

Research Article

Cooking Salt Content in Food Cubes Commonly used in Northern Togo

Adjangba KM^{1*}, Agbodji Y¹, Agoro S¹ and Amouzou EKS²

¹Department of Nutrition, Regional Health Directorate, Kara, Togo

²Laboratory of Biochemistry and Nutrition, University of Lomé and University of Kara, Togo

Abstract

Food cubes are essential additives in the preparation of food. The use of cubes is very widespread in Africa, precisely in West Africa. They are composed of salt and many other ingredients. The objective of this study is to determine the cooking salt content of commonly used cubes. The study consisted of a cross-sectional descriptive survey of restaurant managers from 12 February to 17 April 2019 and the determination of the salt content of 21 samples of cubes using the Mohr method. According to 44.8% of restaurant managers, the food cubes did not contain salt. For 65.5% of the respondents, there was no link between excessive salt consumption and cardiovascular disease. Analysis of the labeling of the cubes shows that they contain monosodium glutamate (100% of cubes analyzed), iodized salt, starch and vegetable fat. The average weight of the cubes analyzed is 9.4 g. The average salt content of the analyzed cubes is 64%, ranging from 40% to 76%. A 10 g food cube tablet provides the meal with more than 5 g of cooking salt, the quantity of salt recommended by the WHO to be consumed per day and per person. In view of the analysis results, it is advisable to take into account the salt content of the meal and the quantity of salt to be consumed per day before adding the food cube. Switching to traditional nutritious condiments would help to reduce the salt in our food and prevent cardiovascular disease.

Keywords: Food cube; Content; Cooking salt; Northern togo

Introduction

Food cubes refer to a broth, a mixture of dehydrated ingredients in cubic form. The main active ingredients in food cubes are sodium chloride and monosodium glutamate. Other ingredients in food cubes include the following: the soybean, carob, onion, tomato, hydrogenated palm oil, caramel, herb leaves, hydrolyzed vegetables and natural spices [1]. The same blends may also be marketed as powders. The cubes act as flavor enhancers in the culinary arts. When added, they enhance the taste properties of these foods. Industrial nutritious condiments, either in the form of food cubes or broths, were introduced to Africa during the colonial period shortly after Julius Maggi introduced them to the Swiss market in 1908. Food cubes were imposed as industrial nutritious condiments in African kitchens and are present in urban and rural areas [2]. Julius Maggi's concern was to give a fish or meat flavor to the dishes of the poor through the cubes as they were not able to have them enough in their meal. Food cubes have become indispensable in many daily dishes in several countries on the African continent. In 2016, 65 billion fortified culinary broths were sold in Central and West Africa according to

"Africa news". Food cubes are popular seasoning products in sub-Saharan Africa, where they are regularly used by a large number of households for meal preparation. Today the West African industrial broth sector is worth \$375 million [3]. Salt, one of the ingredients in food cubes, is also used as a food additive to enhance the taste of food. Salt, a crystalline form, is composed mainly of sodium chloride (NaCl). Experts refer to food cubes as "well-packaged salt".

The high consumption of sodium - a component of cooking salt - is one of the major determinants of blood pressure [4] and is believed to be the cause of diseases such as hypertension and kidney failure. In 2010, a study conducted by Mozaffarian et al. [5] showed that the average salt consumption per person in the world is 3.95 g per day. They estimated that 1.65 million deaths from cardiovascular disease related to excess sodium in the world. Four out of five deaths (84.3%) occurred in low and middle-income countries. These deaths are attributed to salt consumption above the World Health Organization (WHO) recommended intake of 5 g per day [6]. Hypertension is one of the risks cited as being associated with the consumption of broth or food cubes [7]. Few representative data are available on the salt content of food cubes that flood the local market. Apart from traditional mustards, made from protein-rich seeds, food cubes are also widely used in Northern Togo as a food additive. In order to prevent illnesses linked to over-consumption of salt, consumers should be informed about the salt content of food cubes. Thus, the objective of this study is to evaluate the amount of salt incorporated in different imported food cubes sold on market in Northern Togo by direct chemical analysis. Specifically, this study aims to assess the level of knowledge of restaurant managers on the composition of food cubes and diseases related their high amount of salt content one the hand and to determine the dietary salt (NaCl) content of nutritive condiments - food cubes - on the other hand.

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***Corresponding author:** Adjangba Kokou Mensah, Department of Nutrition, Regional Health Directorate, Kara, Togo, Tel: +228-90249015; E-mail: amensah@live.fr

Materials and Methods

Study framework

The analysis of the food cubes is carried out in the laboratory for the analysis of water, products and foodstuffs of the regional health office located at University Hospital Centre (CHU) of Kara. The laboratory of sanitation, water and environmental science of Kara University was used as a framework for the preparation of the solutions.

Raw material

In this study, the raw material used is the food cube. The trials covered a total of 21 types of food cubes purchased on the market in Northern Togo: « Cookzen », « Maggi poulet », « Maxi gout », « Jumbo crevette », « Mimido », « Aromate », « Gino », « Onga », « Bonjour », « Jamila », « Jumbo arôme », « Bonfood », « Aicha », « Mouna's », « Adja épices », « Adja tomate », « Adja poulet », « Jumbo poulet », « Top poulet », « Alafia » et « Africube ».

Reagents

The solutions used to analyze the different bread products are: Silver Nitrate (AgNO_3) [VWR PROLABO CHIMICALS, France] and Potassium Chromate (K_2CrO_4) [VWR PROLABO CHIMICALS, France], as a color indicator.

Inquiry sheet

In order to assess the level of knowledge of the restaurant managers, they are subjected to a 20 questions quiz. The survey was carried out among 29 restaurant managers in the city of Kara. The questions focus on the role attributed to the food cube; the consumption of the food cube and salt; and the diseases that can result from excessive salt consumption.

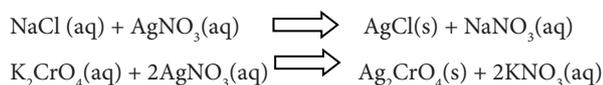
Method

Sampling

This is a cross-sectional study on a sample of 21 bouillon cubes purchased on the market in Northern Togo. The collection of the cubes did not take into account any eligibility criteria. Almost all the cubes found on the market were analyzed in this work. The sampling was carried out from 12 February to 17 April, 2019.

Quantitative evaluation of the salt content of the different food cubes

The Mohr method: The colorimetric titration is based on the differential precipitation of two anions: Cl^- and CrO_4^{2-} by adding a solution of silver nitrate (AgNO_3) in a neutral or alkaline medium. The addition of a color indicator, potassium chromate (K_2CrO_4), is necessary.



Operating procedure: Two (2) grams of food cube sample were weighed and then crushed in a mortar using a pestle. The powder obtained was dissolved in 200 ml of distilled water. To avoid loss of sample, the mortar was rinsed with distilled water. The mixture was homogenized after every 10 minutes for one hour. One milliliter of the homogenized and decanted solution is taken and poured into an Erlenmeyer flask. This volume corresponds to 0.02 g of cube. To 1 ml was added 0.5 cm^3 of potassium chromate solution (colored indicator). The mixture was titrated with the silver nitrate solution until the color changes from yellow to orange. For each sample two tests were carried out.

Statistical analysis

The data collected were analyzed using Excel and R stat software. The mean salt contents of the cubes were compared by ANOVA to a factor. The difference was at $p < 0.05$ level of significance.

Results

Survey

The results of the survey show that 96.6% of large food service areas use the food cube. Forty-eight point three percent (48.3%) of managers believe that the cubes contain glutamate, 24.1% spices and 3.4% oil. For food preparation, 13.8% of the food retailers surveyed incorporate 5 food cube tablets per sauce; 31% 4 tablets; 24.1% 3 tablets; 6.9% 2 tablets and 10.3% 1 tablet. According to the data collected, 51.7% of food outlets in Kara use "Cookzen"; 17.2% "Maggi-chicken"; 6.9% "Maxi-gout"; 6.9% "Onga"; 6.9% "Jumbo shrimp". The criteria used by retailers in choosing food cubes are: taste (69%), customer preference (51.7%), smell (10%) and price (24.1%). Almost all the space managers surveyed prefer food cubes over other food additives such as spices and puddings. The restaurant owners acknowledge that food cubes increase the amount of salt in the sauce and were able to differentiate between cubes by taste (79.3%) and odor (20.7%). For 44.8% of the food court managers, salt is not one of the ingredients used to make the cube. The survey results show that restaurant operators prefer food cubes because of taste (51.7%); the fact that the cube is fashionable (55.2%); ease of use and cost (31.0%); and price (10.3%). Only 44.8% of managers do not know the ingredients that go into the composition of the cubes. For 65.5%, there is no link between excessive salt consumption and cardiovascular disease. Of the 34% who made a link between excessive salt consumption and non-communicable diseases, 31% cited cancer as a disease, 24.1% hypertension and 17.2% cardiovascular disease. To the question "Do you know about hypertension", 26 respondents answered "yes". To avoid hypertension, the respondents think that one should consume less salt (31%); less food (3.4%); less oil and do sports (41.4%).

Composition of the cubes from the packaging data

After analysis of the cube labels, we contact that 43 ingredients are used in the composition of the cubes. All cubes analyzed (100%) contain salt. Only 73.68% of the cubes studied are made from iodized salt. Compared to flavor enhancers, the 21 cubes contain 100% and 63.16% sodium glutamate and sodium guanylate plus sodium inosinate respectively. Sugar is also found in all the cubes (100%) studied. Vegetable fat is present in 78.95% of the cubes. The labels give less information about the nature of the fat.

Starch and spices (57.89%); flavorings (42.11%); maltodextrin, caramel and onion (31.58%), a vegetable protein extract from wheat and soybeans (36.84%) are also found in the food cubes.

Apart from the above-mentioned ingredients, the cubes also contain corn starch (42.11% of the cubes analyzed); oil, garlic, natural coloring (E 150 c, E 100, E 160) (21.05%); glucose syrup, water, preservative, soya flour (5.26%); chicken flavor, turmeric, vegetable extract, food coloring (E 150 d), coloring (E 160 b), vitamin A, chicken, citric acid, yeast extract, herbs (15.79%); soy lecithin, celery, shrimp powder, antioxidant, black pepper, herbs (10.53%); modified starch, succinic acid, egg, chicken soup, chicken fat, parsley, turmeric powder (5.26%).

Net weight of cubes analyzed

The average mass of food cubes sold on markets in northern Togo is 9.4 g. Fifty-five percent (75%) of the cubes weigh 10 g (Figure 1).

Composition of salt in cubes studied

The chemical analysis of the cubes consisted in the determination of NaCl by the Mohr method. The results of the analysis show that all the cubes analyzed contain cooking salt. The salt content of the cubes varies from 40% to 76% (Figure 2). The average sodium chloride composition of the analyzed cubes is 64%.

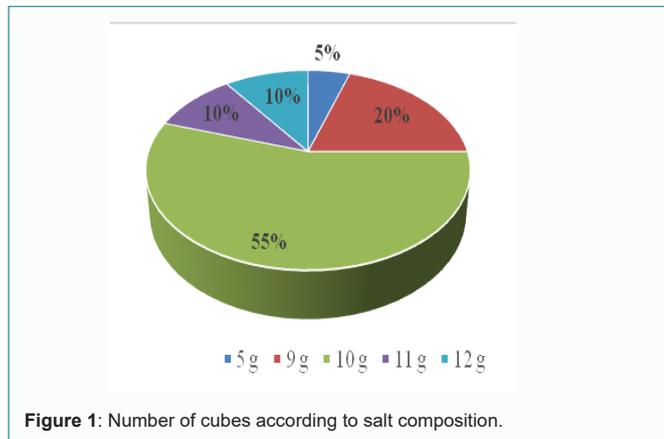


Figure 1: Number of cubes according to salt composition.

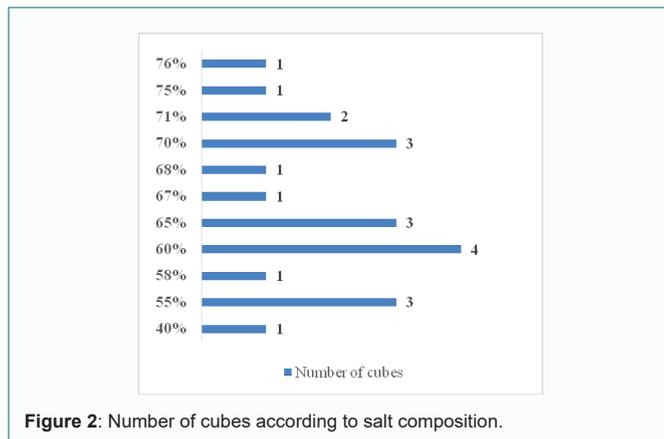


Figure 2: Number of cubes according to salt composition.

Discussion

Seasoning cubes are widely used in the preparation of restaurant meals in the city of Kara. Less than five percent (5%) of women restorer use traditional nutritious condiments made from local products. This observation is in line with Pivot's [2] findings on the presence of food cubes in the public squares of West African cities. The majority of the managers of large catering spaces in Kara are unaware of the composition of the food cubes they use. The amount of cubes added to the sauce would be too high: not only do they add cubes, they also add cooking salt directly to the sauce. In fact, the amount of salt becomes very important in the sauce. The choice of the brand of the cube is guided by the primary role given to the bouillon cube by the manufacturer, as a flavor enhancer. The use of the food cube is guided by consumer appreciation.

In the food industry, the manufacturing process of the cube consists of mixing ingredients such as salt, monosodium glutamate, palm oil, caramel, spices, soy flour, locust bean gum, onion, tomato, natural proteins and starch in addition to coloring and flavoring [8]. The 43 ingredients listed on the packaging of the 21 cubes analyzed are found on the list of Rodrigues et al. in Brazil.

However, the CODEX Alimentarius Standard on "Food Labeling" states that the label should include "specific information on how the

food additive is to be stored and used in food". This is not the case for the labels of the analyzed cubes. Information on storage and guidance for use should be included on the label. In order to comply with CODEX standards. On the shell of the cubes, the list of ingredients begins with salt or iodized salt. The requirement of the standard that the ingredients "shall be listed in decreasing order by weight of the total contents of the package" is met because for all seasoning cubes salt remains the highest constituent.

The cubes analyzed, like the other food cube lines, are composed mainly of cooking salt and sodium glutamate as mentioned by Caponio et al. [9] in their study on stock cubes.

In Benin, Doussou-Yovo et al. [10] in 2013 evaluated the nutritional quality of the most consumed bouillon cubes. The average salt content of the most consumed bouillon cubes in South Benin is 39.00%, which is almost half the average salt content of bouillon cubes in North Togo. This content varies between 17.66% and 53.66%. There is a significant difference between the content of the most used food cubes in South Benin and North Togo at a threshold of 0.05. The average content of bouillon cubes from South Benin is well below the standard set in Senegal (55%) [11].

Sauces prepared with food cubes are usually eaten with foods containing salt in their composition. Sodium intake is essential for health, but excessive intake of sodium is a risk factor for hypertension and cardiovascular disease in some people [12]. The World Health Organization (2013) recommends a 30% reduction in sodium intake worldwide by 2025 and a target average sodium intake of less than 2 g/day, enough to meet human needs for sodium and iodine.

Implementation of the SHAKE [13] guidelines will help reduce the consumption of high-salt foods. The SHAKE program consists of a series of evidence-based policy options and examples for national authorities to reduce salt consumption in the population. Implementing SHARE could save 2.5 million lives per year worldwide and would significantly reduce the burden of non-communicable diseases on health systems in our countries [14,15].

Like some West African countries, Togo will also be able to have a standard that imposes the amount of salt (55%) to be incorporated into food broths [12].

The implementation of the standard will contribute to the reduction of salt, which according to the WHO is one of the best investments to improve public health, an effective and efficient way to reduce the burden of hypertension and cardiovascular disease [16].

Conclusion

Using the Mohr method, 21 food cubes are analyzed. The salt content varies from 40% to 76% with an average of 64%. The taste and preference of the customers guide the restaurant owners in the choice of the food cubes. Most restaurateurs are unaware of the consequences of excessive salt consumption. Excessive consumption of sodium, a component of cooking salt, is harmful to health. The public should be informed about the composition of manufactured and unmanufactured food products so that they can make these arrangements. The results obtained on the content of cooking salt in food cubes indicate the need to work to help reduce the consumption of foods or additives high in salt. It is advisable to take into account the salt content of the meal and the amount of salt to be consumed per day before adding the food cube. Switching to traditional nutritious condiments would help reduce the salt in our food and prevent cardiovascular disease.

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