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Perceptions and attitudes of consumers and non-consumers towards goat milk and its derived products in northern Benin

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Goat milk production is increasingly promoted in West Africa as a strategy to improve nutrition, diversify livestock production systems, and create income opportunities for smallholder farmers; however, consumer acceptance remains a major constraint to the development of the goat dairy sector. This study aimed to analyze perceptions, acceptability, and factors influencing the consumption of goat milk and its derived products (GMDPs) in northern Benin. A survey was conducted among 236 individuals in the cities of Parakou and Ndali. Respondents were categorized into three groups: consumers of goat milk and derived products ($n = 81$), knowledgeable non-consumers ($n = 77$), and non-knowledgeable individuals ($n = 78$). Data were collected through structured questionnaires and analyzed using descriptive statistics, Chi-square tests, and analysis of variance to identify socio-demographic differences and determinants of consumption behavior. The results showed that consumers were significantly younger (30.04 ± 5.14 years) than knowledgeable non-consumers (36.09 ± 10.31 years) and non-knowledgeable individuals (39.28 ± 11.27 years) ($p < 0.001$). Gender and education level did not significantly influence consumption ($p > 0.05$), whereas religion and profession showed highly significant differences between groups ($p < 0.001$). The main motivations for consumption were curiosity (25.9%), social recommendation (24.7%), and perceived health benefits (24.7%). Among knowledgeable non-consumers, the main constraints were product unavailability, high price, lack of information, and uncertainty about product quality rather than negative perceptions of goat milk itself. Among non-knowledgeable individuals, many expressed willingness to try goat milk under certain conditions, including improved availability, lower prices, recommendations from relatives, and information on nutritional benefits. Approximately 66.67% indicated they would consume goat milk if locally produced. Among non-knowledgeable individuals, goat milk was the product most frequently selected for future trial (46.15%), ahead of cheese (28.21%) and yogurt (25.64%). Overall, the study indicates that the main barriers to goat milk consumption are related to market access, product availability, and information rather than sensory rejection. Improving awareness, processing, marketing

strategies, and distribution networks could significantly enhance the adoption of goat milk and its derived products in northern Benin and support the development of the goat dairy value chain.

KEYWORDS

goat milk, dairy products, perceptions, behavior, consumers, non-consumers, Benin

Introduction

In Sub-Saharan Africa, small ruminant production plays a crucial role in rural livelihoods, food security, and poverty alleviation. Among small ruminants, goats are particularly valued for their adaptability to diverse agroecological conditions, low production costs, and capacity to provide income and animal-source foods to resource-constrained households. In Benin, goats constitute one of the most widespread livestock species and contribute significantly to household resilience and livelihood diversification. However, despite a relatively large goat population, their contribution to national milk production remains limited, as production systems are still predominantly oriented toward meat production (Offoumon et al., 2023; Kouato et al., 2021; Challaton et al., 2022). This structural underutilization of goat milk production capacity contrasts sharply with the considerable nutritional and economic potential that this product represents, particularly in a context of persistent food insecurity and micronutrient deficiencies.

Goat milk is increasingly recognized as a valuable food resource due to its nutritional and functional properties. Compared with milk from other livestock species, it is characterized by high digestibility, a favorable fatty acid profile rich in short- and medium-chain fatty acids, and substantial concentrations of essential proteins and minerals such as calcium and phosphorus (Park et al., 2007). These biochemical properties confer on goat milk a particular relevance for vulnerable population groups, including young children, the elderly, and individuals with cow milk intolerance, for whom alternative dairy sources can meaningfully improve dietary quality. Beyond its nutritional value, goat milk can contribute to livelihood diversification and create new income opportunities for livestock producers through the development of local dairy value chains.

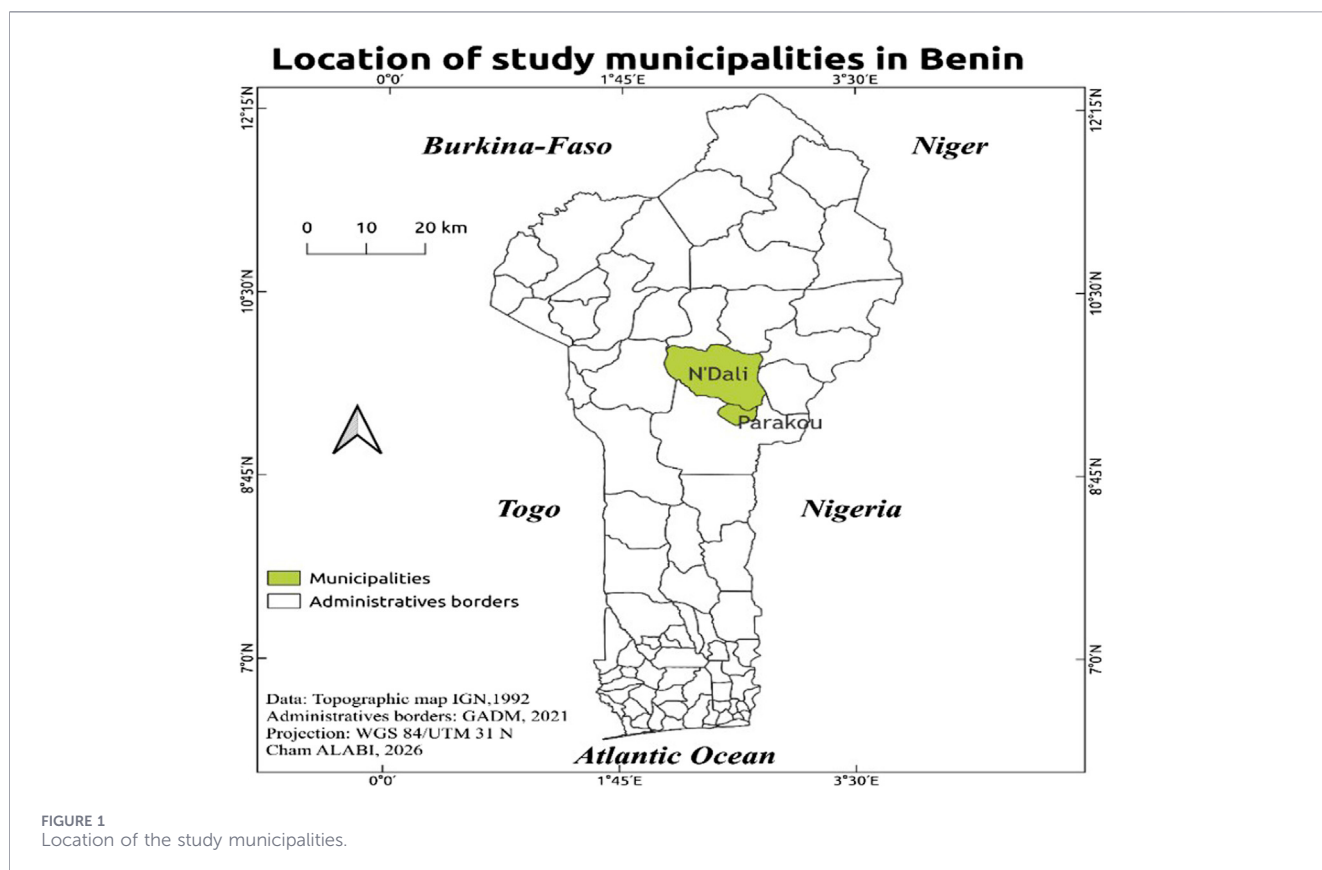
Recognizing this potential, several initiatives have been undertaken in Benin to promote dairy goat production. These efforts include the introduction of high-yielding dairy breeds such as the Saanen goat and their crossbreeding with locally adapted breeds, notably the Red Maradi goat. Such breeding programs aim to combine improved milk production with adaptation to local environmental conditions. Previous studies have demonstrated that these crossbred animals exhibit enhanced productive performance while maintaining satisfactory resilience under local production systems (Offoumon et al., 2019; 2023). In parallel, milk from these animals has been processed and commercialized through different channels in the form of fresh milk, yogurt, and cheese for more than a decade, reflecting the gradual emergence of a dairy goat sector in northern Benin. Yet despite these technical and organizational advances, the sector remains constrained by limited consumer uptake, and the factors underlying this gap between supply development and demand generation have received little systematic attention.

Consumer acceptance is widely recognized as one of the key determinants of the success of emerging livestock-derived food

products. Food choices are influenced not only by nutritional and economic considerations but also by sensory perceptions, cultural beliefs, social norms, and individual experiences. Previous studies have reported that goat milk may be perceived positively because of its nutritional benefits or negatively because of its characteristic flavor and odor, which can influence consumer acceptance and purchasing behavior (Idamokoro et al., 2019; Jerop et al., 2014; Divarathne et al., 2025). However, the relative weight of sensory versus structural factors in shaping non-consumption has rarely been disentangled empirically, particularly in West African contexts where goat milk occupies a marginal position in established dietary habits. In many developing countries, these perceptions are further shaped by limited awareness of the nutritional advantages of goat milk and the predominance of cow milk in established dietary habits. In addition, structural constraints such as limited product availability, weak processing and marketing systems, and difficulties associated with milk preservation may reduce consumer exposure to goat milk products and consequently limit their adoption (Niang et al., 2023).

Another factor that may influence consumer attitudes toward dairy products is food safety. Concerns regarding the hygienic quality of milk and dairy products can significantly affect purchasing decisions and consumption behaviors. Recent studies have highlighted that perceptions related to microbial contamination and sanitary risks may influence consumer trust and acceptance of raw milk and dairy products derived from goats, cattle, camels, and other livestock species (Collins and Lalor, 2024; Mamane et al., 2016; Zakou et al., 2025). In emerging dairy markets such as northern Benin, where formal quality certification systems are largely absent, sanitary perceptions may therefore constitute an additional layer of uncertainty that compounds the informational and structural barriers already faced by potential consumers.

Despite a growing body of research on consumer perceptions of goat milk in Africa and beyond, the existing literature presents several important gaps that this study addresses. Although several studies have documented the nutritional qualities of goat milk and the productive performance of dairy goat breeds in Benin, little attention has been paid to consumer perceptions and market acceptance of goat milk and its derived products. Existing research in the country has mainly focused on animal production, breeding strategies, and dairy performance (Offoumon, 2020; Offoumon et al., 2023), while empirical evidence on consumer behavior remains scarce. Studies conducted in neighboring or comparable contexts — such as Senegal (Niang et al., 2023), Morocco (Zine-eddine et al., 2021), and Algeria (Bouzourene et al., 2026) have begun to document the barriers to goat milk adoption, but their findings cannot be directly transposed to the Beninese context given differences in dietary culture, market structure, and product availability. Furthermore, no study has simultaneously explored the perceptions of consumers, knowledgeable non-consumers, and individuals with no prior knowledge of goat milk products. This tripartite segmentation appears analytically important: barriers to



adoption are unlikely to be uniform across these groups, and a single promotional strategy is therefore unlikely to be equally effective for all. Identifying group-specific constraints and opportunities is a prerequisite for designing targeted interventions capable of stimulating demand across the full spectrum of potential consumers.

Such information is essential for identifying the specific barriers and opportunities associated with the development of the dairy goat sector in a context where cow milk and its derived products remain dominant (Offoumon, 2020; Offoumon et al., 2023).

Therefore, this study aimed to assess and compare the perceptions, attitudes, and consumption intentions of consumers, knowledgeable non-consumers, and non-knowledgeable individuals regarding goat milk and its derived products in northern Benin. Specifically, it seeks to (i) characterize the sociodemographic profiles associated with each consumer group, (ii) identify the motivations and barriers specific to each group, and (iii) derive group-specific strategic recommendations for the promotion and development of the dairy goat value chain. By identifying the factors that encourage or hinder the consumption of these products, this study provides evidence that can support the design of targeted promotion strategies and contribute to the sustainable development of the emerging dairy goat value chain in Benin.

Materials and methods

Data collection

A total of 236 respondents were involved in this study to assess their perceptions of goat milk and its derived products (GMDPs).

Surveys were conducted between July and November 2025 in two localities in the Borgou department (Parakou and Ndali) in northern Benin (Figure 1). The choice of these localities is justified by their central role in the production and marketing of goat milk and its derived products in the region. Indeed, the municipality of Ndali hosts the two main goat milk production farms and processing facilities, including the Fermiers Sans Frontières farm and the Sokounon Livestock Farm. Additionally, the cities of Parakou and Ndali are the main centers for the commercialization and distribution of these products, making them relevant zones for studying consumer and non-consumer perceptions.

The respondents were divided into three groups based on their level of knowledge and consumption of goat milk and its derived products. Group A included individuals who knew and had previously consumed goat milk and/or its derived products ($n = 81$); Group B included individuals who knew goat milk but had never consumed it ($n = 77$); and Group C comprised individuals with no prior knowledge of goat milk and its derived products ($n = 78$). Data collection was carried out using a structured questionnaire administered face-to-face. Face-to-face interviews were selected to ensure a clear understanding of the questions by all respondents, regardless of their educational background and familiarity with survey-based research. This approach was adopted to reduce the risk of missing or incomplete responses, allowed immediate clarification of any ambiguities, and improved the reliability and completeness of the information collected.

Individuals from groups A and B were identified at production farms and sales points, mainly consisting of customers, visitors, or people who had already been in contact with the products. In

contrast, individuals in group C were randomly selected in urban centers of Parakou and Ndali. They were included in the study only after confirming that they had no knowledge of the production, marketing, or consumption of goat milk and its derived products in their area. All surveys were conducted anonymously, and participants provided informed consent, following the ethical principles for research involving human subjects. Prior to the main survey, the questionnaire was pre-tested on 30 individuals, including 10 respondents from each of the three study groups. The pre-test aimed to evaluate the clarity, relevance, consistency, and comprehensibility of the questions. Based on participants' feedback, adjustments were made to improve question wording, ordering, and overall questionnaire structure. The final version was subsequently reviewed and validated by the research team before field administration. Furthermore in this study, perceptions were defined as respondents' beliefs, opinions, and evaluations regarding goat milk and its derived products, including perceived benefits, product quality, accessibility, price, and promotion. Attitudes were defined as respondents' behavioral predispositions and intentions toward goat milk consumption, including willingness to try the products, conditions for consumption, product preferences, and potential adoption. The questionnaire was designed to capture both dimensions in order to better understand the factors influencing the acceptance and consumption of goat milk and its derived products.

The survey instrument comprised 31 substantive items distributed across four modules, in addition to screening questions used to classify respondents into the appropriate study group. The first module, common to all respondents, included five sociodemographic questions (age, gender, education level, religion, and profession). Based on responses to screening questions assessing prior knowledge and consumption experience of goat milk and its derived products, respondents were directed to one of three group-specific modules. The module administered to Group A (consumers) consisted of nine questions, of which four addressed consumption behavior (duration, motivation for first consumption, discovery channel, and frequency) and five assessed perceptions (perceived benefits, attractive aspects, price, accessibility, and promotion). The module for Group B (knowledgeable non-consumers) also comprised nine questions, of which five assessed attitudes toward potential adoption (reasons for non-consumption, hindering factors, conditions for consumption, product preferences, and tendency to try) and four assessed perceptions (perceived benefits, information needs, perceived need for promotion, and influence of external opinions). The module for Group C (non-knowledgeable individuals) consisted of eight questions, of which five assessed attitudes (reasons for not trying, persuasion factors, willingness to consume local production, product preferences, and interest in trying) and three assessed perceptions (sensitivity to benefits, perception of goat milk as an alternative to cow milk, and information needed before trying). Overall, the questionnaire included 12 questions assessing perceptions and 14 questions assessing attitudes, as defined above. Closed-ended multiple-choice questions were preferred because they facilitated respondent understanding, reduced interview duration, and enabled straightforward quantitative comparisons among respondent groups. Dichotomous questions were used for variables requiring binary responses, such as willingness to

consume, receptiveness to product benefits, perception of product promotion, and the potential substitution of goat milk for cow milk. The questionnaire was developed specifically for this study, drawing on themes and constructs identified in the literature on consumer perceptions of goat milk and alternative dairy products (Idamokoro et al., 2019; Jerop et al., 2014; Zulkifli et al., 2023; Mandolesi et al., 2024), and was reviewed and refined following a pre-test procedure as described above.

Statistical analysis

The collected data were entered into Microsoft Excel and subsequently imported into R software (R Core Team, 2023) for statistical analysis. Qualitative variables were summarized using absolute (n) and relative (%) frequencies. Differences in the distribution of qualitative variables across the three groups were assessed using the Chi-square test of independence. For the quantitative variable (age), the assumption of approximate normality was considered acceptable based on the Central Limit Theorem, as each group contained more than 30 observations. Prior to group comparisons, Levene's test was used to assess homogeneity of variances and indicated a violation of this assumption ($W = 17.48$, $p < 0.001$). Consequently, age differences among groups were evaluated using Welch's one-way ANOVA, which is robust to unequal variances, followed by Games-Howell post-hoc tests for pairwise comparisons. A significance threshold of $p < 0.05$ was applied for all statistical tests.

Results

Sociodemographic traits of respondents

The sociodemographic characteristics of the respondents are presented in Table 1. The results showed that respondents in Group A (consumers of GMDPs) were younger (30.04 ± 5.14 years) compared to those in Groups B (36.09 ± 10.31 years) and C (39.28 ± 11.27 years) ($p < 0.001$). Group A consumers were significantly younger than both Group B ($p < 0.001$) and Group C ($p < 0.001$), while no significant age difference was observed between Groups B and C ($p > 0.05$). The gender distribution was homogeneous across the three groups, with a balanced proportion of men and women ($p > 0.05$). This indicates that gender does not significantly influence the knowledge or consumption of goat milk in the study area. Similarly, the level of education showed no significant differences between the groups ($p > 0.05$), with a relatively balanced distribution among the levels of "none," "primary," "secondary," and "higher." This suggests that education level is not a determining factor in the perception or adoption of GMDPs. However, highly significant differences were observed for religion and profession ($p < 0.001$). Group A was predominantly composed of Christians (77.8%), while Group C was mostly Muslim (80.8%), and Group B had a large proportion of animists and atheists. These results indicate that religious affiliation could influence attitudes toward GMDPs. Professionally, merchants were highly represented in Group A (92.6%), while students dominated in Group B (93.5%) and civil servants in Group C (97.4%). This structuring suggests that professional activity,

TABLE 1 Sociodemographic profiles of respondents.

Variable	Modalities	Group A	Group B	Group C	χ^2	p-value	Sig
Age (years)	Mean $\pm$ SD	30.04 $\pm$ 5.14a	36.09 $\pm$ 10.31b	39.28 $\pm$ 11.27b	-	p < 0.001	***
Gender	Female (n = 116)	50.6	48.1	48.7	0.11	p > 0.05	NS
	Male (n = 120)	49.4	51.9	51.3			
EducLevel	None (n = 57)	23.5	24.7	24.4	0.43	p > 0.05	NS
	Primary (n = 60)	24.7	27.3	24.4			
	Secondary (n = 60)	25.9	23.4	26.9			
	Higher (n = 59)	25.9	24.7	24.4			
Religion	Christian (n = 77)	77.8	7.8	10.3	241.21	<0.001	***
	Muslim (n = 78)	11.1	7.8	80.8			
	Animist (n = 41)	6.2	42.9	3.8			
	Atheist (n = 40)	4.9	41.6	5.1			
Profession	Merchant (n = 80)	92.6	6.5	0.0	398.21	<0.001	***
	Civil servant (n = 79)	3.7	0.0	97.4			
	Student (n = 77)	3.7	93.5	2.6			

Within the age row, means followed by different superscript letters differ significantly (Games-Howell post-hoc test, $p < 0.05$). Groups sharing the same letter are not significantly different from each other. EducLevel: Education level; NS: non significant; *: $p < 0.05$; ***: $p < 0.001$.

especially contact with commercial circuits, plays a key role in access to and consumption of goat milk.

Perceptions and attitudes of consumers of GMDPs (group A)

The analysis of attitudes towards goat milk and its derived products reveals a relatively homogeneous structuring of responses, reflecting a diversity of profiles and experiences within the group (Table 2). Indeed, the duration of consumption was almost equally distributed ($p > 0.05$) across the four categories studied (less than 6 months, between 6 months and 1 year, between 1 and 3 years, and over 3 years), with approximately 25% in each category. This balanced distribution suggests that the product attracts both new and long-term consumers, characteristic of the progressive consumption dynamics of GMDPs.

The motivations for first-time consumption were also diverse and evenly distributed ($p > 0.05$) among the motives of “curiosity,” “recommendation from a close person,” “health reasons,” and “availability of GMDPs in the market.” Similarly, the discovery channels for the product were distributed in proportions with no significant difference ($p > 0.05$): 25.9% by word of mouth, 24.7% through advertising, 24.7% via markets, and 24.7% through social media. These results indicate a variety of exposure channels, with no single channel clearly dominating. The frequency of consumption also showed no marked trend, with 21.0% of individuals consuming it daily, 19.8% two to three times a week, 19.8% once a week, 19.8% less than once a week, and 19.8% at most once a month ($p > 0.05$). This distribution reflects a still heterogeneous integration of the product into eating habits, ranging from regular to occasional consumption.

Regarding perceptions, the advantages attributed to GMDPs were varied but relatively balanced: 21.0% of respondents cited superior nutritional intake from GMDPs, 21.0% noted improved digestion from consuming GMDPs, 19.8% perceived improvements in skin condition, 19.8% noticed a reduction in allergies, while 18.5% reported no specific advantages from consuming GMDPs ($p > 0.05$). Additionally, the aspects considered attractive about the product included taste (25.9%), health benefits (25.9%), price (24.7%), and accessibility (23.5%), confirming a general appreciation but without specialized focus.

However, significant differences appear for certain economic and structural variables. The price is considered acceptable by 54.3% of consumers, while 25.9% considered it too high and 19.8% thought that GMDPs were cheaper ($p < 0.05$). The accessibility of GMDPs is perceived as very good by 40.7% of respondents, but 39.5% find it sometimes difficult, while 19.8% find it difficult ($p < 0.05$), highlighting supply constraints. Finally, the promotion of GMDPs was largely perceived as insufficient by the majority of consumers (82.7%), compared to only 17.3% who considered it satisfactory ($p < 0.001$), revealing a major communication gap. Overall, these results indicate a consumption that is still in the process of structuring, characterized by a diversity of profiles, recognition of the benefits of GMDPs, but also by constraints related to accessibility and promotion.

Perceptions and attitudes of knowledgeable non-consumers of goat milk and its derived products (group B)

The analysis of attitudes towards goat milk among individuals who are familiar with the product but do not consume it shows a

TABLE 2 Consumption profile and perceptions of goat milk and derived products among consumers (Group A) (n = 81).

Variable/Modality	n (%)	Variable/Modality	n (%)	Variable/Modality	n (%)	Variable/Modality	n (%)
Consumption profile of GMDP consumers							
Consumption duration		Reason for first consumption		Discovery channel		Consumption frequency	
Less than 6 months	20 (24.7)	Curiosity	21 (25.9)	Word of mouth	21 (25.9)	Daily	17 (21.0)
6 months - 1 year	20 (24.7)	RecomClosePeople	20 (24.7)	Advertising	20 (24.7)	2–3 times per week	16 (19.8)
1–3 years	21 (25.9)	Health reasons	20 (24.7)	Markets	20 (24.7)	Once a week	16 (19.8)
>3 years	20 (24.7)	AvailGMDP	20 (24.7)	Social media	20 (24.7)	Less than once a week	16 (19.8)
$\chi^2 = 0.00$; $p > 0.05$		$\chi^2 = 0.037$; $p > 0.05$		$\chi^2 = 0.00$; $p > 0.05$		Once a month or less	16 (19.8)
						$\chi^2 = 0.05$; $p > 0.05$	
Perceptions of GMDPs among consumers							
Perceived benefits		Attractive aspects		Perception of price		Perception of accessibility	
Superior nutritional value	17 (21.0)	Taste	21 (25.9)	Acceptable	44 (54.3)	Very accessible	33 (40.7)
Improved digestion	17 (21.0)	Health	21 (25.9)	Too expensive	21 (25.9)	Sometimes difficult	32 (39.5)
Improved skin condition	16 (19.8)	Price	20 (24.7)	Cheaper	16 (19.8)	Difficult	16 (19.8)
Reduced allergies	16 (19.8)	Accessibility	19 (23.5)	$\chi^2 = 15.54$; $p < 0.05$		$\chi^2 = 6.74$; $p < 0.05$	
No benefits perceived	15 (18.5)	$\chi^2 = 0.10$; $p > 0.05$					
$\chi^2 = 0.17$; $p > 0.05$							
Perception of promotion							
Insufficient	67 (82.7)						
Sufficient	14 (17.3)						
$\chi^2 = 34.68$; $p < 0.001$							

Recom Close People: Recommendation from close people; AvailGMDP: Availability of GMDPs, in markets.

generally homogeneous response structure (Table 3), indicating a lack of strong opinion towards the product. The reasons for non-consumption were relatively evenly distributed among factors such as the unavailability of the product, lack of taste appeal, uncertainty about quality, high price, and preference for cow milk ($p > 0.05$). This dispersion suggests that non-consumption is not due to a single factor but rather a combination of constraints. The need for additional information follows a similar trend, with similar proportions of individuals wanting to know more about the accessibility of GMDPs, those interested in learning about the benefits of GMDPs, those seeking information about the absence of chemicals, those wanting more information on pricing, and those declaring no need for additional information ($p > 0.05$). This distribution indicates a lack of information but also a certain heterogeneity in the expectations of individuals. Perceptions of the benefits of goat milk were uncertain. Indeed, 25.97% of respondents felt that GMDPs were worse than cow milk, 24.68% were unsure about its benefits, only 23.38% considered it beneficial for health, and 25.97% had no opinion ($p > 0.05$). This distribution reflects a lack of consensus and a still limited knowledge of the benefits of GMDPs.

Regarding the intention to try GMDPs, responses were also divided: 25.97% preferred to stick with cow milk, 24.68% would try it if more information were provided, 24.68% would try it if the price were more affordable, and 24.68% showed no interest ($p > 0.05$). Factors that might hinder consumption were similar to the previously mentioned reasons, including unavailability (25.97%), high cost (24.68%), uncertain quality (24.68%), or no particular concerns (24.68%). In the case of trying the product, derived products like cheese (33.77%) and yogurt (33.77%) generated slightly more interest than milk itself (32.47%), suggesting better acceptability of the processed forms. Conditions favoring consumption included recommendations from close people (25.97%), proof of quality (24.68%), broader product availability (24.68%), and a lower price (24.68%). Furthermore, external opinions influenced individuals in a contrasting way, with 33.77% responding positively, 33.77% negatively, and 32.47% remaining indifferent. Overall, these results highlight a hesitant population, whose non-consumption is based on moderate barriers but which could be potentially overcome through targeted actions focused on information, cost reduction, and improved availability.

TABLE 3 Perceptions and attitudes of knowledgeable non-consumers towards GMDPs.

Variable/Modality	n (%)	Variable/Modality	n (%)	Variable/Modality	n (%)
Barriers to consumption among knowledgeable non-consumers					
Reasons for non-consumption		Perception of benefits		Factors that could hinder consumption	
Product unavailable	17 (22.08)	Worse than cow milk	20 (25.97)	If not available	20 (25.97)
Unappealing taste	15 (19.48)	Unsure of benefits	19 (24.68)	If too expensive	19 (24.68)
Uncertain quality	15 (19.48)	Beneficial for health	18 (23.38)	If quality uncertain	19 (24.68)
Too expensive	15 (19.48)	No opinion	20 (25.97)	No specific concerns	19 (24.68)
Preference for cow milk	15 (19.48)			$\chi^2 = 0.039$; $p > 0.05$	
$\chi^2 = 0.208$; $p > 0.05$		$\chi^2 = 0.143$; $p > 0.05$			
Information and awareness needs					
Need for additional information on...		Need to promote GMDPs		Influence of external opinions	
Accessibility	17 (22.08)	Difficult to say	20 (25.97)	Positive influence	26 (33.77)
Benefits	15 (19.48)	Yes	19 (24.68)	Negative influence	26 (33.77)
No chemicals	15 (19.48)	No	19 (24.68)	Indifferent	25 (32.47)
Price	15 (19.48)	Yes, but moderately	19 (24.68)	$\chi^2 = 0.026$; $p > 0.05$	
Info not needed	15 (19.48)				
$\chi^2 = 0.208$; $p > 0.05$		$\chi^2 = 0.039$; $p > 0.05$			
Potential adoption of GMDPs among knowledgeable non-consumers					
Conditions for consumption		Products to try		Tendency to try	
On recommendation	20 (25.97)	Cheese	26 (33.77)	Prefer cow milk	20 (25.97)
If quality proven	19 (24.68)	Yogurt	26 (33.77)	Would try if informed	19 (24.68)
If more widespread	19 (24.68)	Milk	25 (32.47)	Would try if cheaper	19 (24.68)
If cheaper	19 (24.68)			Not interested	19 (24.68)
$\chi^2 = 0.039$; $p > 0.05$		$\chi^2 = 0.026$; $p > 0.05$		$\chi^2 = 0.039$; $p > 0.05$	

Perceptions and attitudes of non-knowledgeable individuals towards GMDPs (group C)

The analysis of attitudes towards goat milk among individuals who had no prior knowledge of the product is presented in Table 4. Regarding the interest in trying GMDPs, half of the respondents expressed a willingness to try the product if given the opportunity, while 25.64% would accept it if more information were provided, and 24.36% showed no interest in trying GMDPs ($p < 0.05$). This distribution suggests an overall openness to new food products, despite some reservations related to uncertainty. The information considered necessary before trying the product was evenly distributed ($p > 0.05$). Health benefits (25.64%) and the product's origin (organic, local) (25.64%) were the main pieces of information conditioning the willingness to try GMDPs in this group, followed by accessibility (24.36%) and price (24.36%). This distribution

reflects a multidimensional need for information, addressing both quality, benefits, and access conditions for the product.

Regarding the perception of goat milk as an alternative to cow milk, more than two-thirds of respondents (66.67%) indicated that they could potentially consider goat milk as an alternative to cow milk, whereas 33.33% preferred to continue consuming cow milk ($p < 0.05$). Similarly, 66.67% of respondents appeared potentially receptive to information on the benefits of goat milk and its derived products, whereas 33.33% were not receptive ($p < 0.05$). These results indicate that a majority of individuals could be convinced, provided that existing uncertainties are addressed. The main reasons for not trying the product were also varied but not significantly different ($p > 0.05$), including preference for cow milk (25.64%), unavailability of the product (25.64%), perception of incompatibility with the body (24.36%), and lack of trust in the quality (24.36%). These barriers reflect both deeply rooted eating habits and concerns related to safety and accessibility.

TABLE 4 Perceptions and attitudes of non-knowledgeable individuals towards GMDPs (Group C).

Variables/Modalities	n (%)	Variables/Modalities	n (%)	Variables/Modalities	n (%)
Initial attitudes and perceptions					
Reasons for not trying		Sensitivity to benefits		Alternative to cow milk	
Preference for cow milk	20 (25.64)	Potentially receptive	52 (66.67)	Potentially yes	52 (66.67)
Not available	20 (25.64)	No	26 (33.33)	No, prefer cow milk	26 (33.33)
Does not suit the body	19 (24.36)			$\chi^2 = 8.667$; p < 0.05	
Lack of trust in quality	19 (24.36)				
$\chi^2 = 0.051$; p > 0.05		$\chi^2 = 8.667$; p < 0.05			
Information and persuasion needs					
Information needed before trying		Persuasion factors before purchase		Consumption if local production	
Health benefits	20 (25.64)	Price reduction	20 (25.64)	Yes	52 (66.67)
Product origin	20 (25.64)	More availability in stores	20 (25.64)	No	26 (33.33)
Accessibility	19 (24.36)	RecomClosePeople	19 (24.36)		
Price	19 (24.36)	Proof of benefits	19 (24.36)		
$\chi^2 = 0.051$; p > 0.05		$\chi^2 = 0.051$; p > 0.05		$\chi^2 = 8.67$; p < 0.05	
Potential adoption of GMDPs					
Products to try		Interest in trying			
Goat milk	36 (46.15)	Yes, if opportunity	39 (50.00)		
Goat cheese	22 (28.21)	Yes, if information	20 (25.64)		
Goat yogurt	20 (25.64)	Not interested	19 (24.36)		
$\chi^2 = 5.85$; p > 0.05		$\chi^2 = 9.769$; p < 0.05			

Recom Close People: Recommendation from close people.

Factors that could encourage purchase were also evenly distributed ($p > 0.05$), including price reduction (25.64%), better availability (25.64%), recommendations from close people (24.36%), and proof of benefits (24.36%). In addition, in the case of trying the product (for this group of respondents), goat milk was the most considered product for nearly 50% of respondents, followed by cheese (28.21%) and yogurt (25.64%). However, differences among product preferences were not statistically significant ($p > 0.05$). Finally, 66.67% of respondents declared they would consume the product if it came from local production, while 33.33% would not be influenced by this factor ($p < 0.05$). Overall, these results indicate a relatively favorable acceptance potential for GMDPs and a strong market penetration potential, conditioned by targeted actions focused on information, local valorization, and improved accessibility.

Discussion

Sociodemographic profiles of respondents

The analysis of the sociodemographic characteristics of the respondents reveals important dynamics related to the

consumption of goat milk and its derived products. Firstly, age appears as a discriminating factor in this study, with consumers (Group A) being significantly younger than both knowledgeable non-consumers (Group B) and non-knowledgeable individuals (Group C), while no significant age difference was observed between Groups B and C. This trend aligns with the observations of (Jerop et al., 2014), who noted that younger individuals generally have a more favorable perception of goat milk, likely due to greater openness to food innovations and diet diversification. This age gradient suggests that goat milk adoption in its current form is disproportionately concentrated among younger adults, and that age-related differences in dietary openness may partly explain the consumption patterns observed across groups. In contrast, the absence of a significant difference related to gender observed in this study contrasts with some previous studies. For instance, in South Africa, men were more inclined to consume goat milk than women (Idamokoro et al., 2019). However, other studies indicate that gender may not always be a determining factor, suggesting that its influence heavily depends on the socio-cultural context.

Regarding education level, the results show no significant effect. The absence of this effect in our study is interpretable in light of a structural specificity of the northern Benin context: information

about GMDPs appears to circulate primarily through commercial and social networks (word of mouth, markets, and social media) rather than through formal educational channels. This diverges from several studies. In Nigeria (Apata and Adewumi, 2010) and Kenya (Jerop et al., 2014) for example, education was identified as a significant factor influencing the perception and consumption of goat milk. Similarly, studies suggest that more educated individuals are generally more receptive to innovative food products due to better access to information. Under these conditions, education level becomes a less relevant predictor of product knowledge or adoption, as access to information is mediated by proximity to the market rather than by academic attainment. This has a practical implication: awareness campaigns in this context should prioritize market-based and social communication strategies over formal educational settings. The importance of merchants among consumers suggests that exposure to commercial circuits promotes product adoption. This observation aligns with studies conducted in Algeria, where occupation and socio-economic status strongly influence goat milk consumption (Bouzourene et al., 2026). Furthermore, the significant influence of religion highlights the role of socio-cultural factors in food choices. In fact, the concentration of Christians in Group A, Muslims in Group C, and animists and atheists in Group B suggests that religious affiliation structures not only food choices but also the pathways through which individuals come into contact with GMDPs. The dominance of Muslims in Group C (individuals with no prior knowledge of goat milk products) is particularly notable given that Islam does not prohibit goat milk consumption. This pattern may therefore reflect not a religiously motivated avoidance but rather a differential spatial and social exposure: if production farms and commercial outlets are located in areas or social networks more accessible to Christian communities, Muslim consumers may simply have had fewer opportunities to encounter the product. Other studies have shown that cultural and traditional beliefs can be significant barriers to goat milk consumption (Nhovhoro et al., 2025). Thus, beyond individual characteristics, social determinants appear essential for understanding the consumption behavior of GMDPs. Overall, these results confirm that the consumption of goat milk is a multifactorial phenomenon, where socio-economic and cultural variables play a crucial role, although their influence may vary depending on the context.

From the professional viewpoint, the overwhelming representation of merchants in Group A, students in Group B, and civil servants in Group C indicates that goat milk consumption in northern Benin is, at this stage of sector development, largely a function of market proximity rather than individual preference or nutritional awareness. Merchants, by virtue of their daily engagement with commercial circuits, are systematically exposed to GMDPs in ways that students and civil servants are not. This occupational structuring of consumption has a direct strategic implication: expanding the distribution network and increasing product visibility in spaces frequented by non-merchant populations. Taken together, these sociodemographic patterns suggest that goat milk consumption in northern Benin is currently shaped less by individual characteristics such as gender or education than by structural factors determining exposure and access namely, professional integration into commercial circuits and, potentially, spatial proximity to production and distribution

points. This framing shifts the analytical focus from consumer profiling to market architecture, and underscores the importance of distribution network development as a precondition for broadening adoption across all population segments.

Perceptions and attitudes of consumers of GMDPs (group A)

The analysis of the consumption profile and perceptions of goat milk consumers in our study reveals an early but progressive diffusion phase of GMDPs, characterized by a wide diversity of behaviors. The homogeneous distribution of consumption duration, which includes both recent and long-term users, suggests a gradual adoption of goat milk in dietary habits. This also indicates that the product is simultaneously attracting new users while retaining long-term ones, a pattern consistent with early-stage market adoption rather than a passing trend. This pattern suggests that goat milk consumption in the study area is still evolving and has not yet reached a stable or mature stage of market development and aligns with the diffusion trajectory described by Niang et al. (2023) for goat milk in Senegal, where consumption expanded gradually once distribution constraints began to ease.

The initial motivations for consumption, dominated by curiosity (25.9%), social recommendation (24.7%), and health reasons (24.7%), confirm the central role of social and cognitive factors in adopting new food products. Thus, the near-equal distribution across these motives challenges the assumption that health-driven motivation is the primary driver of alternative dairy adoption. These results align with those of (FAO, 2013), who indicate that awareness of nutritional benefits and social interactions are key levers for promoting goat milk in developing countries. Instead, our findings suggest that social influence and exploratory behavior are equally decisive, which has direct implications for promotion strategy: communication campaigns focused solely on nutritional messaging may capture less than a quarter of potential new consumers. Similarly, the diversity of discovery channels (word of mouth, markets, media, advertising) reflects a lack of clear structuring in diffusion strategies, which is typical of emerging sectors. The relatively scattered frequency of consumption, ranging from daily to occasional, confirms that goat milk has not yet been fully integrated into the dietary habits of populations in the study area. This situation is comparable to the results observed in West Africa by Niang et al. (2023) who reported irregular consumption of goat products due to access constraints and eating habits dominated by cow milk. Consumers' perceptions indicate a general recognition of the nutritional and health benefits associated with goat milk and its derived products. These perceptions are noteworthy because the nutritional and functional properties of goat milk, including its high digestibility and favorable nutrient composition, have been well documented in the scientific literature (Park et al., 2007). However, the present study focuses on consumers' perceptions of these benefits rather than on the nutritional properties themselves. The absence of a dominant perception and the significant proportion of individuals who perceive no benefits reflect a communication gap. Furthermore, economic and structural constraints appear to be determining factors. Although the price is considered acceptable by more than half of the consumers, a significant portion finds it high, which

aligns with (Hadeef et al., 2024) who highlighted the limiting role of cost in the adoption of goat dairy products. The variable accessibility of the product and, especially, the overwhelming perception of insufficient promotion (82.7%) revealed in this study confirm that the main barrier lies in the lack of market structuring. Thus, these results highlight that, despite a generally positive perception, goat milk consumption remains limited by information, accessibility, and visibility constraints, requiring better-targeted valorization strategies.

Perceptions and attitudes of knowledgeable non-consumers of GMDPs (group B)

The results related to knowledgeable non-consumers show that the non-consumption of goat milk is not due to total rejection of the product but rather to a combination of constraints related to accessibility, price, perceived quality, and lack of information while revealing that no single barrier dominates. This indicates that non-consumption in this group is not driven by a primary rejection factor but by a cumulative accumulation of these constraints. This pattern is consistent with recent findings reported by Mandolesi et al. (2024) who showed that perceptions of product quality, taste, and naturalness influence the acceptance of sheep and goat dairy products, while price and product availability remain important determinants of purchasing decisions. In this study, the unavailability of the product, high price, and uncertainty about quality were the main reasons for non-consumption. These results are similar to those observed in Algeria, where goat milk consumption is strongly influenced by income, product price, and market accessibility (Bouzourene et al., 2026). The study notably shows that the perception of price and taste is an important predictor of future consumption. Furthermore, the uncertain perception of the benefits of goat milk among non-consumers confirms the importance of information in the adoption of alternative food products. The fact that more than half of knowledgeable non-consumers either doubt or are unaware of the health advantages of goat milk despite being familiar with the product points to a significant information deficit that persists even after product exposure. This finding diverges from what might be expected: familiarity with a product does not automatically translate into knowledge of its properties, a distinction that has important consequences for awareness campaign design. A recent review of consumer preferences for goat milk-based products indicates that the lack of information about nutritional and health benefits is one of the main barriers to consumption, particularly in regions where cow milk dominates eating habits (Zulkifli et al., 2023); nevertheless our results suggest this applies even to populations with prior product exposure, not only to the uninitiated. The moderate interest of non-consumers in trying the product, particularly under certain conditions (price reduction, information, social recommendation), in our study, confirms that non-consumption is not definitive but depends on socio-economic and informational factors. The importance of social influence and access to information in shaping consumer acceptance has been documented in recent studies on dairy and novel food products (Günden et al., 2024; Laureati et al., 2024; Mandolesi et al., 2024). Considering the slightly greater preference for processed products (cheese, yogurt) than for goat milk itself in our study suggests that

entry-point strategies focusing on derived products rather than fresh milk may reduce the initial sensory barrier and facilitate progressive adoption. This confirms results from other studies indicating that derived products are often better accepted than fresh goat milk, particularly due to the attenuation of the characteristic odor and taste of goat milk (Vargas-Bello-Pérez et al., 2022). Overall, these results show that knowledgeable non-consumers could represent a strategic target population for sector development because their barriers are mainly related to modifiable factors such as information, price, availability, and perceived quality, rather than a cultural or sensory rejection of the product.

Perceptions and attitudes of non-knowledgeable individuals towards GMDPs (group C)

The results related to individuals with no prior knowledge of goat milk show that a significant proportion of them would be willing to try the product, indicating a high acceptance potential despite the lack of familiarity with GMDPs. This willingness to try a new food under certain conditions is consistent with recent studies on consumer behavior regarding new or unfamiliar foods, where information on nutritional benefits and product origin plays a crucial role in the intention to try (Liñán et al., 2019; Petrescu et al., 2019). In this study, interest in trying the product is strongly conditioned by the availability of information on health benefits, product origin, price, and accessibility. These findings support previous evidence indicating that uncertainty regarding product characteristics, safety, and expected benefits constitutes a major barrier to the adoption of unfamiliar food products (Fischer and Reinders, 2022; Günden et al., 2024). According to a study on the acceptance of alternative dairy products, consumers who are not familiar with a product are more sensitive to information related to food safety, nutritional quality, and product origin (Günden et al., 2024; Laureati et al., 2024; Fischer and Reinders, 2022). This explains why the origin of goat milk is an important factor for acceptance here. Furthermore, a significant proportion of respondents considers goat milk to be a potential alternative to cow milk, which aligns with findings from several studies showing that diversifying milk sources is an important strategy in regions facing supply issues or rising cow milk prices (Clark and Mora García, 2017; Tiwari et al., 2022). The reasons for non-trying mentioned by respondents, such as preference for cow milk, unavailability of the product, lack of trust in the quality, and fear of incompatibility with the body, have also been reported in several studies on the perception of goat milk in developing countries. These barriers are generally linked to the lack of information and the absence of consumption habits rather than a negative perception of the product itself (Güney, 2019; Zine-eddine et al., 2021). Factors that could encourage purchase, such as price reduction, better availability in stores, recommendation from close people, and proof of benefits, confirm the combined role of economic, informational, and social factors in the adoption of new food products. The influence of relatives and the broader social environment has been widely documented as a determinant of food choice, particularly in contexts where dietary practices are strongly shaped by social and cultural norms (Liñán et al., 2019; Sogari et al., 2025). Overall, the results from Group C show that non-

knowledgeable individuals do not form a group opposed to goat milk, but rather a potentially receptive group, whose adoption mainly depends on awareness, product availability, trust in quality, and the promotion of local production. These results suggest that promotional strategies should prioritize targeting nutritional information, sanitary quality, and the product's origin to encourage the acceptance of goat milk and its derived products.

Limits and implications of the study

Although this research provides insights into the perceptions, attitudes, and consumption intentions regarding goat milk and its derived products in northern Benin, it is important to highlight certain methodological and contextual limitations to better frame the interpretation of the results and guide future research. Indeed, the present study is geographically limited to two localities, thus restricting the representativeness of the results to the entire northern region of Benin, not to mention other ecological and cultural areas of the country (central, southern, and rural versus urban zones). Eating habits, access to dairy products, and preferences are likely to vary depending on the regions, product availability, and exposure to different production systems. Additionally, while our study primarily focuses on populations living around the breeding environment of Saanen goats and their crossbreeds (Saanen $\times$ Rousse de Maradi), other dairy breeds, such as the Alpine goat, are also present in Benin, particularly in the south, where study (Vissoh et al., 2021) analyzed its average milk production ($\approx 0.88 \pm 0.42$ kg/day) and its lactation potential (up to 1.60 kg/day) under local breeding conditions. That being said, these breeds can also influence product perceptions due to their organoleptic and technological profile in commercial or processing circuits. Furthermore, although the study identifies factors influencing goat milk consumption, it does not thoroughly address the sensory dimensions of the product (taste, smell), which can be determining factors in the acceptance or rejection of the product (Zulkifli et al., 2023). Cultural, traditional, and dietary factors that shape deeply rooted eating behaviors in the population have also not been thoroughly explored, although they could play a crucial role in the adoption of goat milk (Idamokoro et al., 2019). Finally, this study relies on cross-sectional data collected over a limited period. Perceptions and attitudes may evolve with increased product availability, awareness campaigns, or market transformations (Bonnal et al., 2019; Zindy et al., 2017), suggesting the need for longitudinal approaches to track changes over time.

Beyond confirming findings reported in previous studies, the present research provides novel insights into consumer segmentation within an emerging dairy goat market. To our knowledge, this is the first study conducted in Benin to simultaneously examine consumers, knowledgeable non-consumers, and individuals with no prior knowledge of goat milk and its derived products. While consumers mainly reported issues related to product promotion and accessibility, knowledgeable non-consumers were more concerned about product availability, quality assurance, and affordability. In contrast, non-knowledgeable individuals expressed a relatively high willingness to try goat milk products when provided with adequate information and access. These findings suggest that a single promotional strategy may not be effective and that group-specific interventions are

needed to stimulate demand for goat milk and its derived products in Benin. Thus, the findings of this study have practical implications for stakeholders involved in dairy goat development in Benin. Awareness campaigns should target non-knowledgeable individuals through information on nutritional and health benefits, while efforts directed at knowledgeable non-consumers should focus on improving product availability, affordability, and quality assurance. Strengthening local marketing networks and promoting locally produced goat milk products may further enhance consumer acceptance and contribute to the sustainability of the dairy goat value chain.

Conclusion

This study analyzed the perceptions, attitudes, and consumption intentions regarding goat milk and its derived products (GMDPs) among different categories of individuals in northern Benin. The results show that consumers generally perceive goat milk as a product beneficial to health and nutrition, but highlight constraints related to accessibility, price, and, above all, the lack of promotion. Among knowledgeable non-consumers, non-consumption is mainly linked to the lack of information, uncertainty about quality, and limited product availability, rather than a rejection of goat milk. As for non-knowledgeable individuals, they show a relatively favorable disposition to try the product, provided they have sufficient information, an affordable price, and better market availability. Overall, the results indicate that the main obstacle to the development of goat milk consumption is not the acceptability of the product, but rather the lack of information, limited availability, and insufficient promotion strategies. The development of the goat dairy sector should therefore focus on awareness campaigns, improving distribution, and promoting local products.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study involving human participants was approved by the Ethics Committee of the University of Parakou (Ethical approval No. 367-2025/UP/R/VR-RU/SA). The study was conducted in accordance with the institutional and national ethical requirements for research involving human participants. All participants were informed about the objectives and procedures of the study, and written informed consent was obtained prior to their participation in the survey. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

OO participated in the study design, planning and in the drafting of the document. AA, HS and TO participated in the data collection, processing, and analysis. LZ, ZA, CA, and YI participated in the design, data analysis, and drafting of the document, EA and IA participated to the supervision and writing the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

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