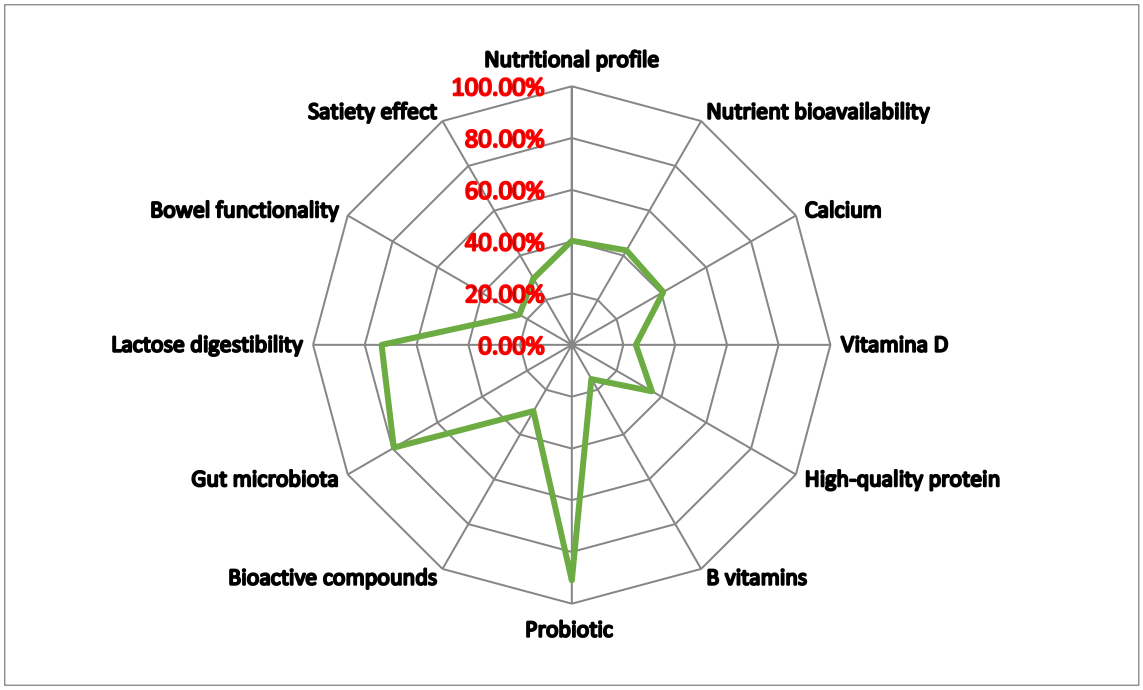
Regarding the importance of dairy for bone health, 62% of participants considered this aspect important or very important (37.2%; n=132 and 24.8%; n=88 respectively). Additionally, 11,8% (n=42) identified dairy as essential, 6,5% (n=23) as non-essential, and 16,9% (n=60) were neutral. Almost 62,8% of participants considered yogurt consumption as important it or very important (44,8%; n=159 and 18,0%; n=64 respectively), in a healthy diet. Professionals who excluded lactose tended to rate yogurt as less important (16,1% vs. 4,3%; p=0.006). The knowledge score was significantly associated with considering yogurt as important in a healthy diet (p=0.002).

Most participants identified its beneficial microorganisms/probiotics (91,0%; n=323), its role in improving of gut microbiota (79,4%; n=282), and its higher lactose digestibility (73,5%; n=261) as main as nutritional characteristics of yogurt that distinguish it from other dairy products. The knowledge score was associated with the improvement of lactose digestibility (p<0,001), its probiotic effect (p=0,043), microbiota improvement (p=0,020), bowel movement improvement (p=0,007), and as a source of vitamin D (p=0,017), B vitamins (p=0,035), and proteins (p=0,026) (Figure 1.A). Regarding the most important factors for recommending yogurt consumption, the majority pointed to its nutritional value (96,1%; n=341) and its proven health benefits (70,1%; n=249) (Figure 1.B).

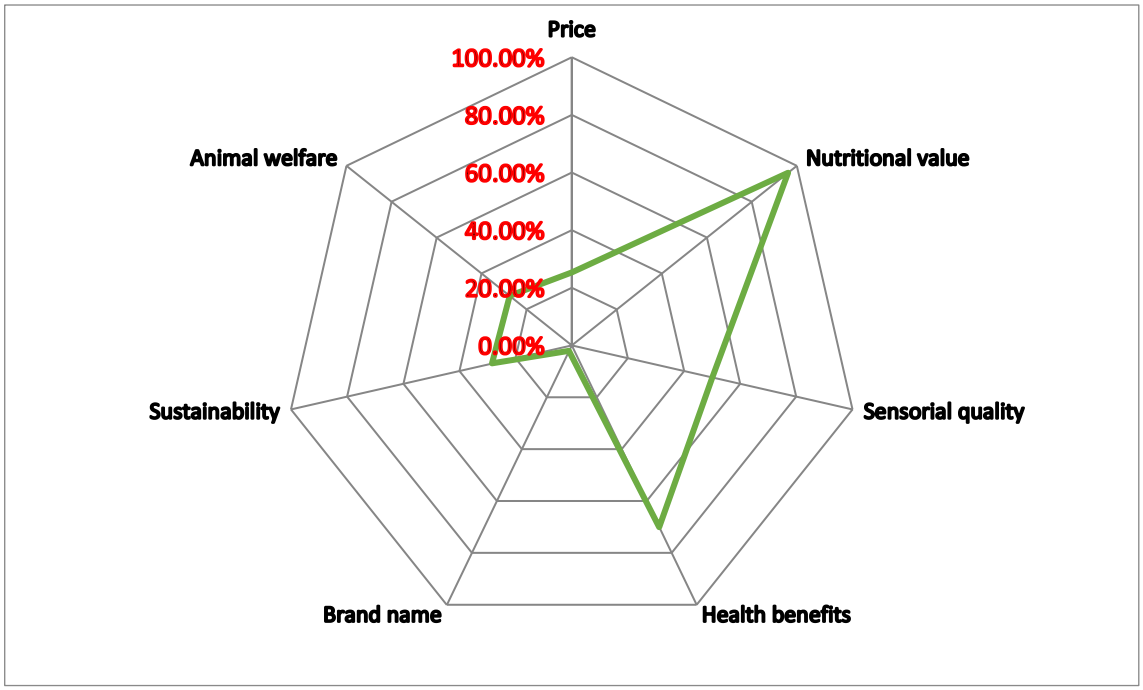
doi: 10.14306/renhyd.29.1.2332 [ahead of print]

Figure 1. A. Distribution of the sample based on the factors that differentiate yogurt from other dairy products. **B.** Factors for recommending yogurt

A



B

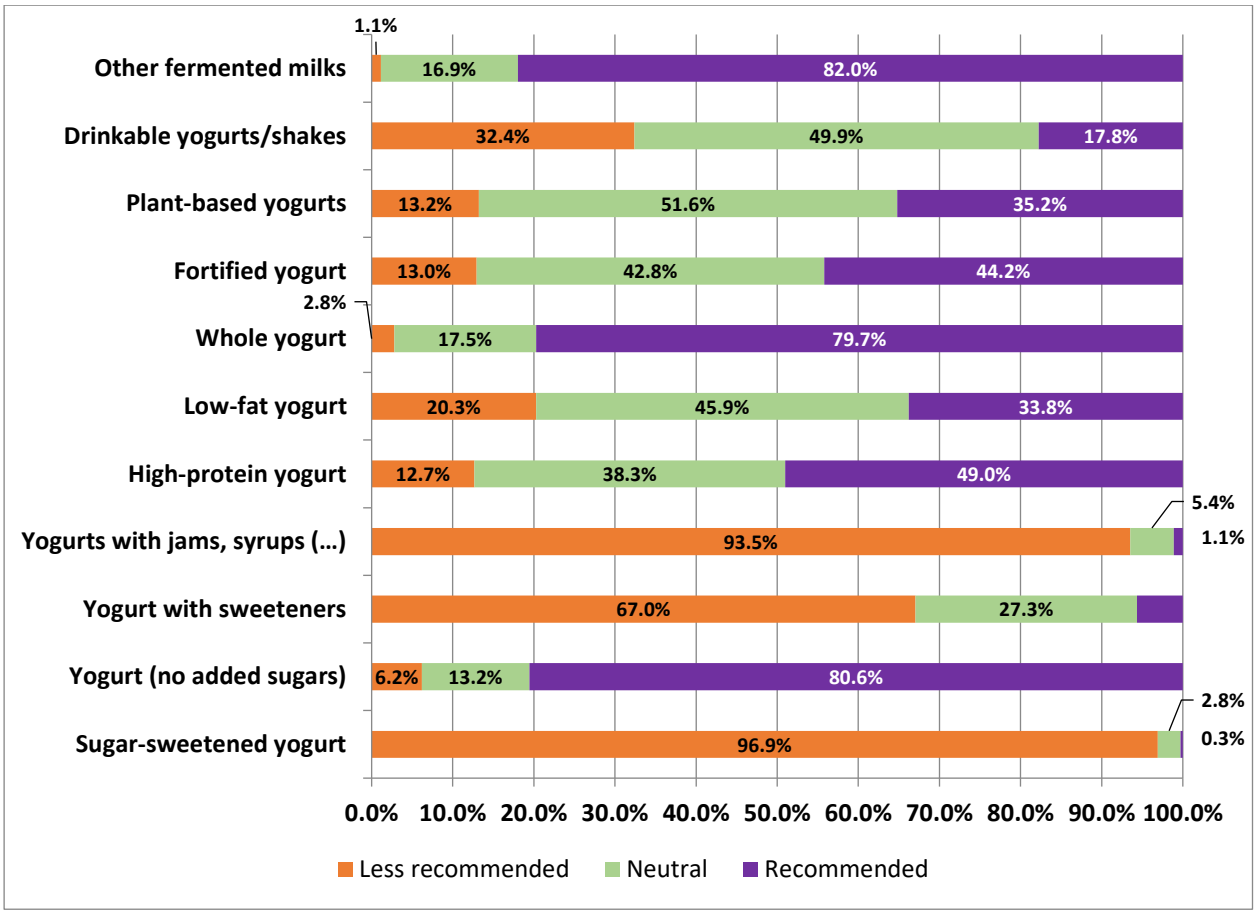


A large majority supported that the most recommended options are yogurt (80,6%; n=286) and other fermented milks (82,0%; n=291) without added sugars, while yogurts with added sugars,

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

jams, and sweeteners (non or low caloric) were the least recommended. Figure 2 details the preferences of nutrition professionals when recommending different types of yogurts. The knowledge score appeared to be associated with a greater willingness to recommend drinkable yogurts (p=0,001) and other fermented milks (p=0,015).

Figure 2. Nutrition professionals' preferences for recommending different types of yogurts.

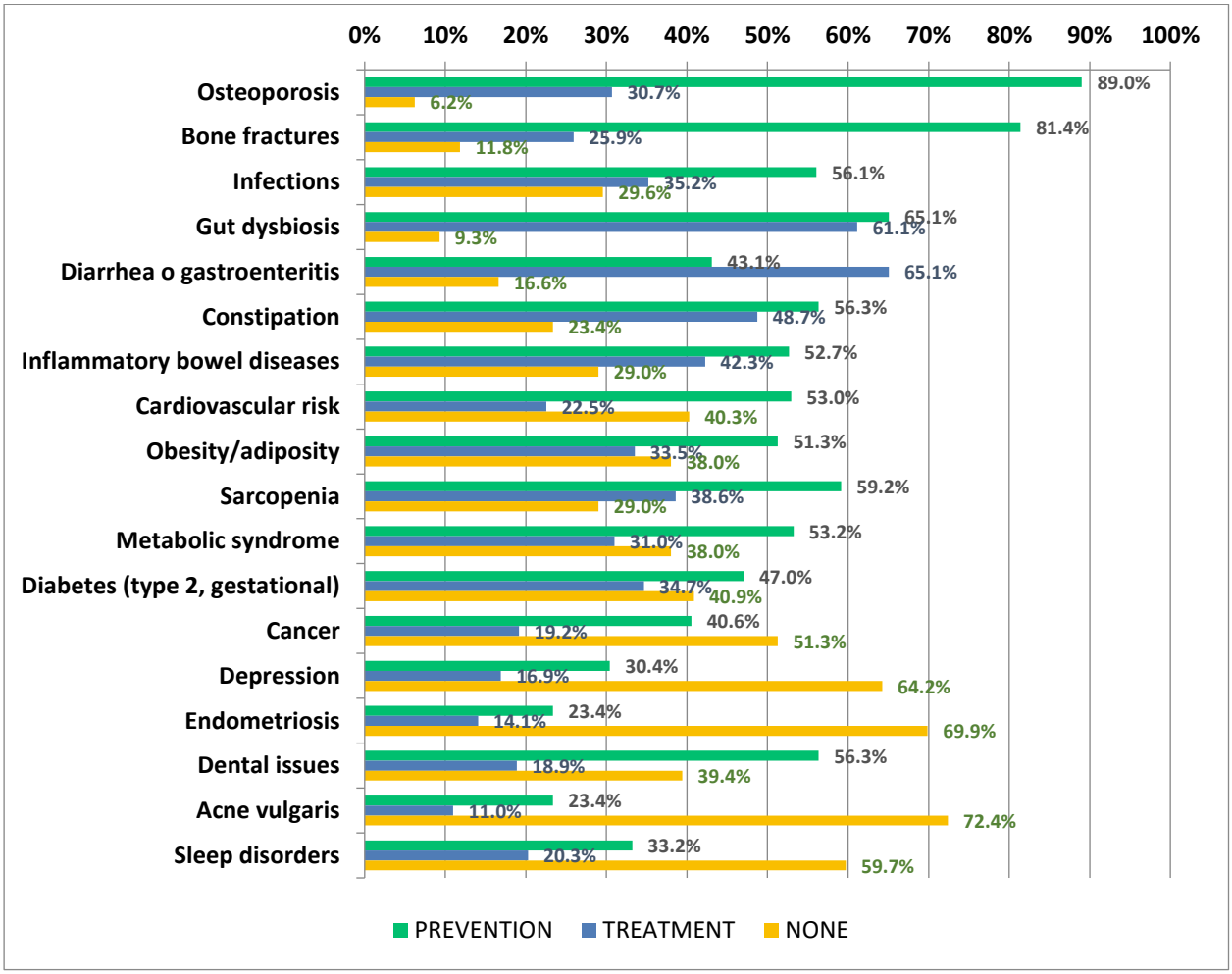


Perceptions on yogurt's role in disease prevention and treatment

Over 80% (n=316) of participants associated yogurt consumption with osteoporosis and bone fractures prevention. Between 60% and 65% linked it to benefits for the prevention of sarcopenia and in the management or treatment of diarrhoea and gut dysbiosis (Figure 3).

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

Figure 3. Distribution of nutrition professionals who perceive yogurt consumption as beneficial for the prevention or treatment of certain diseases



Dietitian-nutritionists tended to recommend yogurt more frequently for the prevention of dysbiosis (67,6% vs. 49,0%, p=0,011), sarcopenia (61,4% vs. 44,9%, p=0,029), and depression (32,4% vs. 18,4%, p=0,048). Higher education levels correlated with recognizing yogurt's role in disease prevention (p<0,02). In terms of treatment, there were no significant differences among professionals, educational level, or dietary patterns, including lactose exclusion. Knowledge score was associated with greater confidence in stating that yogurt consumption could play a preventive or therapeutic role in certain diseases. Between 60% and 73% indicated that yogurt consumption would not play a significant preventive or therapeutic role in various health conditions.

Preferences for probiotic sources to prevent or treat diseases included yogurt or other fermented milks (49,3%; n=175) and pharmaceutical probiotics/dietary supplements in powder or capsule form (12,7%; n=45). Another 33,8% (n=120) stated they were open to recommend either option.

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

Sustainability perceptions

Regarding the perception of yogurt and sustainability, 69,9% (n=248) considered yogurt a less sustainable source of protein compared to legumes, nuts, seeds, or cereals. Milk (71,3%, n=253) and cheese (69,3%, n=246) were widely perceived as equally sustainable sources of protein as yogurt, while opinions were divided in the case of eggs (47,9%, n=170). There was consensus among nutrition professionals that yogurt represents a more sustainable source of protein compared to meat (62,8%, n=223), with divided opinions regarding fish and seafood (44,8%, n=159).

Professional practices and recommendation

74,9% of respondents (n=266) consumed of whole-fat yogurt, 54,6% (n=194) sugar-free yogurt, 43,9% (n=156) other fermented milks, and 34,4% (n=122) high-protein yogurt. Only 2,8% reported not consuming any type of yogurt. A significant positive attitude towards yogurt correlated with higher consumption and recommendations (p=0,004).

Most professionals encouraged daily yogurt intake. For these professionals, yogurt consumption was slightly more important for their patients compared to other dairy products (63,1% vs. 50,1%, respectively). The ability of patients to choose the type of yogurt was considered important (36,6%) or very important (58,9%). A positive attitude towards yogurt among professionals was significantly associated with giving more importance to patients consuming yogurt (p<0,001) and being able to differentiate between yogurt types (p=0,015).

In total, 68,1% of professionals recommended daily yogurt consumption, with 44,2% suggesting one yogurt per day and 23,9% recommending more than one. Another 26,8% advised a weekly intake of 2 to 6 yogurts, while 5,1% did not recommend regular yogurt consumption. A positive attitude towards yogurt was also linked to recommending higher consumption frequencies (p<0,001). Regarding portion sizes, 50,1% believed the ideal portion size is 2 standard yogurts (240–250 g), while 47,6% suggested 1 standard yogurt (120–125 g).

In relation to the recommendation for dairy and yogurt alternatives, as well as for lactose intolerance, 78,0% (n=277) identified yogurt or other fermented milks as the main alternatives due to their probiotic effects. For alternative calcium sources , 83,4% (n=296) mentioned green leafy vegetables, seeds or nuts, while 60% also considered calcium and vitamin D enriched plant-based beverages or plant-based "yogurt".

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

In case of lactose intolerance, 88,2% (n=313) agreed on testing tolerance to yogurts and other fermented milks, and 70,1% (n=149) agreed or strongly agreed to consider tolerance to hard cheeses. A total of 74,9% (n=266) of participants showed little or no support for the systematic removal of all dairy products, and 59,7% (n=212) disagreed with directly recommending lactose-free yogurt. Professionals with a positive attitude towards yogurt considered the complete removal of dairy products (p=0,006) or recommending plant-based "yogurt" (p=0,014) as inappropriate. Instead, testing tolerance to yogurt (p=0,016) and lactose-free milk (p=0,032) were seen as suitable alternatives.

DISCUSSION

The study reflects the profile of Spanish nutrition professionals, with a majority being women and dietitians-nutritionists. High educational levels and omnivorous dietary patterns suggest the sample is well-suited to address complex issues in nutrition and is representative in its perceptions and practices toward dairy and yogurt.

Differences in attitudes towards yogurt were observed. Although widely recognized as part of a healthy diet, one-third of professionals adopted a neutral stance. Some studies have identified yogurt consumption as a marker of healthy eating patterns and lifestyles[10–12]. One in ten professionals' view dairy consumption as essential for bone health. However, although dairy plays a key role in ensuring adequate calcium intake in Spanish population, labelling it as 'essential' conflicts with evidence showing that plant-based diets, such as flexitarian, vegetarian, and vegan diets, can also support optimal bone health despite limiting dairy intake[13,14].

Professionals emphasize yogurt's probiotic effects and health benefits, aligning with studies linking dairy consumption to improved bone health and microbiota Sugar content in yogurt remains a concern[15]. Due to the population's importance placed on dairy consumption, choosing sugary dairy products could become a source of added sugars, especially for children[16]. Some studies report an intake of between 3,41 g[16,17] to 3,63 g of added sugars/day[18] from yogurt and other fermented milks. In any case, yogurts and fermented milks are not the main source of free sugars, although it would be desirable for dietary guidelines for the Spanish population to emphasize the recommendation to include dairy products without added sugars[30]. Studies clearly indicate that sugary soft drinks (which provide 25% of these sugars), consciously added sugar

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

(17,8%), pastries and cakes (15,2%), and chocolate (11,4%) are the primary contributors to excessive free sugar consumption in children[18].

The association between positive attitudes and higher yogurt consumption mirrors findings in other populations. A study conducted in the Australian population revealed that individuals who previously did not consume probiotics would be willing to do so if they were recommended by a healthcare professional[19].

There is unanimity in associating yogurt with osteoporosis prevention, microbiota improvement, and better lactose digestibility, aligning with previous studies[20,21]. Probiotic use, particularly yogurt, is widely recognized for benefits in treating conditions like diarrhoea. This practice is aligned with studies supporting the positive impact of probiotics in yogurt in managing acute diarrhoea and antibiotic-associated diarrhoea. Specifically, a 2019 study[22] found that 90,2% of surveyed professionals associated probiotic recommendations with antibiotic therapy, 83,5% with diarrhoea, and 63,3% as preventive treatment for travellers.

However, discrepancies exist between perceptions of nutrition professionals and other healthcare providers. While only 48,7% of nutrition professionals consider yogurt beneficial for constipation, previous studies reported 70,6%22. Regarding yogurt's benefits in managing inflammatory bowel diseases, only 42,3% recognised yogurt as beneficial, compared to 80,8% of British gastroenterologists[23]. Similarly, although evidence suggests that probiotic[24,25] and fermented dairy consumption[26,27] may be beneficial in preventing certain infectious diseases, only 56,1% of respondents in our study associated it with infection prevention.

Regarding lactose intolerance management, most respondents would explore tolerance to yogurt, other fermented milks, and hard cheeses as the preferred option for addressing this health issue, a practice supported by scientific studies[28,29].

Sustainability considerations influenced perceptions, with yogurt seen as more sustainable than meat and fish. As sustainability becomes central to dietary recommendations, reflecting trends in Nordic and Baltic dietary guidelines[30], national guidelines[31], and some research[32,33], professionals should integrate these considerations into practice.

Overall, the analysis shows a positive association between knowledge score and the perception of yogurt's impact on health. Likewise, confidence in nutritional counseling is positively related to the level of knowledge, highlighting the importance of continuous education. The low importance

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

assigned to brands in recommendations underscores a positive attitude and confidence in the intrinsic food identity of yogurt and fermented milks, regardless of the brand.

Strengths and limitations

This study addresses an important yet underexamined topic: the knowledge, attitudes, and practices (KAP) of nutrition professionals regarding yogurt's role in healthy and sustainable diets. By focusing on professionals who influence dietary choices, it provides valuable insights. A robust sample size (n=355) which includes a diverse range of professionals across Spain enhances internal validity. The use of a KAP questionnaire ensures data comparability, while rigorous statistical analyses identify significant associations between knowledge and professional practices. Additionally, the study underscores also the increasing importance of environmental sustainability in dietary recommendations.

However, the study has some limitations. Initially, participants were randomly selected from the database of the Academia Española de Nutrición y Dietética. Due to low response rate, alternative recruitment methods were used to achieve the required sample size, which may have introduced selection bias, limiting the representativeness of the final sample.

The ad hoc questionnaire, though aligned with the study's objectives and content-reviewed, has not undergone formal validation. This may affect the reliability and generalizability of the findings. Future research should prioritize the development and validation of standardized tools to ensure greater robustness and comparability.

The study's cross-sectional design captures perceptions at a single point in time, which may evolve. Longitudinal studies would allow for tracking changes over time and exploring causal relationships. Additionally, qualitative methods, such as interviews or focus groups, could provide deeper insights into barriers and facilitators of yogurt recommendation, shedding light on the factors shaping professional attitudes and practices.

Reliance on self-reported data introduces the potential for response bias. Incorporating objective measures, such as practice audits or direct observations, could offer a more comprehensive understanding of professional behaviors. Finally, cultural and systemic differences may limit the

generalizability of findings to other countries. Including nutrition professionals from diverse regions in future studies would improve external validity and provide a broader perspective.

To enhance future research, strategies such as offering incentives or simplifying survey participation can help improve response rates while preserving the integrity of random sampling.

CONCLUSIONS

Participants demonstrated positive attitudes and practices towards yogurt and dairy products, recognizing their importance in bone health, gut health and sustainable diets. Yogurt's probiotic benefits, nutritional value, and sustainability considerations influenced recommendations. The interconnection between knowledge, attitudes, and practices underscores the role of lifelong learning in shaping positive attitudes and professional practices. The study highlights the influential role of nutrition professionals in promoting yogurt consumption and shaping healthy eating habits.

Future research should explore broader populations and validate tools to ensure robust findings. Strengthening food literacy strategies and incorporating sustainability into dietary guidelines will further enhance yogurt's role in promoting health and well-being.

AUTHORS' CONTRIBUTIONS

The authorship contribution according to CRedit is distributed as follows: the conceptualization of the study was carried out by EB, MMñ, and MM; the methodological design was the responsibility of EB and MMñ; fieldwork involved EB, MMñ, MM, and GR; data analysis was conducted by EB and MMñ; the first draft of the manuscript was written by EB and MMñ. All authors participated in the review, editing, and improvement of the manuscript. Funding acquisition was led by MM, while the overall project management was the responsibility of EB.

FUNDING

This research was funded by DANONE. The funding entity, DANONE, played a relevant role in validating the objectives established by the authors for this research, as well as in reviewing the methodology used. Additionally, the funding entity actively participated in the review of the final manuscript, suggesting editorial improvements that did not alter the original message conceived by the authors.

CONFLICTS OF INTEREST

The authors declare no personal or academic conflicts of interest regarding the research, writing, and publication of this work. However, it is noted that DANONE provided funding to carry out this

doi: 10.14306/renhyd.29.1.2332 [ahead of print]

research through the Academia Española de Nutrición y Dietética, with which the authors are affiliated as employees. Although no direct payments or personal gifts were received, the financial contribution of DANONE to the execution of this study is acknowledged. Prior to conducting this research, a contract was established between the funding entity and the executing entity, obligating the publication of the study's results and conclusions, regardless of their relevance to the funding entity. While the funding entity was involved in various stages of the process, the independence and objectivity in the presentation of the research results are guaranteed.

DATA AVAILABILITY

In accordance with RENHYD's editorial policies, the data used in this study are available upon request to the corresponding author. Please contact MMñ at the email address provided for the corresponding author to request access to the data.

REFERENCES

(1) Silva P. Food and Nutrition Literacy: Exploring the Divide between Research and Practice. Foods. 2023;12(14):2751, doi: 10.3390/foods12142751.

(2) Capdevila F, Martí-Henneberg C, Closa R, Subías JE, Fernández-Ballart J. Yoghurt in the Spanish diet: nutritional implications and socio-cultural aspects of its consumption. Public Health Nutr. 2003;6(4):333-40, doi: 10.1079/PHN2002443.

(3) Heshmat R, Abdollahi Z, Ghotbabadi FS, Rostami M, Shafiee G, Qorbani M, et al. Nutritional knowledge, attitude and practice toward micronutrients among Iranian households: the NUTRI-KAP survey. J Diabetes Metab Disord. 2015;15:42, doi: 10.1186/s40200-016-0260-8.

(4) Huang F, Wang H, Wang Z, Zhang J, Su C, Du W, et al. [Knowledge, behavior and consumption types of milk and dairy products among the Chinese aged 60 and above in 15 provinces (autonomous regions and municipalities) in 2015]. Wei Sheng Yan Jiu. 2019;48(1):9-15.

(5) Wei J, Wang J. Chinese residents' knowledge about and behavior towards dairy products: a cross-sectional study. BMC Public Health. 2023;23(1):374, doi: 10.1186/s12889-023-15254-1.

(6) Ares G, Giménez A, Gámbaro A. Influence of nutritional knowledge on perceived healthiness and willingness to try functional foods. Appetite. 2008;51(3):663-8, doi: 10.1016/j.appet.2008.05.061.

(7) Bimbo F, Bonanno A, Nocella G, Viscecchia R, Nardone G, De Devitiis B, et al. Consumers' acceptance and preferences for nutrition-modified and functional dairy products: A systematic review. Appetite. 2017;113:141-54, doi: 10.1016/j.appet.2017.02.031.

(8) Lachat C, Hawwash D, Ocké MC, Berg C, Forsum E, Hörnell A, et al. Strengthening the Reporting of Observational Studies in Epidemiology - nutritional epidemiology (STROBE-nut): An extension of the STROBE statement. Nutr Bull. 2016;41(3):240-51, doi: 10.1111/nbu.12217.

(9) Fautsch Y, Glasauer P. Guidelines for assessing nutrition-related Knowledge, Attitudes and Practices. Rome: Food and Agriculture Organization of the United Nations; 2014. Disponible en: http://www.fao.org/3/a-i3545e.pdf. s. f.

(10) Mena-Sánchez G, Babio N, Martínez-González MÁ, Corella D, Schröder H, Vioque J, et al. Fermented dairy products, diet quality, and cardio-metabolic profile of a Mediterranean cohort at high cardiovascular risk. Nutr Metab Cardiovasc Dis. 2018;28(10):1002-11, doi: 10.1016/j.numecd.2018.05.006.

(11) Cormier H, Thifault É, Garneau V, Tremblay A, Drapeau V, Pérusse L, et al. Association between yogurt consumption, dietary patterns, and cardio-metabolic risk factors. Eur J Nutr. 2016;55(2):577-87, doi: 10.1007/s00394-015-0878-1.

(12) Tremblay A, Panahi S. Yogurt Consumption as a Signature of a Healthy Diet and Lifestyle. The Journal of Nutrition. 2017;147(7):1476S-1480S, doi: 10.3945/jn/116.245522.

(13) Melina V, Craig W, Levin S. Position of the Academy of Nutrition and Dietetics: Vegetarian Diets. J Acad Nutr Diet. 2016;116(12):1970-80, doi: 10.1016/j.jand.2016.09.025.

(14) Craig WJ, Mangels AR, Fresán U, Marsh K, Miles FL, Saunders AV, et al. The Safe and Effective Use of Plant-Based Diets with Guidelines for Health Professionals. Nutrients. 2021;13(11):4144, doi: 10.3390/nu13114144.

(15) Guideline: Sugars intake for adults and children. Geneva: World Health Organization; 2015. Disponible en: https://www.who.int/publications/i/item/9789241549028/

(16) Rodríguez-Artalejo F, García EL, Gorgojo L, Garcés C, Royo MA, Martín Moreno JM, et al. Consumption of bakery products, sweetened soft drinks and yogurt among children aged 6-7 years: association with nutrient intake and overall diet quality. Br J Nutr. 2003;89(3):419-29, doi: 10.1079/BJN2002787.

(17) Redruello-Requejo M, Samaniego-Vaesken M de L, Partearroyo T, Rodríguez-Alonso P, Soto-Méndez MJ, Hernández-Ruiz Á, et al. Dietary Intake of Individual (Intrinsic and Added) Sugars and Food Sources from Spanish Children Aged One to <10 Years—Results from the EsNuPI Study. Nutrients. 2022;14(8):1667, doi: 10.3390/nu14081667.

(18) Ruiz E, Rodriguez P, Valero T, Ávila JM, Aranceta-Bartrina J, Gil Á, et al. Dietary Intake of Individual (Free and Intrinsic) Sugars and Food Sources in the Spanish Population: Findings from the ANIBES Study. Nutrients. 2017;9(3):275, doi: 10.3390/nu9030275.

(19) Khalesi S, Vandelanotte C, Thwaite T, Russell AMT, Dawson D, Williams SL. Awareness and Attitudes of Gut Health, Probiotics and Prebiotics in Australian Adults. J Diet Suppl. 2021;18(4):418-32, doi: 10.1080/19390211.2020.1783420.

(20) Ong AM, Kang K, Weiler HA, Morin SN. Fermented Milk Products and Bone Health in Postmenopausal Women: A Systematic Review of Randomized Controlled Trials, Prospective Cohorts, and Case-Control Studies. Adv Nutr. 2020;11(2):251-65, doi: 10.1093/advances/nmz108.

(21) Wilson Z, Whitehead K. A cross sectional survey to assess healthcare professionals' attitudes to and understanding of probiotics. Clin Nutr ESPEN. 2019;34:104-9, doi: 10.1016/j.clnesp.2019.08.004.

(22) Fijan S, Frauwallner A, Varga L, Langerholc T, Rogelj I, Lorber M, et al. Health Professionals' Knowledge of Probiotics: An International Survey. Int J Environ Res Public Health. 2019;16(17):3128, doi: 10.3390/ijerph16173128.

(23) Cordina C, Shaikh I, Shrestha S, Camilleri-Brennan J. Probiotics in the management of gastrointestinal disease: analysis of the attitudes and prescribing practices of gastroenterologists and surgeons. J Dig Dis. 2011;12(6):489-96, doi: 10.1111/j.1751-2980.2011.00534.x.

(24) Bo L, Li J, Tao T, Bai Y, Ye X, Hotchkiss RS, et al. Probiotics for preventing ventilator-associated pneumonia. Cochrane Database Syst Rev. 2014;2014(10):CD009066, doi: 10.1002/14651858.CD009066.pub2.

(25) Zhao Y, Dong BR, Hao Q. Probiotics for preventing acute upper respiratory tract infections. Cochrane Database Syst Rev. 2022;8(8):CD006895, doi: 10.1002/14651858.CD006895.pub4.

(26) Rashidi K, Razi B, Darand M, Dehghani A, Janmohammadi P, Alizadeh S. Effect of probiotic fermented dairy products on incidence of respiratory tract infections: a systematic review and meta-analysis of randomized clinical trials. Nutr J. 2021;20(1):61, doi: 10.1186/s12937-021-00718-0.

(27) Poon T, Juana J, Noori D, Jeansen S, Pierucci-Lagha A, Musa-Veloso K. Effects of a Fermented Dairy Drink Containing Lacticaseibacillus paracasei subsp. paracasei CNCM I-1518 (Lactobacillus casei CNCM I-1518) and the Standard Yogurt Cultures on the Incidence, Duration, and Severity of Common Infectious Diseases: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Nutrients. 2020;12(11):3443, doi: 10.3390/nu12113443.

(28) Facioni MS, Raspini B, Pivari F, Dogliotti E, Cena H. Nutritional management of lactose intolerance: the importance of diet and food labelling. J Transl Med. 2020;18(1):260, doi: 10.1186/s12967-020-02429-2.

(29) Szilagyi A, Ishayek N. Lactose Intolerance, Dairy Avoidance, and Treatment Options. Nutrients. 2018;10(12):1994, doi: 10.3390/nu10121994.

(30) Blomhoff R, Andersen R, Arnesen E, Christensen J, Eneroth H, Erkkola M, et al. Nordic Nutrition Recommendations 2023. 2023.

(31) Agencia Española de Seguridad Alimentaria y Nutrición. Recomendaciones dietéticas saludables y sostenibles complementadas con recomendaciones de actividad física para la población española. AESAN, 2022: Disponible en: https://www.aesan.gob.es/AECOSAN/web/nutricion/subseccion/recomendaciones_dieteticas.htm. s. f.

(32) Ly LH, Ryan EB, Weary DM. Public attitudes toward dairy farm practices and technology related to milk production. PLoS One. 2021;16(4):e0250850, doi: 10.1371/journal.pone.0250850.

(33) Katz-Rosene R, Ortenzi F, McAuliffe GA, Beal T. Levelling foods for priority micronutrient value can provide more meaningful environmental footprint comparisons. Commun Earth Environ. 2023;4(1):1-9, doi: 10.1038/s43247-023-00945-9.