






Research Article

Situation of Consumption of Seasoning Broths in Three Cities in Côte d'Ivoire: Abidjan, Bouaké and Daloa

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Abstract

Introduction: Seasoning broths have become an indispensable ingredient of more than 80% of households. The objective of this study is to assess the consumption of seasoning broths in three cities of Côte d'Ivoire: Abidjan, Bouaké and Daloa. **Methodology:** Survey missions were carried out from 2nd June 2022 to 10th August 2022 in Abidjan, Bouaké and Daloa. **Results:** Tablet (Maggi), Soumara and shrimp (Maggi) broths were the most consumed with 36%, 18% and 17% of the surveyed households respectively. The most consumed broths are Crevette (Maggi) in Bouaké, Poulet (Maggi) in Daloa and Tablette (Maggi) in Abidjan. The long consumption periods were in Bouaké with Soumara (16.7 years), Poulet (Maggi) (16.5 years) and Tablette (Maggi) (16.3 years). The daily consumption frequencies were between 2 and 3. The recorded frequencies were between 1.12 and 2.13 in Abidjan, between 2.7 and 3 in Bouaké and, 2 and 2.05 in Daloa. **Conclusion:** The most consumed broths were Tablette (Maggi), Soumara and Crevette (Maggi), respectively. Bouaké recorded the longest consumption periods of 14 to 16.7 years. Daily consumption frequencies ranged from 2 to 3 broths/day. Investigations will be conducted for the enhancement of the traditional broth «Soumara» for its highly appreciated properties in food and traditional medicine.

Keywords

Broths, Consumption, Households, Cities, Côte d'Ivoire

1. Introduction

Broths are seasoning ingredients, in different forms (cubes, powders, liquids) [1]. These seasoning broths have become an indispensable and unavoidable ingredient in many everyday

dishes of more than 80% of African households [2, 3]. They are valued for their taste-enhancing powers and affordable prices [4, 5]. In order to meet the ever-growing needs of

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consumers, food technology professionals are trying several formulations. For example, 75,000 tons of seasoning broth are produced annually. In 2016 alone, more than 65 billion broths flood the African market, dominated by a few large companies including Nestlé, Jumbo and KUB [6]. Besides these industrial broths, Soumara, fermented food condiment, handcrafted from the cotyledons of the seeds of *Parkia biglobosa* «néé» is very popular in sub-Saharan Africa [7-10]. Soumara recipes are highly valued not only for their richness in nutrients (diet), but also in traditional medicine (polyphenols, flavonoids) [11]. Soumara reduces high blood pressure, fights goiter, reduces anemia, prevents cancer and fights constipation [12]. However, while appreciated, there are many criticisms of seasoning cubes for their composition and the health effects of the many food additives they contain [13]. Indeed, the cubes contain Monosodium Glutamate or MSG (E 621) [14], which turns out to be one of the most contested products. Industrial broths are responsible for sexual weakness in men, vaginal bleeding, urogenital disorders, heart problems, hypertension, gastritis, behavioral disorders in children, prostate swelling, Parkinson's disease, Alzheimer's [14]. In Côte d'Ivoire and especially in large cities, household eating habits cause seasoning broths to be purchased day by day despite the potentially dangerous effect of these. In addition, little data exists on household eating habits. In 2023,

Ahon et al. [11] conducted a survey of soumara consumption in the communes of Koumassi and Port-Bouët located in the District of Abidjan. In view of the risks to the health of consumers that their excessive consumption could cause, it appeared necessary to conduct a consumption survey in order to look for the different seasoning broths consumed while highlighting the factors of appeal (frequency, preference and duration) of these broths by households surveyed in Abidjan, Bouaké and Daloa.

2. Study Areas

This study took place in three major urban centers of Côte d'Ivoire: Abidjan, Bouaké and Daloa. Abidjan, the country's economic capital, has a population of 5,616,633 with an average household size of 4.5 [15]. The city of Bouaké is located in central Côte d'Ivoire. It is the second most populous city after the economic capital Abidjan and the third economically. Its population is estimated at 832,371 with 152,187 households with an average size of 5.4 [15]. Daloa is the third city in Côte d'Ivoire in terms of population after Abidjan and Bouaké. Located in the center-west, Daloa is a cosmopolitan agricultural town. Its population is 421,879 with 80,584 households averaging 5.2 [15].

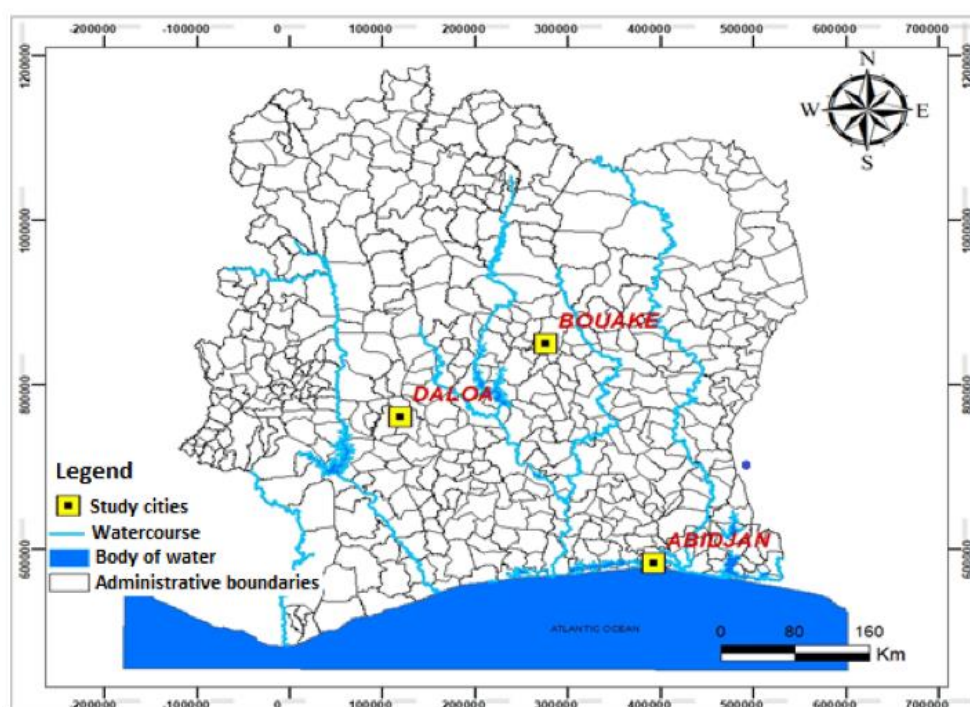


Figure 1. Study areas.

3. Sampling Method

Fact-finding missions were carried out from 2 June 2022 to

10 August 2022 in three major urban centers in Côte d'Ivoire: Abidjan, Bouaké and Daloa. Data collection used the development of a household-only questionnaire, a pre-survey to test the questionnaire, and actual data collection [16]. The

questionnaire included open, semi-open and closed questions, with spaces available to record alternatives to the proposed options. This questionnaire was based on the preferential choice of broths of households, their duration and frequency of consumption of broths. These survey missions lasted 69 days corresponding to the pre-survey during which the questionnaire was tested and the collection of data from households.

The number of households covered by the consumption survey was determined using Survey Monkey Audience [17] with:

Population size = Total number of households per city (Abidjan = 1,261,750; Bouaké = 152,187; Daloa = 80,584);

Margin of error = 5%;

Confidence level = 95%;

z-score = 1.96.

The interview was face to face, in one go. The household survey was a 24-hour recall type of consumption survey [18]. A total of 656 households were surveyed.

4. Statistical Analyses

The data was collected in Microsoft Excel 2013. GraphPad. Prism. V9.5 was used for averaging and plotting graphs. Means are presented as mean standard deviation.

5. Results

5.1. Different Types of Broths Consumed and Consumption Preference of Study Households

The survey revealed two types of culinary broths consumed: industrial broths [Crevette (Maggi), Jumbo, Tablette (Maggi), Tomato (Doli), Adja, Etoile (Maggi) and Poulet (Maggi)] and traditional broth "Soumara" (Figure 2). Overall, Tablette (Maggi), Soumara and Crevette (Maggi) broths were the most consumed with 36%, 18% and 17% of the surveyed households respectively (Figure 3).

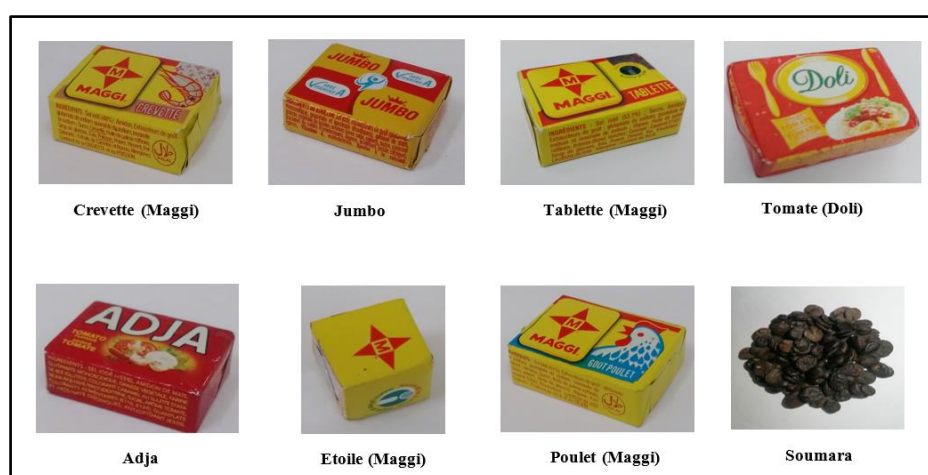


Figure 2. Seasoning broths recorded after investigation.

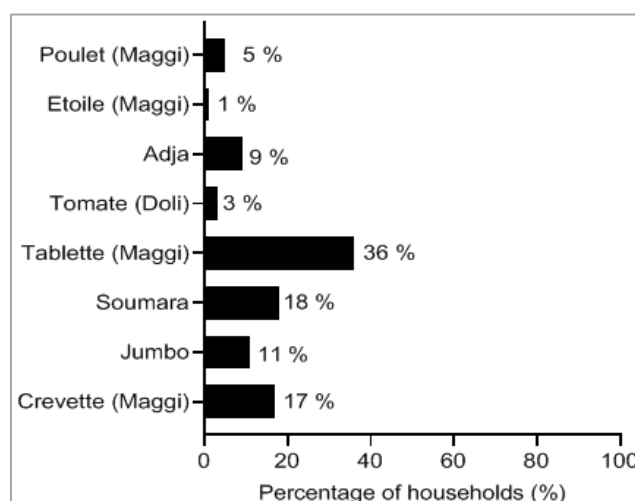


Figure 3. Type and preferred choice of household broths.

5.2. Distribution of Households Consuming Broths by City

Throughout the survey, an appeal for broths was observed in households in the three cities, namely Daloa, Bouaké and Abidjan. The Crevette (Maggi) broth was found more in households

in Bouaké than in Daloa and Abidjan. It is the same for the broths Crevette (Maggi), Jumbo, Soumara, Tomato (Doli), Adja and Etoile (Maggi). However, the number of households consuming Poulet (Maggi) broth was higher in Daloa than in Bouaké and Abidjan. Tabletée (Maggi) broth was more consumed in Abidjan than in Daloa and Bouaké (Figure 4).

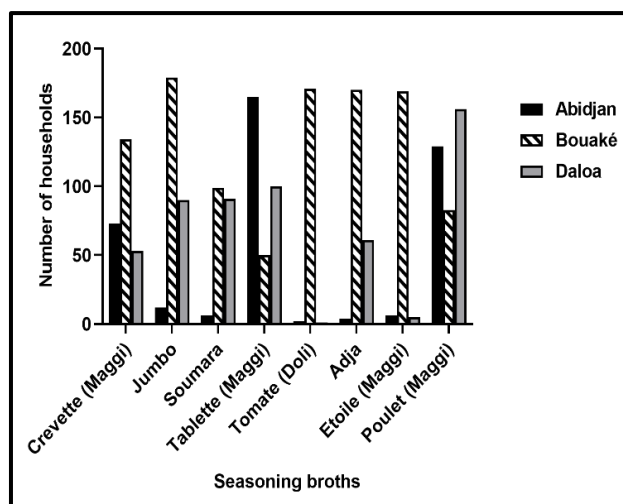


Figure 4. Distribution of broth consumption in households by city.

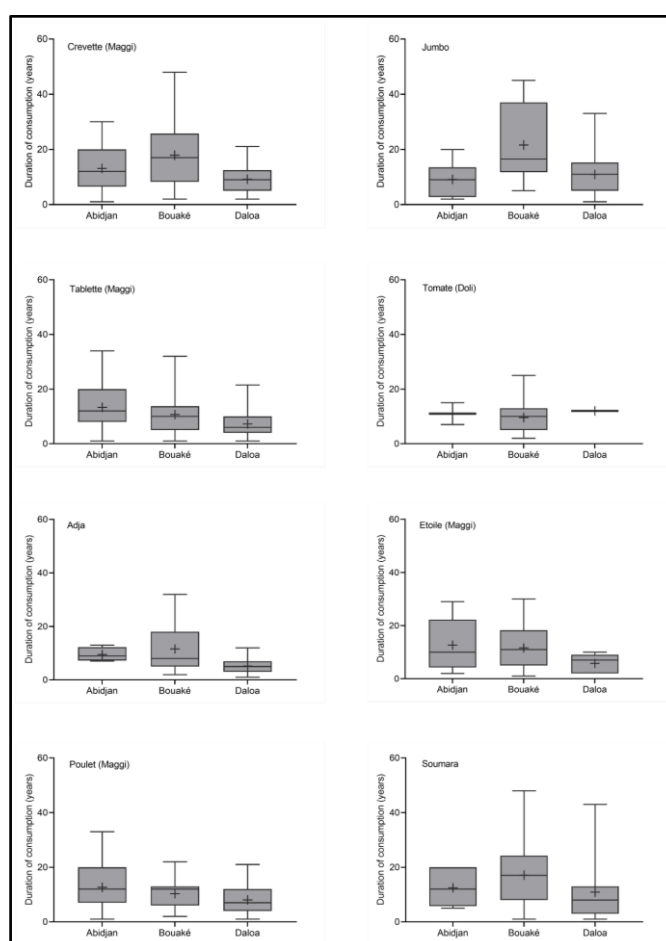


Figure 5. Broth consumption duration by city.

5.3. Duration of Consumption of Household Broths

Overall, it was in Bouaké that the high consumption durations were observed, namely 14 to 16.5 years of consumption of broths with Soumara (16.7 years), Poulet (Maggi) (16.5 years) and Tablette (Maggi) (16.3 years) respectively as the longest consumed. The city of Abidjan occupied the second place behind Bouaké with 12 to 15 years of consumption of broths with Tomato (Doli) broth as the longest consumed (15 years). The third place was occupied by the households of Daloa with average consumption durations of broths that ranged from 8 to 12 years with the broth Tomato (Doli) as the longest consumed (12 years) (Figure 5).

5.4. Frequency of Consumption of Household Broths

As for the daily consumption frequencies, they were between 2 and 3 broths/ Day in all the households surveyed. Indeed, households in Daloa recorded frequencies between 2 and 2.05 broths/Day with broths Crevette (Maggi), Tablette (Maggi), Poulet (Maggi) and Soumara the most consumed daily. Those of Bouaké had frequencies ranging from 2.7 to 3 broths/ Day with the broth Tomato (Doli) most frequently consumed. Daily consumption frequencies of Abidjan household broths were between 1.12 and 2.13 broths/Day with the most consumed Adja broth and Tablette (Maggi) and Poulet (Maggi) broths (Figure 6).

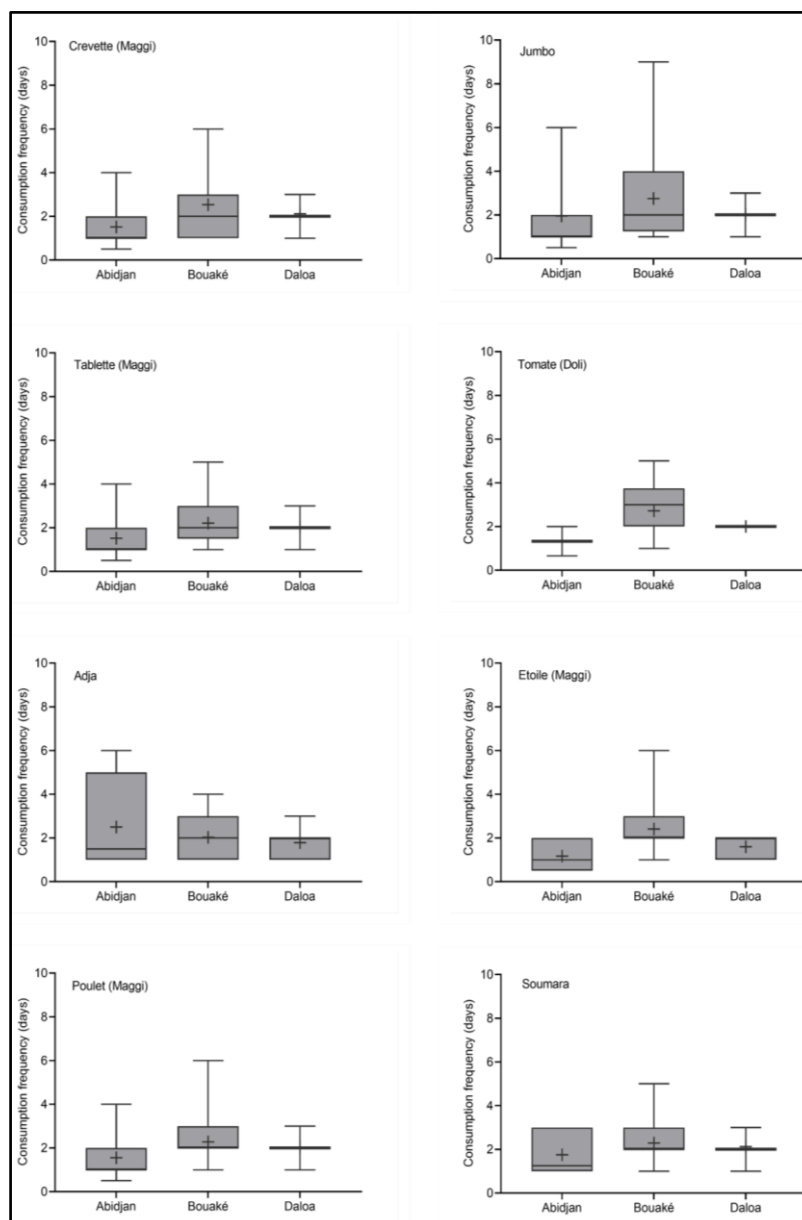


Figure 6. Broth consumption frequency by city.

6. Discussion

The investigation revealed the presence of industrial broths such as Crevette (Maggi), Jumbo, Tablette (Maggi), Tomato (Doli), Adja, Etoile (Maggi) and Poulet (Maggi), and traditional broth, Soumara, a food condiment based on «Néré» seeds *Parkia biglobosa* in the three cities of Abidjan, Bouaké and Daloa. These broths are well known to populations. Indeed, they have become an indispensable ingredient for more than 80% of households in West Africa [2, 3]. In addition, Tablette (Maggi), Soumara and Crevette (Maggi) broths were the most consumed in respectively 36%, 18% and 17% of the surveyed households. A pronounced interest in broths Crevette (Maggi), Jumbo, Soumara, Tomato (Doli), Adja and Etoile (Maggi) was noted in households in the city of Bouaké While Poulet (Maggi) broth was more consumed in Daloa. As for Tablette (Maggi) broth, it was more consumed in Abidjan. According to 2011 estimates, Maggi brand broths were most present in West and Central Africa with more than one hundred million cubes sold daily [13]. In all the households surveyed, consumption frequencies were between 2 and 3 cubes of broths per day with consumption durations between 8 and 16.7 years. This range of consumption periods shows the recent integration of broths into the cooking habits of households in these cities of Côte d'Ivoire. Indeed, industrial culinary broths appeared in Africa in the 1950s with a penetration rate of more than 70% in households [13].

However, Bouaké recorded the longest consumption periods: 14 to 16.7 years of consumption of broths with 16.7 years for Soumara against 16.5 years for Poulet (Maggi) and 16.3 years for Tablette (Maggi). This singularity of the city of Bouaké could be explained by the presence of populations already having a culture of broths. Bouaké is a cosmopolitan city with strong migrant communities from neighboring countries such as Burkina Faso, Mali and Guinea [19]. These populations have a long history with culinary broths, with a particular reference to the nutritional values, safety and commercial potential of these broths [20, 21].

Consumers prefer broth in their daily diet because of its palatability, high nutritional value [22, 23]. Indeed, broth is a food product in which a good number of protein-rich substances and their derivatives play an essential role in taste [1, 24]. These broths all also contain salt, maltodextrin, flavour enhancers, oil and aromas [1, 13]. However, several decades after their introduction into households, scientific studies have revealed the toxic character of industrial broths. Indeed, cubes would be dangerous because of the presence of monosodium glutamate or MSG (E 621) also called «flavor enhancer» [14]. Similarly, these broths are salt providers whose excessive consumption contributes significantly to the development of non-communicable diseases (NCDs) such as high blood pressure and other cardiovascular diseases [25-27].

On the other hand, Soumara, fermented food condiment made from the cotyledons of the seeds of *Parkia biglobosa*

«Néré» is very appreciated by indigenous communities in sub-Saharan African countries [7-10]. Soumara recipes are highly appreciated not only for their taste, but also for their nutritional (rich in proteins and vitamins) and medical qualities. Indeed, Soumara would decrease high blood pressure, combat goiter, reduce anemia, prevent cancer and fight constipation [12]. This survey showed that traditional broth, Soumara was very present in households. This was confirmed by Ahon *et al.* (2023) [11] who justified through a consumption survey, the many uses of this ingredient, both in food and traditional medicine, because very rich in nutrients, polyphenols and flavonoids. The authors also revealed that the Soumara produced in Côte d'Ivoire is relatively more consumed (55.77%) than that produced in other countries (44.23%). And that this artisanal product was appreciated for its taste to 50.97% of consumers and for its therapeutic character to 37.5%: in the form of grain (68.27%), powder (23.08%) or paste (8.65%).

7. Conclusions

This investigation revealed two types of seasoning broths, namely industrial broths [Crevette (Maggi), Jumbo, Tablette (Maggi), Tomato (Doli), Adja, Etoile (Maggi) and Poulet (Maggi)] and traditional broth Soumara. Overall, Tablette (Maggi) broth was the most consumed, followed by the Soumara and finally the broth Crevette (Maggi). Bouaké households preferred broth Crevette (Maggi), while Daloa households favored broth Poulet (Maggi). Abidjan households preferred broth Tablette (Maggi).

The city of Bouaké had the longest consumption periods: 14 to 16.7 years with Soumara broths (16.7 years), Poulet (Maggi) (16.5 years) and Tablette (Maggi) (16.3 years). As for the daily consumption frequencies, they were between 2 and 3 broths/Day in all the households surveyed. Daily consumption frequencies of Abidjan household broths were between 1.12 and 2.13 broths/Day. Investigations will be conducted for the enhancement of the traditional broth for its properties as well as in food as in traditional medicine very appreciated by households of these three major cities of Côte d'Ivoire.

Abbreviations

MSG	Monosodium Glutamate
NCDs	Development of Non-Communicable Diseases

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Author Contributions

Lassana Bamba: Data curation, Writing – original draft

Gervais Méline M'Boh: Conceptualization, Project administration

Kipré Laurent Séri: Data curation, Writing – original draft, Writing – review & editing

Gnogbo Alexis Bahi: Methodology

N'Gbesso Amos Ekissi: Resources

Kouassi Denis Bédou: Data curation, Formal Analysis

Grah Avit Maxwell Beugré: Supervision

Allico Joseph Djaman: Validation, Visualization

Conflicts of Interest

The authors declare no conflicts of interest.

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