

# Production of Sausage from Macabí Fish Pulp<sup>1</sup>

## Elaboración de Productos Embutidos a Base de Pulpa de Macabí

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**Abstract--** The objective of this study is to promote healthy eating habits through the production of sausage made from fish. The study uses a qualitative approach with a descriptive scope and an active participation research design, using participative observation and focus group techniques. The study's findings are that both the participants and the community involved in discussions on the product found it to be viable and liked it. Additionally, through workshops, awareness was raised and information was shared on the changes in eating habits required to promote a healthy culture.

**Keywords--** Healthy food habits, sausage, fish.

**Resumen--** El presente artículo tiene como objetivo fomentar hábitos alimenticios saludables a través de la producción de productos embutidos a base de pescado. Metodológicamente se orientó desde un tipo de investigación cualitativa desde un alcance descriptivo con un diseño de investigación acción-participación, utilizando como técnicas la observación participante y los grupos focales. Los resultados obtenidos fueron que tanto los participantes como la comunidad a la que le fue socializado el producto, les parecieron viable y fue acogido con gran gusto, además por medio de los talleres lograron concientizarse y aprender de los cambios necesarios en los hábitos alimenticios y así promover una cultura saludable.

**Palabras clave--** hábitos alimenticios saludables, productos embutidos, pescado.

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## I. INTRODUCTION

The current trend towards increasingly adopting healthy eating habits has been widely accepted as a complement for exercising. Schools have even introduced courses intended to promote such healthy habits at school and at home. It is therefore important to include in the daily diet essential nutrients that contribute to people's health while providing the required amount of energy. The essential nutrients are: proteins, carbohydrates, fats, vitamins, minerals and water [1].

In this regard, science holds that nutrition "is the relationship between feeding and living organisms" [2]. Regarding human nutrition itself, it is relevant to know the nutritional requirements of the body and the amount of food that must be consumed in a balanced manner, always seeking to avoid illnesses derived from excessive or insufficient food intake [2].

According to some authors, a balanced diet consists in consuming foods that provide the body the complements and nutrients it requires to maintain energy and nutrition levels, which implies that it is important to combine foods from the different food groups (fruits and vegetables, cereals and foods from animal sources) [3].

### A. FISH

Fish is considered a particularly relevant source of protein because of its high nutritional value in terms of vitamins, minerals and polyunsaturated fatty acids, i.e. Omega 3. It also contains essential amino acids - as much as milk, meat and eggs - with the added benefit that it is more digestible. It is also important to point out that fish proteins are almost indispensable in the diets of children, youth and adults, considering that it contributes to brain formation and development and body growth [4].

Preparing and cooking fish has the advantage that it requires less time than other foodstuffs, and as a result it is better at preserving its vitamins and other properties, thereby enhancing the benefits in terms of development and conservation of the operation of the circulatory system, preventing illnesses [4]. According to the UN's Food and Agriculture Organization (FAO) and the WHO, fish consumption can also reduce the risk of cancer, particularly of the coronary system, and in pregnant and breastfeeding women it contributes to the brain development of infants by significantly reducing possible deficiencies [4].

For this reason, and based on the fact that the community's livelihoods are primarily based on fishing, the researchers are interested in promoting fish consumption in the population and in transforming their eating habits through the production of sausage made from pulp of the Macabí fish. This involves identifying the benefits of consuming and producing this type of food product and raising awareness on its positive impact on health and the family's economy, due to its low cost [5].

### B. SAUSAGE MADE FROM FISH

The production of sausage and food products made from fish represents an important innovation by new companies venturing into the cold meats industry, because the raw material they use is quite unusual. In most cases, the selected fish species are of low cost [6].

In Colombia, as a country rich in water resources, fish can be easily obtained to increase the promotion and production of this type of food by companies that make use of food engineering and technical innovations and that seek to help improve people's eating habits, with the objective of increasing its consumption as sausage with the ultimate goal of improving health and reducing the risk of nutrition-related illnesses [6].

## III. METHODOLOGY

The study used qualitative research techniques with a descriptive scope and an active participant design, taking into consideration that the community has an issue that requires resolving and that the proposed solutions will generate significant change [7], in this case in the type of food consumed by the population, given that the objective of the study is to promote healthy eating habits through the production of sausage products made from fish.

### A. PARTICIPANTS

The participants of this study are thirty five (35) students in the 10th grade between the ages of 15 and 17 at the Nueva Frontera School.

### B. DATA GATHERING TECHNIQUES AND INSTRUMENTS

Information was gathered using techniques such as participative observation and focus groups, using field journals in which the researchers recorded all the experiences gathered in the process of promoting healthy eating habits through the production of sausage products. A focus group was also held aimed at further inquiring about the way people eat at home and on weekends.

C. PROCEDURE

The activities were designed based on the main purpose of the study. Initially participative observation was performed by the researchers to identify the students' eating habits. Based on the analysis of the information recorded in the field journals, workshops were held to raise awareness in the community on the benefits of healthy eating habits and the properties of the macabí fish pulp as an alternative to this effect.

Subsequently, training was provided to teach how to make sausage from the Macabí pulp, the way of extracting the pulp and they way to extract and mix other ingredients such as ice, vegetable oil, salt, pepper and synthetic cold meat. Here they learned how to make three modalities; sausage, ground meat for hamburgers and Catalan sausage.

IV. RESULTS

The following is the systematization of the results based on the observation performed. The main findings of the study indicate that the school's students have a preference for foods such as snacks or packaged potato chips, accompanied by carbonated soft drinks, primarily dark ones, and that they eat large quantities of sweets (chocolate, jelly beans, chewing gum and candies); they often eat fried foods (turnover patties, egg-filled patties, stuffed potatoes and stuffed patties made from yucca flour) and they sometimes do not eat anything during the school break hour. Based on the above information, the researchers designed two focus group sessions, one with 17 students and another with 18, where they were asked about their everyday eating habits. The following were their responses:

	Leading question	Participant responses	
	What types of food to you regularly eat every day?	<i>“At home for breakfast I usually eat cooked yucca with cheese, or crushed green bananas.” “Well, teach, I don’t really like potatoes or cooked yucca; I prefer fried plantain slices with sausage, or else French fries with cold meat and ketchup.” “Well, at home for breakfast I have fried foods such as turnover patties and fried green plantain, and at lunch I don’t like soup and I almost always eat rice with an egg, or beef, or fried chicken.”</i>	
	What types of protein do you normally eat at home? Describe them.	<i>“Well, at home we eat chicken, beef, pork and entrails, but I don’t like it when they make liver or lungs; I prefer to have eggs or cheese.” “At home they almost always make beef, and sometimes they make pork or chicken, but I don’t like chicken much, so when they make it I eat a slice of cheese.” “For example at my house they make all kinds of things, but I don’t like tripe and they almost always make soup, so when they make soup I ask my mom to make me a piece of chicken instead, or else sausage if there is no chicken.”</i>	
	What do you usually eat on weekends?	<i>“In the evenings on weekends my mom sometimes doesn’t cook, so I always eat sausage and French fries or a hot dog.” “Well, teach, my mom doesn’t like me to eat fast food, but that’s what I like most, so on weekends I eat hamburgers and sausage with French fries, using the money I save from my weekly allowance.” “On weekends I eat whatever they make; in the evenings they serve rice with meat or chicken. What I do is go out and buy pizza and stuff like that.”</i>	

Source: Authors.

Based on the information that was gathered through observation and the focus groups, workshops were scheduled with the students to explain healthy eating habits and the benefits of nutrition for development. During the session they made questions and contributed to the discussion based on their own experience with food. In three subsequent sessions the researchers were assigned as homework to previously research the topics to be discussed, in this case topics such as nutrition requirements for adolescents, consequences of eating sausage and cold meats and the properties of the Macabí pulp.

During the workshops the students displayed interest in the explanations and discussions that arose from the questions and contributions, and some of them believe that they must take care of their health and bodies from an early age.

The fact that the main economic activity of the municipality of San José de Pueblo Viejo is fishing was used as input, because the Macabí pulp is easily available for the students, who were asked to research whether any products were manufactured from fish. They found that processed meats from fish were made in Kamaboko, including sausages, meatballs and hamburgers.

For the preparation of the fish sausages from macabí pulp, the ingredients included the meat or pulp from the fish, vegetable oil, ice, salt, pepper and artificial cold meat. These ingredients were mixed to obtain a fine grain using a method called 5-4-3, which consists in adding 5 parts of meat, 4 parts of oil and 3 parts of ice. The emulsion was made with ice in order to create a paste; the macabí pulp that was used was not wet. Once the paste was ready, it was introduced into the artificial edible tripe or synthetic cold meat as the final step for consumption. The population of San José de Pueblo Viejo liked the sausages made from macabí, and they were therefore left with an option to consume food products made from fish to improve their habitual diets.

## V. CONCLUSIONS

The students in their role of researchers learned about healthy habits and the benefits of including them in their daily food. According to the Health Ministry [1], it is very important to maintain a healthy diet through good eating habits that provide the essential nutrients to achieve excellent health, maintaining a balance between proteins, vitamins, minerals and water, which are considered the primary nutrients.

They also learned about the consequences of excess consumption of cold meats, sausages and unhealthy foods (fried foods, carbonated soft drinks, sweets). Some of the effects of over-consumption of sugary beverages, fast foods and cold meats are

that these damaging eating habits are correlated with illnesses such as type 2 diabetes, high fat levels, low absorption of vitamins and proteins and stomach illnesses [13].

In this sense, it is suggested that these foods tend to increase the number of calories consumed above normal, and do not have the proteins required for good nutrition, but instead have high levels of saturated fats, salt, sugar and chemical additives that are not appropriate, especially for children and youth, given their stage of development [14].

Lastly, during the training session on how to make products based on Macabí pulp, the students learned the full manufacturing process and the required ingredients, enabling them to propose entrepreneurial projects to sell the products at a large scale, because for them the raw material is very affordable and would represent another way to contribute to sustaining their families. For the institution this is highly relevant in that it strengthens research and cross-cutting teaching processes involving the entire educational community.

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