

Market study for a production unit of natural flavors for yogurts:



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Agroecology

Part 1. Consumer and processor expectations

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December 2024



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Market study for a production unit of natural flavors for yogurts:

Part 1. Consumer and processor expectations

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1. Introduction

In Burkina Faso, the Agroecology Initiative (AEI) supports the Dairy Innovation Platform (DIP) in the agroecological transition of the dairy sector. The aim is to move from the vision of the DIP, defined in 2020 during Africa-Milk, reviewed and confirmed in 2023 at the start of the AEI (due to its compatibility with the principles of agroecology) to its implementation. In 2023, the DIP was consolidated by integrating new partners likely to provide helpful support for the agroecological transition of the dairy sector (Sib et al., 2023). As part of the AEI, we are working within this Agroecological Living Landscape (ALL) centered on the dairy industry (in other words, the ALL corresponds to the DIP consolidated by the accession of new actors).

For the ALL stakeholders, the ultimate goal is "to increase the share of local milk in dairy products manufactured by Bobo-Dioulasso dairy processors, through innovations at farm level, in milk collection and processing, and governance of the dairy value chain".

In response to consumer demand for high-quality dairy products, particularly "nature" yoghurt and its variants in a variety of flavors (Fayama et al., 2024), processors have begun to produce yoghurts flavored with natural extracts of non-wood forest products (nééré, mango, moringa, etc.) and agricultural products (sweet potato, banana, pineapple, etc.) (Sib et al., 2024a). These local products, such as fruits, leaves and barks, represent a valuable resource for meeting this demand. In addition to offering natural flavors, their use in yogurt production aligns perfectly with certain principles of agroecology (biodiversity, economic diversification, co-creation of knowledge, social and food values - Wezel et al., 2020; Sib et al., 2024b) by valorizing local resources and promoting sustainable production.

But for processors, one of the problems is access to these natural extracts in terms of quantity, quality, regularity and price, as highlighted in the cost-benefit analysis of the agroecologicalization of the dairy sector (Sib et al., 2024 b).

Setting up a natural flavor production unit could respond to this increased demand from local milk processors and consumers for yoghurts flavored with natural extracts of local products. It would offer several advantages:

- Strengthening the local economy: By adding value to local products, this unit could create jobs and generate additional income for local communities by collecting and processing local produce into aromatic extracts.
- Support for the dairy industry: The availability of high-quality natural flavors could increase the competitiveness of locally-produced yogurts, thus meeting consumer expectations while supporting milk processors in their agroecological transition.
- Positive environmental impact: The rational use of local aromatic products (non-wood forest products) contributes to biodiversity conservation and the sustainable management of forest resources, while reducing dependence on imported artificial flavors.

This market study aimed to determine the feasibility and potential of setting up a production unit for extracts based on local products (non-timber forest products, and various agricultural products) to flavor yogurts made from local milk in the Bobo-Dioulasso dairy basin. More specifically, the project involved :

- Analyze demand from yogurt milk processors
- Identify consumer preferences and expectations
- Assess technical and logistical challenges
- Analyze market opportunities

This report presents the study results relating to the two first abovementioned points.

2. Methodology

2.1. Study site

The study was carried out in western Burkina Faso, more specifically in the city of Bobo-Dioulasso.

2.2. Sampling

The study involved an exhaustive census of local milk processors in the Bobo-Dioulasso dairy basin. A total of 16 processors were surveyed, providing a representative view of the needs, challenges and expectations of stakeholders in the sector concerning the use of natural extracts based on non-timber forest products (NTFPs) and agricultural products in the production of flavored yogurt.

For yoghurt consumers, the selection method used was that of reasoned choice. This approach enabled us to target 220 consumers with varied profiles.

2.3. Collecting data

The first step was to design a data collection tool to gather relevant information from yogurt milk processors and yogurt consumers (see appendices). The tool selected is a structured questionnaire, comprising open and closed questions, and includes the following sections

Two separate, structured questionnaires were used, comprising open and closed questions.

The questionnaire for yoghurt milk processors covered the following aspects:

- Flavor use habits.
- Preferences for natural versus synthetic flavors.
- The technical and economic feasibility of incorporating flavorings based on natural extracts of local products (NTFPs and various agricultural products).
- Processors' awareness of environmental issues and certifications.
- SWOT analysis

As for the questionnaire aimed at consumers to assess their interest in consuming yoghurts with natural flavors from natural extracts of local products, it included the following sections:

- Yogurt consumption habits.
- Preferences for natural and synthetic flavors.
- Knowledge and perception of natural flavors (NTFPs and other agricultural products).
- Feasibility and acceptability of natural-flavored yogurts.
- Consumer awareness of environmental issues and respect for the environment.

The tool was designed in digital format, and responses were recorded via the KoboToolbox platform, ensuring efficient and secure management of the data collected.

To guarantee the validity and reliability of the tool, the study coordination team carried out a pre-test. This involved administering the questionnaire to a small sample of three (03) processors and five (05) consumers representative of the target groups. The aim was to identify imperfections in the questionnaire, such as poorly worded/ambiguous questions, and to determine the average time required to complete the questionnaire. Feedback from the interviewers was used to fine-tune and improve the tool before its full-scale implementation.

In-depth training was given to the three interviewers (2 women and 1 man) selected by the study coordination team before data collection began.

The training covered the following points:

- Survey objectives: Interviewers were briefed on the importance of the survey, as well as expectations and expected results.

- Understanding the collection tool: Each section of the questionnaire was the subject of detailed training, explaining how to ask the questions neutrally, without influencing the answers.

Once the collection tool had been validated and the agents trained, the data collection phase began. It lasted two weeks between September and October 2024.

2.4. Data analysis

A methodical approach combining quantitative and qualitative techniques was used to analyze the data collected. Quantitative data were processed using Excel spreadsheets and SPSS software. At the same time, qualitative data including strengths, weaknesses, opportunities and threats, and suggestions were subjected to in-depth thematic analysis, facilitating a detailed understanding of respondents' perceptions, attitudes and opinions towards yoghurt flavored with natural extracts of local produce.

3. Results and discussion

3.1. Results of a survey of local milk yogurt processors

3.1.1. Knowledge and use of natural flavors

Using flavorings in yogurt

When asked whether local milk processors currently use flavourings in their yoghurts (and other dairy products), most (94%) answered in the affirmative (Figure 1). This high proportion suggests that adding flavorings is widespread and may be considered a norm or preference among processors. This could reflect consumer demand for yoghurts with a more diversified taste, or a need to improve the organoleptic properties of products to make them more attractive.

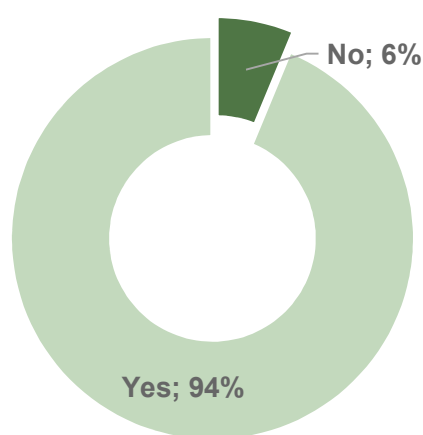


Figure 1. Distribution of processors surveyed according to their use of flavourings in yoghurts

Breakdown by type of flavorings used

The majority of processors use artificial flavours (60%; Figure 2). A minority (20%) of processors use natural flavours, and 20% use both types of flavour. This means that if we consider the 20% who use natural flavours and the 20% who use both types of flavour, we end up with 40% of processors (i.e. 6 processors) who are potential customers for a flavour production unit based on local natural products (non-timber forest products and agricultural products). These results underline a significant opportunity for the development of a natural flavor production unit based on local products. The 40% of processors identified as current or potential users of natural flavors represent a promising initial market. What's more, these processors could be key actors in promoting and adding value to products based on natural flavors, particularly by responding to a growing demand for healthier, environmentally-friendly products.

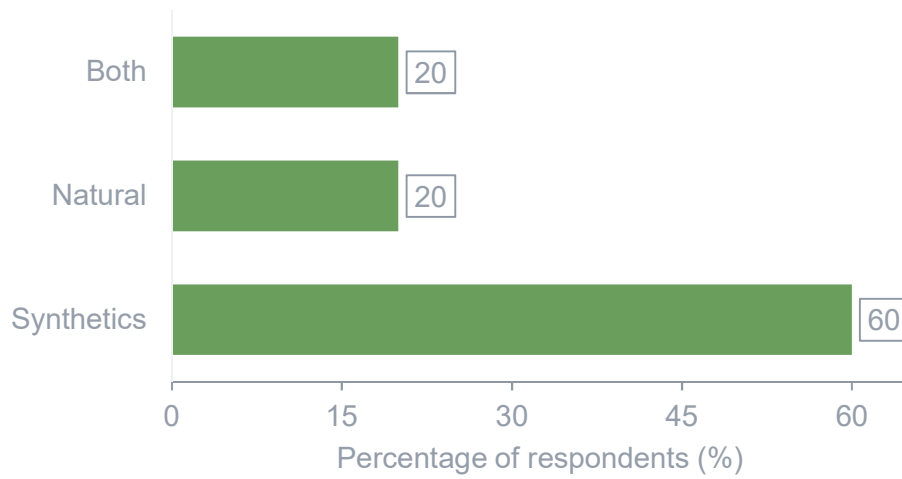


Figure 2. Distribution of processors by type of flavor used

Use of different types of aromas

Processors using natural flavours make more use of monkey bread (theodo - 37%) and moringa (31% - Figure 3). These two sources stand out for their popularity, probably due to their distinctive organoleptic properties, nutritional value, or relative availability in the Bobo-Dioulasso dairy basin. However, among processors, only 1/8 use flavors from the following local products: date, kinkéliba, coconut, pineapple, horchata, néré, mango and banana. This low uptake could be attributed to various factors, such as limited availability, a lack of knowledge about their aromatic potential, or the high costs associated with their extraction and use. These observations point to a double opportunity. On the one hand, it would be relevant to enhance the value and accessibility of flavors derived from monkey bread and moringa, given their current high uptake. On the other hand, an awareness-raising and promotion strategy could be implemented to broaden the use of other local natural aromatic products. This could include information campaigns on their benefits, research to optimize their extraction processes or cost reduction to encourage processors to adopt them.

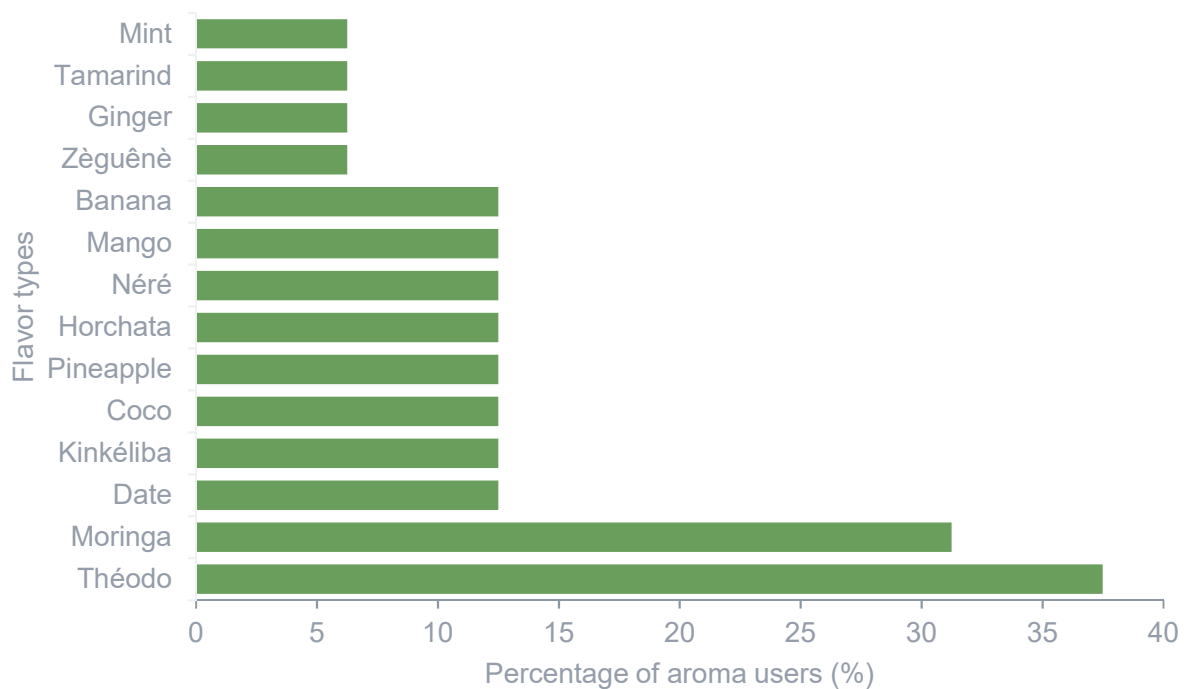


Figure 3. Distribution of processors according to their use of different types of natural flavours

3.1.2. Demand and preferences

Flavor selection criteria

The main criteria used to choose flavourings are sustainability (38%), price (38%), consumer preferences (38%) and the quality of the yoghurt produced with the flavouring (38%; Figure 4). This parity underlines a complex, multi-factorial decision-making process, where processors seek to reconcile economic imperatives, performance requirements and market expectations.

At the same time, the attention paid to suppliers (31%) highlights the relational and logistical dimension of the choice of flavors. This suggests that processors prefer products adapted to their needs and reliable partners capable of ensuring regular, high-quality supplies.

These observations indicate that initiatives should meet these multiple criteria to encourage the adoption of natural flavors. Clear communication on the sustainability and quality of natural flavors, combined with competitive pricing and efficient customer service, could convince more processors to opt for local, sustainable products. This integrated approach would ensure optimal alignment with market expectations and processor priorities.

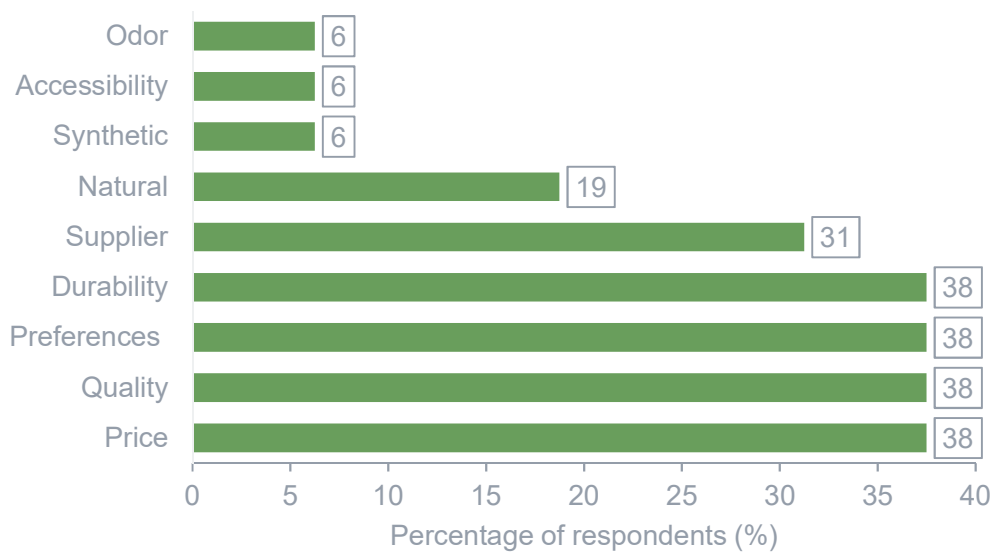


Figure 4. Flavour selection criteria expressed by processors

Interest in yoghurt flavourings based on local natural aromatic products

Most processors (94%) are interested in flavors based on local natural aromatic products (Figure 5). This high percentage indicates a promising acceptance potential for a production unit dedicated to these flavors. This enthusiasm could be explained by several factors: the search for market differentiation, the desire to meet growing consumer demand for more natural products, or an awareness of the environmental and economic benefits of using local resources. However, it is essential to note that this interest, a priori, will have to be consolidated by an offer that meets the specific expectations of processors.

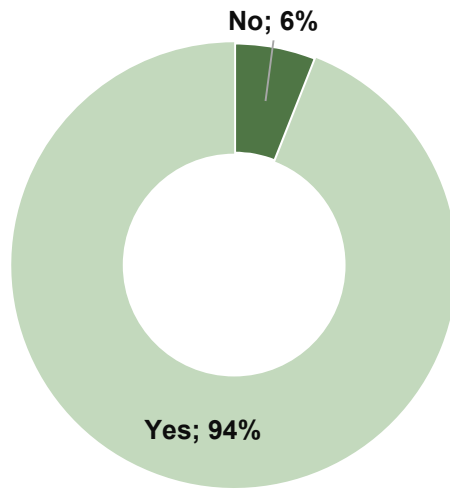


Figure 5. Distribution of processors according to their interest in natural flavours

Desired presentation formats for flavours based on local natural aromatic products

The results show a majority preference among processors for flavorings in liquid form (53%), which probably reflects ease of use and better integration into current yogurt-making processes (Figure 6). Although less popular (33%), the powdered form still represents an interesting alternative for some users, perhaps because of its longer shelf life or practicality in specific production environments.

The suggestion to produce certain flavors in essence form (such as mint, for example), reflects a pertinent reflection on the physico-chemical characteristics of raw materials. Because of their concentration and stability, essences could offer a suitable solution for aromatic products with delicate or volatile aromatic profiles, while also meeting the specific needs of processors.

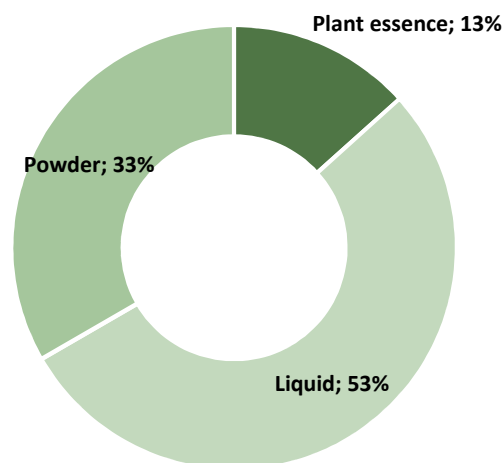


Figure 6. Distribution of processors according to desired presentation form for flavours

3.1.3. Technical and quality aspects

Emphasis on quality aspects

Most (88%) processors prefer a good shelf life, enabling them to stock bulk-purchased flavorings and reduce costs through economies of scale. Moreover, flavor purity is an essential quality criterion for 75% of respondents, reflecting their demand for reliable, impurity-free products, guaranteeing the quality of the yogurts produced. These priorities underline the importance of offering stable, high-quality flavors to meet market needs effectively.

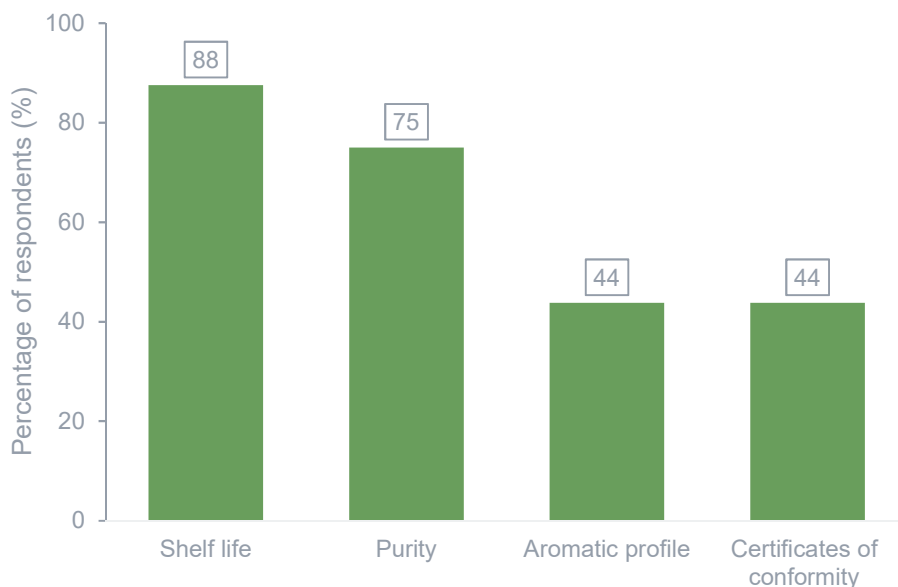


Figure 7. Distribution of quality aspects according to the degree of importance attributed to them

Willingness to pay more for high-quality natural flavors based on local natural aromatic products

Most processors (87%) will pay more to source local natural flavors (Table 1). However, this willingness to pay remains moderate, with the acceptable surplus capped at 10% above the price of synthetic flavors. This underlines a price sensitivity, even for products that offer added value in naturalness and sustainability.

Table 1. Processors' willingness to pay more for high-quality natural flavours

Variables	Workforce	Percentage (%)
No	2	12,5
0-5%	2	12,5
Yes	14	87,5
6-10%	8	50,0
0-5%	3	18,8
11-20%	2	12,5
More than 20% reduction	1	6,3

Source: Market survey data, Bobo-Dioulasso, September-November 2024

To successfully position natural flavors on the market, it is imperative to promote their distinctive characteristics and competitive pricing in a balanced way. Effective communication on the specific advantages of these flavors (quality, local origin, sustainability) could justify this slight price increase with processors. In addition, efforts to optimize production and distribution costs will be necessary to meet this pricing constraint, while ensuring the economic viability of the production unit.

While these results are encouraging, they call for a strategic approach to pricing and promotion to maximize acceptance while meeting processors' expectations.

3.1.4. Technical feasibility

Availability of suitable equipment for incorporating flavorings into production

Most processors (88%) stated that they do not have the necessary equipment to incorporate natural flavors into their current production (Figure 8). This constraint could hinder the effective use of natural flavours, even if they are available on the market. The 12% of processors equipped mention the use of mixers and skimmers, but these tools, while helpful, are not always sufficient for optimal incorporation processes.

To overcome this challenge, a relevant strategy would be to accompany the setting up of the natural flavor production unit with a complementary offer of small, adapted equipment. This could include simple, affordable tools designed to integrate natural flavors into production effectively. In addition, training in their use could be offered to ensure effective adoption.

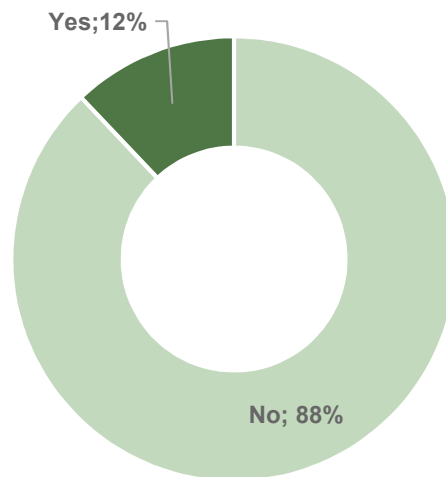


Figure 8. Distribution of processors according to whether or not they have equipment for incorporating flavorings

Main technical concerns regarding the use of natural flavors in yogurt production

Among the main technical concerns regarding using natural flavors in yogurt production, staff training (75%) comes top (Figure 9). This reveals the importance of having a competent and qualified team (staff) to guarantee the efficient and optimal use of natural flavors in yogurt production. This priority underlines the need to reinforce skills to adapt to new technical requirements and meet market expectations.

Flavor shelf life (56%), in second place, is a key requirement for efficient stock management and limiting losses. This confirms the importance of in-depth research into the stabilization of natural flavors and their packaging, in order to optimize their durability.

Equipment adaptability (50%) is a significant technical concern, directly linked to the limitations of current processor infrastructure. This reinforces the idea that appropriate technical solutions should accompany the introduction of natural flavors.

To address these concerns, it would make sense to set up customized training modules for entrepreneurs and their employees, focusing on handling natural flavors, stock management and using specific equipment. These initiatives would help overcome the identified challenges and maximize the impact of using natural flavors made from local products in yogurt production, while boosting the competitiveness of processors on the market.

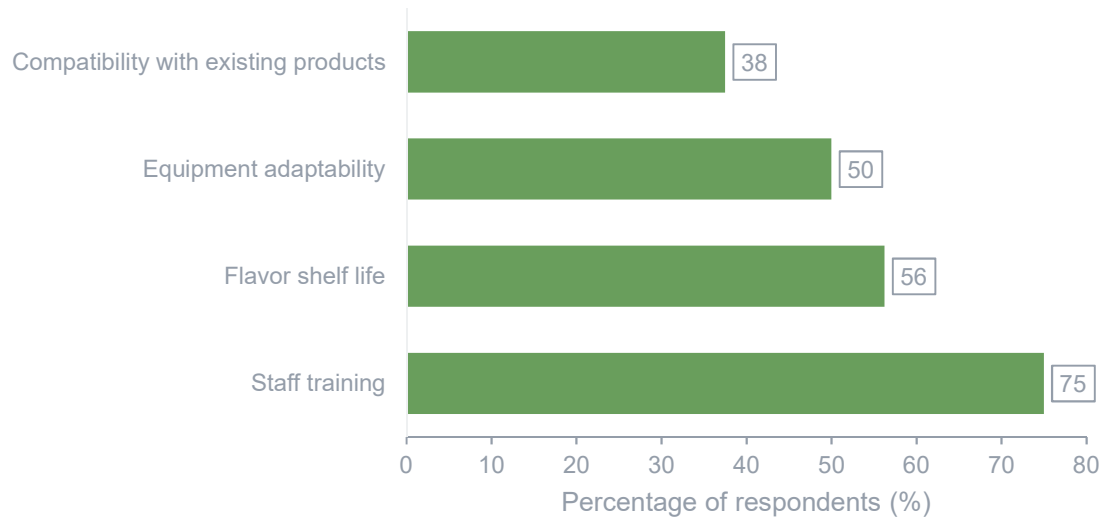


Figure 9. Main technical concerns related to the use of natural flavors

3.1.5. Economic feasibility

Over half the processors (56%) stated they could allocate between 10,000 and 49,999 FCFA to purchase flavourings (Table 2). Considering this range, if the production unit were to estimate these annual sales figures, they would have to average between 90,000 and 450,000 FCFA. This shows that it will be necessary to rely on the Bobo-Dioulasso dairy basin market to sell flavors and think about marketing strategies to find customers in the surrounding regions, on a national scale and even outside Burkina Faso. For half (50%) of processors, an increase in the cost of flavorings could moderate their production. According to 69% of processors, these impacts will be reflected in traditional yoghurt flavoring methods, compared with 39% for artificial flavors.

As for the criteria for choosing a good flavour supplier, 69% of processors said it would be the discount on purchasing large volumes. For 50% of these processors, the price at which flavors are sold to them is also significant when choosing a supplier. However, they will need to closely monitor payment terms (44%), making them flexible for customers and ensuring price stability (44%).

Table 2. Potential economic impact on the natural flavor production unit

Variables	Workforce	Percentage (%)
Monthly budget for the purchase of aromas		
10,000 - 49,999 FCFA	9	56
50,000 - 99,999 FCFA	4	25
Less than 10,000 FCFA	2	13
At least 100,000 FCFA	1	6
Impact of rising flavor costs on production		
Moderate	8	50
Low	4	25
High	4	25
What might these impacts look like?		
Using the traditional yogurt flavoring method	11	69
Use of artificial flavors	5	31
Key economic criteria for choosing a flavor supplier		
Volume discounts	11	69
Price	8	50
Terms of payment	7	44
Price stability	7	44

Source: Market survey data, Bobo-Dioulasso, September-November 2024

3.1.6. Processors' awareness of environmental issues related to the use of natural flavors

A large majority of the processors (81%) stress the importance of good harvesting practices for local natural aromatic products to preserve forest resources and biodiversity, showing a commitment to responsible natural resource management (Figure 10). Furthermore, 50% of processors highlight the need for an effective waste management plan for flavour production, underlining their concern for the well-being of local populations and the protection of the environment. These concerns call for integrating eco-responsible practices throughout the production chain to meet these expectations, while reinforcing the acceptability of natural flavours.

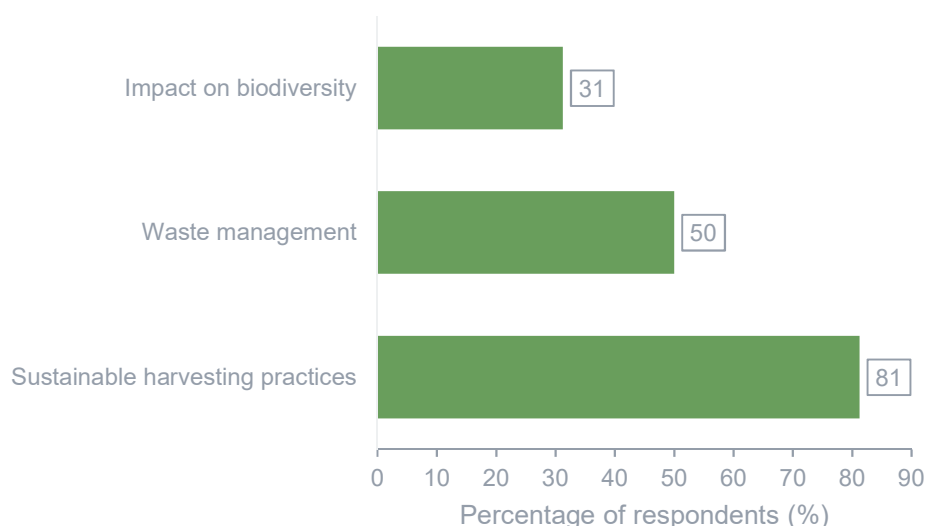


Figure 10. Transformers' main environmental concerns

3.1.7. SWOT analysis

The strengths, weaknesses, opportunities and threats associated with setting up the production unit, according to the processors surveyed, are presented in Table 3.

Table 3. SWOT matrix of the natural flavor production unit for milk processors

	Positive Forces	Negative Weaknesses
Internal	<ul style="list-style-type: none"> - Diversification of flavors and continuous improvement of aroma quality. - Promoting local products and respecting agro-ecological values. - Sustainable company expansion. 	<ul style="list-style-type: none"> - Non-durable aromas. - Natural flavors are challenging to preserve. - High production costs. - Low customer awareness of the new product. - High employee training costs. - No purity of local natural aromatic products. - Increase in the price of flavorings. - Scarcity or unavailability of certain flavors at certain times. - Hygiene problems in the production process.
External	<ul style="list-style-type: none"> - Increased product and company recognition. - Increased production and customer base. - Attractiveness of natural flavors. - Consumer health and promotion of local products. - Market/clientele expansion - Increased demand. - Positive consumer appraisal and appeal of natural products. - Reduced competition. - Attracting new customers thanks to the health and environment dimension. 	<ul style="list-style-type: none"> - Consumers' lack of appreciation of new flavors - Growing inaccessibility to local natural aromatic products. - Risk of product denaturation if poor-quality flavors are used. - Unavailability of products needed for flavor production. - Milk shortage during the dry season. - The high cost of yogurt leads to a drop in customers. - No dosage control - Risk of economic downturn if poor-quality flavorings are used. - Increased market competition. - The difficulty for customers is in adapting to their tastes. - High product cost, resulting in fewer customers. - Customers ' non-acceptance of flavors leads to a drop in production. - Risk of negative impact on product texture due to aromas.

Source: Market survey data, Bobo-Dioulasso, September-November 2024

3.2. Summary of Processor Survey Results

The survey results reveal a marked interest among processors in natural flavors, particularly those derived from non-timber forest products (NTFPs). Most processors (94%) already use flavorings in their production, and a large proportion (40%) would be willing to adopt natural flavorings, particularly those based on NTFPs. This indicates a favorable market potential for natural flavors, particularly if they meet quality, price and sustainability criteria. The liquid form is widely preferred by processors, closely followed by the powder form, and the possibility of producing flavors in essence form for specific flavors, such as mint, is also seen as relevant.

The main criteria for choosing flavors are sustainability, price, consumer preferences and end-product quality. So, for a natural flavor production unit to be viable, it must offer products that meet these requirements while remaining economically competitive. Moreover, most processors (88%) do not have the necessary equipment to incorporate flavorings into their current production. This gap could be filled by offering, in addition to flavors, specific equipment that would facilitate their integration, and thus constitute an additional argument to encourage the adoption of these natural flavors.

In addition, central technical concerns were raised, mainly concerning staff training, flavour shelf-life and the adaptability of existing equipment. It is, therefore, imperative to support processors with appropriate training and develop technical solutions

that meet the identified challenges. The management of forest resources and the environmental impact of flavor production are also significant concerns for processors. A large majority of processors (81%) stress the importance of ensuring sustainable NTFP harvesting to preserve biodiversity and forest resources. In addition, a good waste management plan is considered essential by 50% of respondents to minimize the environmental impact of production.

So, setting up a production unit for natural extracts based on local products to flavor yoghurt must consider all these factors. In addition to a diversified range of flavors and suitable incorporation equipment, technical support and sustainable resource management will be crucial to meeting processors' expectations and guaranteeing the project's success.

“ An integrated approach, focusing on quality, sustainability and support for processors, will enable these flavors to be effectively positioned on the market.

3.3. Results of yogurt consumer survey

3.3.1. Yogurt consumption habits

Based on the survey figures, yogurt made from local milk is consumed at least once a week by 39% of consumers surveyed (Figure 11). Added to this group are those who consume yoghurt made from local milk several times a week (30%) and those who consume it less than once a week (26%). Only 5% of consumers surveyed consume yoghurt every day. These figures suggest a growth opportunity for yoghurt made from local milk. A marketing strategy highlighting its advantages, such as its freshness, naturalness and role in supporting the local economy, could encourage more regular consumption. In addition, actions to expand supply and improve distribution could encourage daily adoption by more consumers.

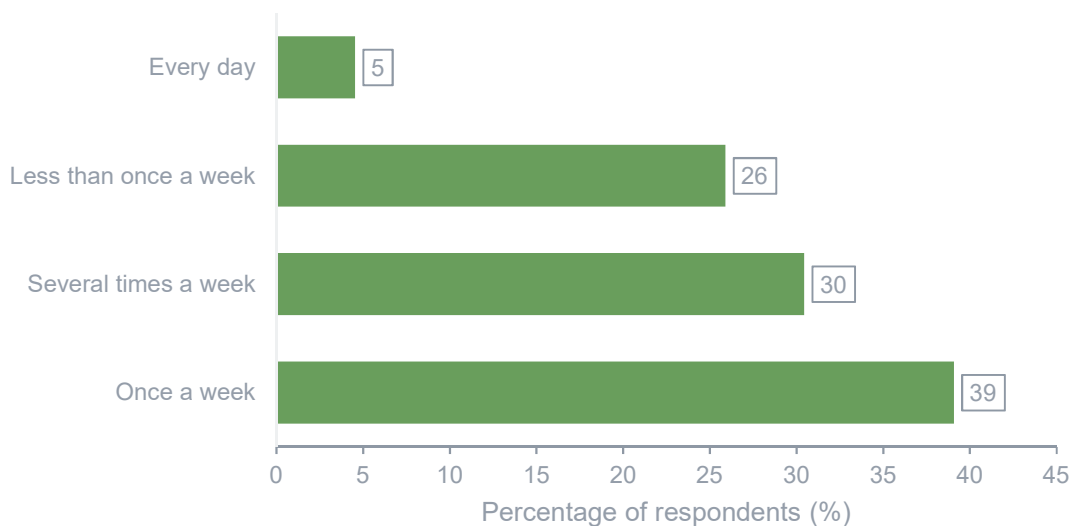


Figure 11. Yogurt consumption frequency

3.3.2. Flavor preferences

How yogurt is purchased

When we look at how consumers acquire the yogurts they consume, we see that 85% of yogurt are purchased on the market. (Figure 12). Only 15% of consumers said they produce the yoghurts they consume.

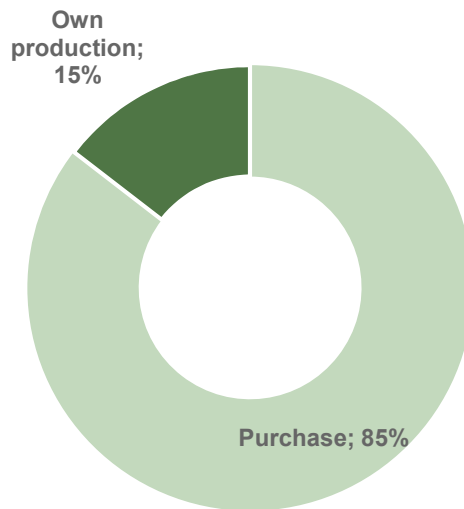


Figure 12. How yogurt is purchased

Types of yogurt consumed

Among the types of yoghurt consumed, "nature" yoghurt comes first, accounting for 50% of the consumers surveyed (Figure 13). This strong preference probably reflects a search for simplicity, naturalness and authenticity in yogurts. "nature" yoghurt is often perceived as healthier and more versatile, and can be eaten as is or topped up to suit individual tastes, which could explain its popularity. Vanilla-flavored and fruit-flavored yogurts were consumed by 36% and 30% of consumers surveyed. These results reveal a clear segmentation of consumer preferences, with a strong appeal for naturalness on the one hand, and familiar, sweet flavors on the other. This underlines the importance of maintaining a varied range of yogurts, while highlighting the benefits associated with each type to meet the expectations of each segment.

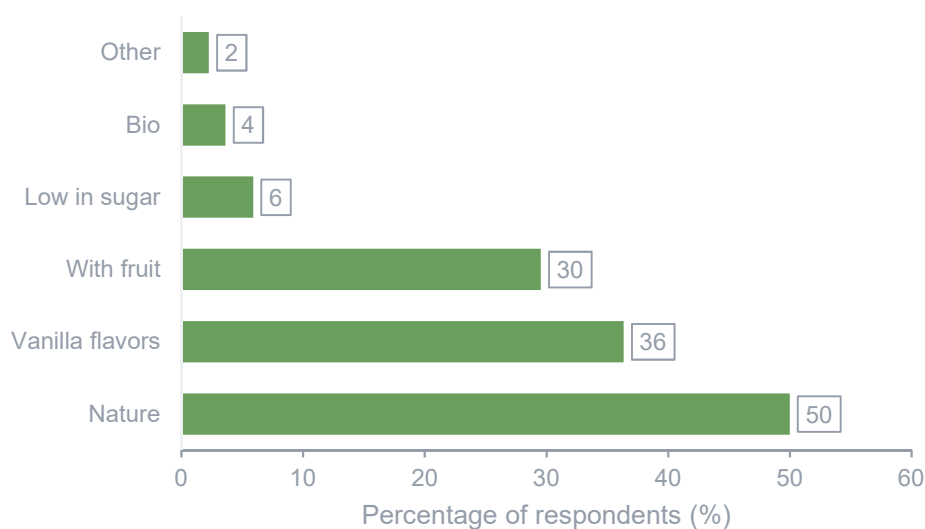


Figure 13. Types of yogurt consumed

3.3.3. Knowledge and perception of natural aromas

Preferred flavors in yogurt

When asked what type of flavor consumers prefer in yogurt, 74% said they prefer natural flavors, i.e. those derived from local aromatic natural products (Figure 14). This high proportion reflects a growing sensitivity to products perceived as healthier, authentic, and rooted locally. It also points to a market opportunity for yoghurts enriched with natural flavors from local aromatic products, which could meet an apparent demand and potentially win the loyalty of a significant market share. On the other hand, 25% of these consumers show no preference for any flavoring. The most important thing for this group is to consume yoghurt, regardless of its aromatic composition. This finding is interesting, as it suggests that even without an explicit interest in natural flavours, these consumers remain open to consuming yoghurts incorporating flavours from NTFPs. They, therefore represent a potentially receptive target, especially if marketing efforts emphasize other attractive aspects, such as overall quality, taste or health benefits.

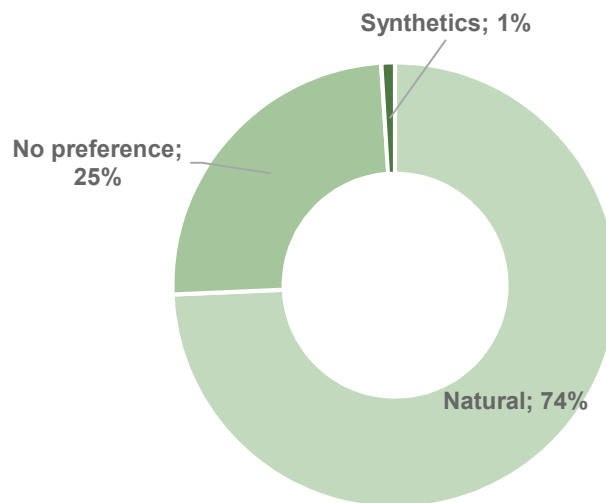


Figure 14. Preferred types of flavor in yogurt

Current consumption of natural-flavored yogurts

The consumers surveyed consume a wide range of yogurts flavored with extracts of local products (Figure 15). Yogurt with fruity flavors dominates preferences. At the top of the list, date yogurt is the most popular, with 33% of respondents consuming it. It is closely followed by papaya yogurt (25%) and mango yogurt (22%), confirming consumers' attraction to sweet, tropical tastes and local fruits.

Intermediate flavors, such as coconut (10%) and strawberry (7%), also find a certain number of consumers, but their popularity remains below that of the dominant flavors. Other flavours, such as zaïguaïnai (Balanites) yoghurt and moringa yoghurt, managed to appeal to 16% and 13% of consumers surveyed respectively, indicating a moderate interest in slightly less classic options that are still rooted in local products.

On the other hand, certain flavors seem to be of little interest to consumers. This is the case for mint yoghurt (5%) and néré (3%), as well as kinkéliba, théodo (monkey bread) and pineapple yoghurts, which each attract 2% of consumers.

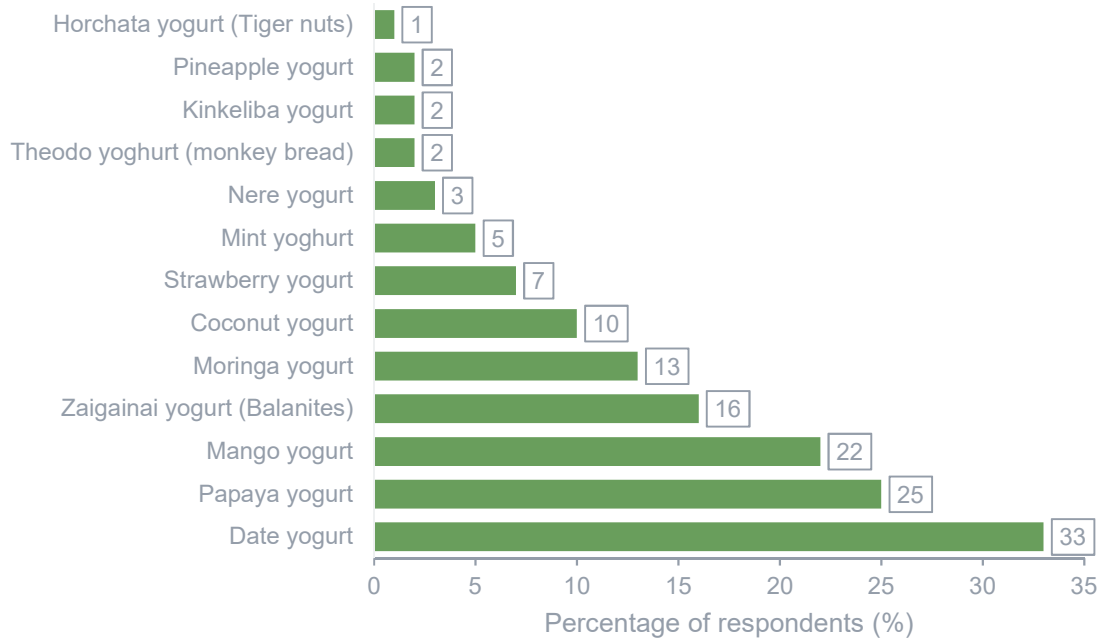


Figure 15. Types of yogurt currently consumed

Willingness to pay more for flavored yogurt extracted from local products

The Figure 16 illustrates the responses of yogurt consumers surveyed in the Bobo-Dioulasso dairy basin concerning their willingness to pay a higher price for yogurts flavored with local aromatic products. The results reveal that a large majority, 75% of consumers, are willing to pay more. This reflects a strong interest in products featuring local flavors, often perceived as authentic, natural or beneficial.

Some 24% of consumers surveyed remain undecided, answering "Maybe". This group could be influenced by factors such as final price, perception of product quality or familiarity with specific flavors. They represent an interesting target for exploring their expectations and removing any hesitations they may have.

These results show that the idea of flavouring yoghurts with extracts of local produce is widely welcomed by consumers, offering promising commercial potential if price and positioning aspects are well managed.

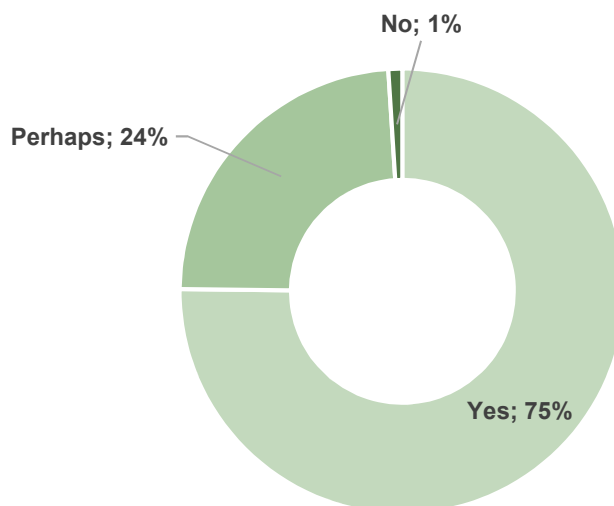


Figure 16. Consumers' willingness to pay more for yoghurts with natural flavours

3.3.4. Feasibility and acceptability

Figure 17 shows consumers' importance to different criteria when buying yoghurt (Figure 17). The results show distinct priorities among the different aspects evaluated. **Taste** tops the list, with 78% of consumers considering it a determining factor, confirming that the sensory experience is paramount when choosing yogurts. **Natural ingredients** follow closely behind, garnering 73% of favorable opinions, reflecting a strong preference for products perceived as healthy and authentic. **The brand** is also a significant criterion, with 71% of consumers attaching importance to it, reflecting a search for trust and quality associated with recognized names. **Price** comes a close second, with 69% of respondents considering it a key criterion, showing sensitivity to cost while valuing other qualitative aspects. **Packaging**, considered important by 66% of respondents, plays a moderate role, mainly because of its practical and aesthetic aspects. **Organic certification**, at 63%, underlines a growing interest in environmental and ethical standards, although this criterion remains secondary for some consumers. Finally, **color** is the least important criterion, with only 44% of consumers giving it a high priority, showing that visual appearance remains less decisive than other factors. Consumers value the intrinsic qualities of yoghurts, such as taste and natural ingredients, followed by external considerations, such as price and brand. These preferences offer key pointers for directing product production and marketing toward the highest expectations.

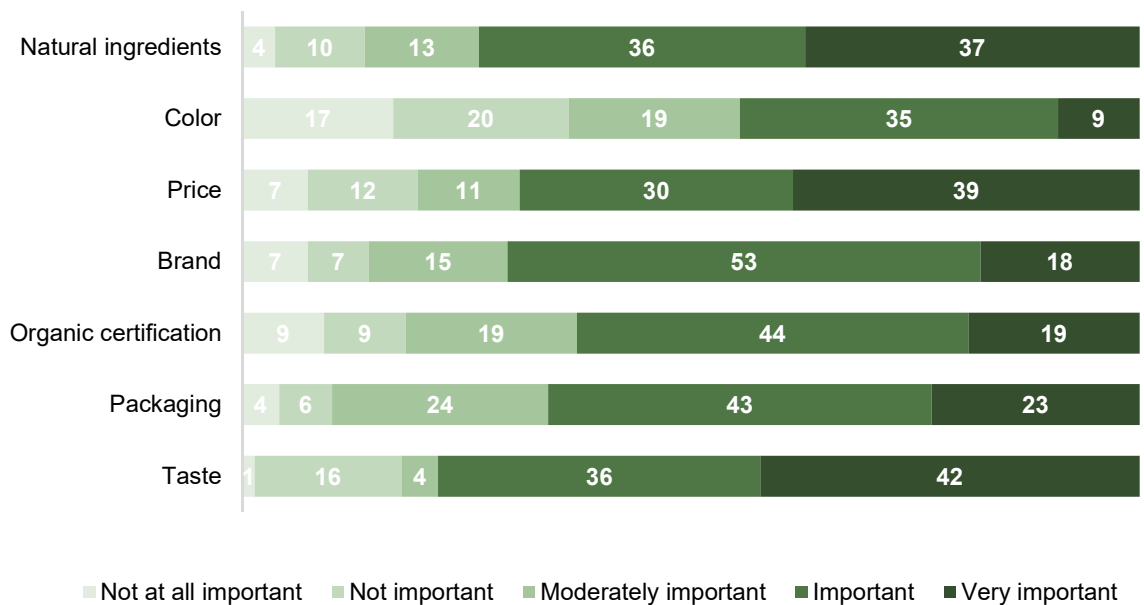


Figure 17. Importance of consumer criteria when buying yoghurts

3.4. Summary of consumer survey results

A survey of yogurt consumers in the Bobo-Dioulasso dairy basin reveals interesting opportunities for setting up a local natural product-based flavor production unit for yogurts made with local milk. Most consumers (74%) prefer natural flavours, which opens the way for introducing flavours made from local natural products, especially as 39% already consume yoghurt made from local milk.

The results show that taste and natural ingredients are consumers' most important choice criteria, underlining the importance of ensuring impeccable taste quality for the flavors produced. Moreover, 75% of consumers are prepared to pay more for yoghurts flavored with natural extracts and made from local produce, which is an asset in positioning these flavors as premium products.

Demand for local, natural products is strong, and consumers' openness to new flavors and willingness to support local products supports the economic feasibility of such a production facility. Producing tasty natural flavors at competitive prices will be crucial to meeting consumer expectations and promoting local natural flavors as a valuable alternative.

4. Conclusion

This first part of the study on processor and consumer expectations of flavored yogurts based on local natural products (made from non-timber forest products and various agricultural products) shows that there is certainly an opportunity to develop a production unit for these types of flavors. The survey revealed growing interest among processors and consumers for natural, local and authentic products. The growing demand for more natural products in the food sector suggests a promising opportunity to introduce these flavors to the market and develop new yogurt ranges.

However, several conditions must be met to ensure the success of such a project. It is essential to meet processors' quality, cost and sustainability expectations. The development of a diversified range of flavor formats, notably in liquid, powder or essence form, and the provision of suitable equipment for incorporating flavors into yogurt production, are key elements in facilitating the adoption of these products. In addition, particular attention must be paid to training processors and their staff to ensure optimal use of natural flavors and guarantee the quality of the final products.

In addition, the success of this project will also depend on adopting an eco-responsible approach, incorporating sustainable harvesting practices for the local produce from which the flavors will be extracted, and efficient waste management. This will respond not only to the environmental concerns of processors, but also to a growing consumer demand for environmentally-friendly products.

A strategy to raise awareness of the importance of local natural aromatic products in taste and nutrition will prove crucial to increasing consumer acceptance. This will help support local industries and enhance the natural resources of the Bobo-Dioulasso dairy basin, while boosting the appeal of yoghurts made from local milk and incorporating natural flavors.

5. References

- Fayama T, Sodr  E, Sib O, and Dabir  D, 2024. Study report on consumer preferences for milk and dairy products in the city of Bobo-Dioulasso. Working document, 30 p.
- Sib O, Orounladji B M, and Ouattara S D, 2023. Work Package 1. Formalization of the Burkina Faso agroecological living landscape (based on the actors of the local dairy value chain). Bobo-Dioulasso, 28-30 March 2023. s.l. CGIAR Initiative on Agroecology-CIRAD, Working document, 14 p.
- Sib O, Orounladji B M, Ouattara S D, Traor  I, Sanogo S, and Vall E, 2024a. Cost-Benefit Analysis of Agroecological Packages for Producers, Collectors and Processors in the Bobo-Dioulasso Milk Value Chain. Working document, 35 p.
- Sib O, Ouattara S D, Orounladji B M, Sodr  E, Traor  A, Sanogo S, Corniaux C and Vall E, 2024b. Agroecological characteristics of dairy value chain stakeholders' business models in Bobo-Dioulasso. Working document, 21 p.
- Wezel A, Gemmill Herren B, Bezner Kerr R, Barrios E, Rodrigues Gonalves A L, Sinclair F, 2020. Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review. *Agron Sustain Dev* 40: 40. doi.org/10.1007/s13593-020-00646-z

6. Appendices

6.1. Questionnaire for yogurt milk processors

Hello. Thank you for taking a few minutes to answer this questionnaire. Your answers will help us evaluate the profitability of a natural flavor production unit based on non-timber forest products.

Are you willing to answer our questions? 1 - yes, 2 - no

Do you agree that this data may be published but, of course, without your personal details? 1 - yes, 2 - no

Section 1: General information

1. Name of company/person :
2. Sector of activity :
 - Food industry
 - Yogurt producer
 - Other (please specify)
3. Geographical location (GPS coordinates) :
4. Company position (optional):
 - Manager/Director
 - Purchasing Manager
 - Production Manager
 - Other (please specify)

Section 2: Knowledge and use of natural flavors

5. Do you currently use flavorings in your products?
 - Yes
 - No
6. If so, what types of flavorings do you use?
 - Synthetics
 - Natural
 - Both
7. What natural flavors do you already use?
 - Date
 - Théodo (monkey bread)
 - Kinkéliba
 - Moringa
 - Coco
 - Pineapple
 - Horchata
 - Néré
 - Mango
 - Banana
 - Zèguènè
 - Other (please specify)
8. How important are natural flavors in your production?
 - Very important
 - Important
 - Not important
 - Not important
9. Are you familiar with non-timber forest products (NTFPs - leaves, fruit, bark, etc.) as a source of natural flavorings?
 - Yes
 - No

Section 3: Demand and preferences

10. What are your main criteria for choosing the flavors you use? (In order of importance)
 - Price
 - Quality

- Natural
 - Synthetic
 - Durability
 - Supplier
 - Other (please specify)
11. Would you be interested in NTFP-based yoghurt flavourings?
- Yes
 - No
12. If not, why not (several choices possible)
- Lack of knowledge about NTFPs
 - Preference for synthetic flavours
 - Quality concerns
 - Other (please specify)

Section 4: Technical and quality aspects

13. Which aspects of quality are most important to you?
- Aromatic profile
 - Purity
 - Shelf life
 - Certificates of conformity (organic, ISO, etc.)
 - Other (please specify)
14. Would you be willing to pay more for high-quality natural flavours based on NTFPs?
- Yes
 - No
15. What do you think would be an acceptable additional cost for natural flavors (as a percentage compared with synthetic flavors)?
- 0-5%
 - 5-10%
 - 10-20%
 - More than 20% reduction

Section 5: Technical feasibility

16. Do you have the equipment you need to incorporate natural flavors into your current production ?
- Yes
 - No
17. If yes to the previous question, what equipment do you have?
-
 -
18. Would you be prepared to invest in new equipment if necessary?
- Yes
 - No
19. What would be your main technical concerns regarding the use of NTFP flavors in yogurt production? (multiple choices possible)
- Equipment adaptability
 - Staff training
 - Compatibility with existing products
 - Flavor shelf life
 - Other (please specify)

Section 6: Economic feasibility

20. What is your annual budget for the purchase of aromas?
- Less than 100,000 FCFA
 - 100,000 - 500,000 FCFA
 - 500,000 - 1,000,000 FCFA
 - More than 1,000,000 FCFA
21. What impact would an increase in the cost of flavorings have on your production?
- Low
 - Moderate
 - High
22. What might these impacts look like?
- Using the traditional yogurt flavoring method

- Use of synthetic flavors
 - Other (please specify)
23. What are your main economic criteria for choosing a flavorings supplier? (multiple choices possible)
- Price
 - Terms of payment
 - Volume discounts
 - Price stability
 - Other (please specify)

Section 7: Environmental feasibility

24. How important are sustainability and environmental aspects in your choice of flavors?
- Very important
 - Important
 - Not important
 - Not important
25. Would you be interested in environmental certification for NTFP-based flavors?
- Yes
 - No
26. If no to the previous question, what are the reasons for your point of view?
- A tedious process
 - Additional costs incurred in flavor production
 - Other (please specify)
27. What would be your main environmental concerns regarding the use of NTFP flavors? (multiple choices possible)
- Impact on biodiversity
 - Sustainable harvesting practices
 - Carbon footprint
 - Waste management
 - Other (please specify)

Section 8: SWOT analysis

28. In your opinion, what are the main strengths of NTFP flavours for your production?
-
 -
 -
29. What are the main weaknesses of NTFP flavours for your production?
-
 -
 -
30. What opportunities do you see in the use of NTFP flavors for your company?
-
 -
 -
31. What are the main risks or threats to your business from the use of NTFP flavors?
-
 -
 -

Section 9: Opinions and suggestions

32. What other factors or concerns do you consider when purchasing flavors for your products?
-
 -
 -
33. Do you have any suggestions or comments regarding the use of NTFPs for flavor production?
-
 -
 -

Section 10: Follow-up contact

34. Would you be willing to be contacted for further discussions or potential partnerships?
- Yes
 - No
35. If yes, please provide your contact details :
- Name :

- Email (if possible) :
- Phone

6.2. Questionnaire for yogurt consumers

Hello. Thank you for taking a few minutes to answer this questionnaire. Your answers will help us better understand consumer preferences for natural-flavored yogurts available in the Bobo-Dioulasso dairy basin.

- Are you willing to answer our questions? 1 - yes, 2 - no
- Do you agree that this data may be published but, of course, without your personal details? 1 - yes, 2 - no

Section 1: General information

1. Age
 - Under 18s
 - 18-25 years
 - 26-35 years
 - 36-45 years
 - 46-55 years
 - Over 55
2. Type
 - Female
 - Male
 - Prefer not to say
3. Geographical location:

Section 2: Yogurt consumption habits

4. How often do you eat yogurt?
 - Every day
 - Several times a week
 - Once a week
 - Less than once a week
5. What types of yogurt do you eat most often? (several choices possible)
 - Nature
 - With fruit
 - Vanilla, chocolate, etc. flavors
 - Low in sugar
 - Bio
 - Other (please specify)

Section 3: Flavor preferences

6. Do you prefer yoghurts with natural or synthetic flavours?
 - Natural
 - Synthetics
 - No preference
7. Which natural-flavored yogurts do you currently consume?
 - Date yogurt
 - Theodo yoghurt (monkey bread)
 - Kinkeliba yogurt
 - Moringa yogurt
 - Coconut yogurt
 - Pineapple yogurt
 - Horchata yogurt (Tiger nuts)
 - Nere yogurt
 - Mango yogurt
 - Banana yoghurt
 - Zaigainai yogurt (Balanites)
 - Other (please specify)
8. Would you pay more for yoghurt with natural flavourings?
 - Yes
 - No

- Perhaps

Section 4: Knowledge and perception of natural aromas

9. Are you familiar with natural flavors from non-timber forest products (NTFPs)?
- Yes
 - No
10. If yes to the previous question, where can you find them?
-
 -
11. How important are the following aspects when buying yogurt?

	Not at all important (1)	Not important (2)	Moderately important (3)	Important (4)	Very important (5)
Taste					
Natural ingredients					
Price					
Brand					
Organic certification					
Packaging					

Section 5: Feasibility and acceptability

12. If yoghurts with natural NTFP flavours were available, would you be interested in trying them?
- Yes
 - No
 - Perhaps
13. What factor(s) could convince you to buy NTFP natural-flavored yogurt? (multiple choices possible)
- Better taste
 - Natural ingredients
 - Health benefits
 - Respect for the environment
 - Other (please specify)

Section 6: Sensitivity to environmental and sustainability issues

13. How important are environmentally-friendly products to you?
- Very important
 - Important
 - Moderately important
 - Not important
 - Not at all important
14. Would you be more inclined to buy natural-flavored yogurts if you knew they were sustainably produced?
- Yes
 - No
 - Perhaps

Section 7: Opinions and suggestions

15. What other factors or concerns do you consider when buying yogurt?
-
16. Do you have any suggestions or comments about natural-flavored yogurts?
-

Section 8: Follow-up contact

17. Would you be willing to be contacted for further discussions or potential partnerships?
- Yes
 - No

18. If yes, please provide your contact details :

- Name :
- Email (if possible) :
- Phone :



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