



## Sensory evaluation of shredded bullfrog back meat by Affective tests and Triangle test of difference

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### ABSTRACT

The aim of this study was to evaluate the probability to discriminate, through the triangular test, the shredded bullfrog back meat from shredded chicken breast, as well as to assess the acceptability of the formulation with bullfrog meat. A hundred people (100 panelists) were randomly selected to conduct the triangular test of difference and affective tests. The data obtained with the triangular test was submitted to analysis of the result table by Dutcosky (2012), while the affective tests were analyzed using descriptive statistics. The majority of the panelists (77%) that participated in the triangular test detected the difference between the formulations. The overall acceptability of the formulation with bullfrog back meat was 82% with 56% purchase intent. Thus, bullfrog back meat although does not resemble chicken, showed high acceptance and therefore has potential to attend a market niche of people who need/prefer to consume foods that benefit health.

**Keywords:** Sensory Analysis, *Lithobates catesbeianus*, formulation, acceptance, bullfrog meat.

### INTRODUCTION

Bullfrog farming has become a feasible activity with high growing potential. This is due, not only to bullfrog meat refined taste and easy preparation (AFONSO, 2014), but, mainly, to its nutritional quality given by an adequate balance of amino acids and low fat and cholesterol levels, which is an important advertising tool (NÓBREGA *et al.*, 2007). According to Feix *et al.* (2006), frog meat supplies protein with high absorption and high biological value. Its centesimal composition is similar to other white lean meats, with very low calorie levels and lipid content (AFONSO, 2005).



Frog meat has a mild flavor because of the absence of intracellular fat and its normal color is creamy-white, thus it is defined as white meat (MOURA, 2003). Its taste is similar to chicken and light as fish (AFONSO, 2014).

Frog meat can be commercialized fresh, frozen or manufactured (LIMA *et al.*, 1999). Frog farmers offer the entire carcass in the domestic market as a way to broaden their revenue, however the "back" composed by the chest and arms is usually discarded by consumers due to the high number of small bones (NÓBREGA *et al.*, 2007). However, it can be used as raw material in the manufacture of new products with high added value, such as sausage, nuggets and paste, not yet widespread in the Brazilian market (CONCEIÇÃO, 2000). In addition, manually shredded frog back meat can be used in the formulation of preserved food and portions for later use in restaurants or at home (LINDENER JUNIOR *et al.*, 2013).

Thus, the objective of the present study was to determine if there are sensory differences between formulations using shredded frog back meat and shredded chicken meat as ingredients as well as to evaluate the acceptance and purchase intent of the formulation with shredded frog meat among potential consumers aiming at adding commercial value to this animal's back and turning frog meat more popular through the diversification of products from this matrix.

## **MATERIAL AND METHODS**

The project was approved by the Ethics in Research Committee from the Antônio Pedro Medicine School/ University Hospital, constituted under Resolution no 196/96 of the Health National Council and duly registered at the Ethics in Research National Committee.

The frozen frog backs used in the present study were acquired from a store under state inspection and stored at - 18°C in a freezer together with the chicken breasts purchased at a grocery store, previously packed and frozen, with the seal from the Federal Inspection Service. The day before deboning, the frozen blocks of frog back and chicken breast were transferred to a refrigerator and kept at  $\pm 4^{\circ}\text{C}$  for about 24 hours, for slow thawing.

The frog back and chicken breast meats were cooked separately in water and manually shredded. Next, the other ingredients of the formulation were added. The formulations were developed only changing the type of meat. One



gram of garlic, five grams of onion, one gram of parsley + chive, ten grams of tomato paste, two milliliters of oil, one milliliter of lemon juice and 0.5 grams of salt per 100 grams of shredded frog back or chicken breast were used in the formulations. The samples were then subjected to sensory analysis.

Two different records were used to apply the three tests in the present study, one for the triangular test and the other for both acceptance and purchase intent. One hundred untrained panelists, from both sexes aged between 17 and 63 years, being 58 female and 42 male, participated in all tests. The tests were performed in individual booths. The samples were served in disposable plastic cups, in a pre-established sequence, together with the Free Informed Consent form and the two ballots for the tests. Water at room temperature and salty crackers were offered to remove the residual flavor between samples. First, for the triangular test, the booths were prepared with special lighting (red lights) to mask eventual product color differences. Three samples coded with letters randomly defined (each containing about 25 g) were served to each panelist. They were oriented to taste the samples from left to right and detect the different sample by circling its code letter (forced choice). The results were statistically assessed and submitted to the Dutcosky result table. This table is based on the number of correct judgments compared to the total number of judgments. After the triangular test, in a second stage of the sensory analysis, the acceptance test of the formulation with bullfrog back meat was applied using the 9-point hedonic structured scale varying from dislike extremely (one) to like extremely (nine) and the purchase intent was evaluated by the 5-point attitude scale varying from definitely would not buy (one) to definitely would buy (five). The results were analyzed by descriptive statistics in percentage.

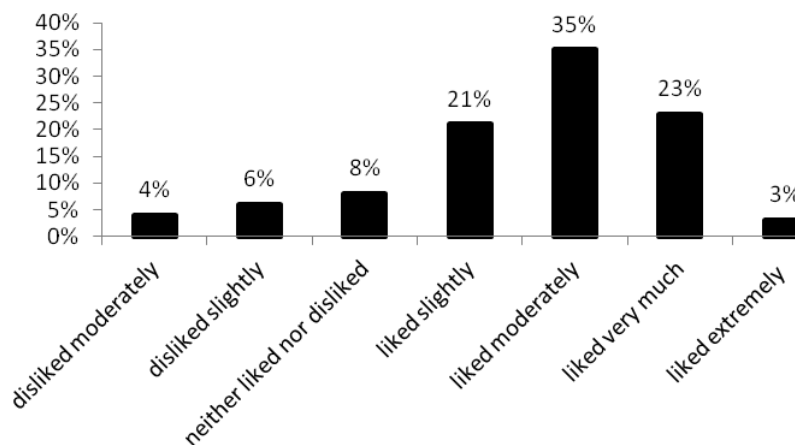
## **RESULTS AND DISCUSSION**

Frog meat had never been consumed by 63% panelists. In the triangular test, of the 100 panelists, 77 (77%) selected correctly the different sample. As the minimum number of correct selections of the different sample necessary to establish a significant difference between the samples is 42 (DUTCOSKY, 2012), the samples significantly differed at the probability level of 5%. Although frog meat is considered white (MOURA, 2003), and it tastes similar to chicken

(AFONSO, 2014), it can be stated that there is a sensory difference between the meat of these two species.

The results of the acceptance test presented in Figure 1 show that 82% panelists gave scores between six and nine, with a mean score of 6.58 on the hedonic scale. The acceptance terms oscillating between “liked slightly” and “liked very much” demonstrate that the product was accepted by the consumers under the sensory aspect. The shredded frog back meat obtained good global acceptance (82%) among the panelists, a percentage which was close to the one obtained by Furtado and Modesta (2006) with preserved frog meat. The purchase intent was positive with 56% panelists stating that they would buy the product.

Figure 1. Sensory acceptance of the formulation with shredded bullfrog back meat.



## CONCLUSIONS

Frog meat, which is defined as fish meat, has sensory characteristics different from chicken meat, which is widely accepted by Brazilians. However, due to its nutritional characteristics, this matrix can be considered a new product suitable to enter the market niche of people that need/prefer foods that bring specific health benefits.

The formulation based on shredded bullfrog back meat, in the conditions assessed in the present study, presented high acceptability by potential consumers, indicating that the product has good sensory quality. This good acceptance is reinforced by the high purchase intent index, therefore the marketing of new formulations based on shredded frog back meat is an option



for the industries that desire to use the carcass, a region considered less noble, to manufacture new products and thereby add value to this segment.

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