



# Analysis of Acceptance of Cow Milk-Free Food by Allergic Children



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## Abstract

**Objective:** To analyze foods free from cow's milk protein by allergic children. **Methods:** The research for the development of the project, regarding the objectives, was exploratory, as to the nature, applied and the procedures, a case study. It was held at the Integrated Medical Care Center (NAMI), from February to April 2017, in the population of children from two to five years old with cow's milk protein allergy. We used forms with hedonic facial expression scale with five categories to be selected according to the children's acceptability. The research was designed according to what governs Resolution 466/12 of the National Health Council (BRASIL, 2012).

**Results:** In the study we obtained 14 children and 14 participating mothers. We found that children aimed only at the taste of the products, with product A (salty barbecue flavored product) being the most acceptable with 79% acceptance, unlike mothers who generally exploited the product from the ingredients mentioned in label up to its nutritional value, always comparing with conventional products. The most acceptable product among mothers was product C (Sweet product, similar to conventional cornstarch cookies), with 71% acceptance. **Conclusion:** The research result provided information that contributed to the quality of life of children with APLV, considering that they can have a balanced, varied and enjoyable diet.

**Keywords:** Food Allergy; Food; Food hypersensitivity; Food analysis; Cow milk

## Introduction

Among food allergies, the most common is milk protein allergy, affecting mainly children from 0 to 24 months. The allergic cycle is developed when milk protein is identified as a foreign agent in the body [1].

The actual prevalence of aplv in the general population is still unknown. In children, cow's milk protein allergy is manifested in about 2% to 7.5% in the first years of life [2].

Aplv symptoms may be immediate (ige-mediated) or late (non-ige-mediated), depending on the type of reaction triggered, and are divided into four groups: ige-mediated or type i hypersensitivity; cytotoxicity or type ii; by immunocomplexes or type iii and cellular or type iv [3].

The main clinical manifestations of aplv are: irritability, crying and difficulty in weight gain. It usually involves the following systems: cutaneous, gastrointestinal, respiratory and cardiovascular. In cutaneous manifestations, urticaria (lesions lasting up to 6 weeks) and angioedema are the most common.

Gastrointestinal symptoms usually occur shortly after eating or within two hours of eating, namely: abdominal distention, nausea, vomiting, diarrhea and melena. Respiratory system symptoms are associated with skin and gastrointestinal symptoms, causing a sore throat, irritating dry cough, intense nasal congestion, sneezing, asthma, and rhinitis secondary to cow's milk intake or inhalation [4].

For a reliable diagnosis of APLV, a detailed history and physical examination is essential. In the anamnesis, it is important to investigate the food history, in order to collect information about the diet from the first months of life to the present age, record when the allergy began, the frequency of symptoms, the factors and individual characteristics of the patient, what is the amount and shape of the potential food that causes the allergy. Physical examination, besides providing anthropometric data, is fundamental to evaluate signs that may be related to APLV [5].

The treatment of APLV is based on a diet excluding cow's milk and dairy products, which aims to prevent possible symptoms

and improve the child's quality of life, growth and proper development. In cases of acute allergic crisis or chronic signs, treatment becomes drug [6].

Currently, it is observed that the number of people who are allergic to cow's milk protein has been increasing, because of this, the search for products that favor the health and well-being of this public has been increasing. New products have been launched in the market for the public with food allergies. Amaranth grain is one of them, being characterized by a high protein, fat and mineral content compared to conventional cereals. Amaranth leaves can be used in salad production, and can be substituted for soups, fillings, instant and infant products. The flour form is used in pancakes, bread, tortillas and porridge, including beverages that are similar to cow's milk [7]. The treatment of APLV is based on the total exclusion of cow's milk protein from the allergic diet. For this, a balanced and sensorially pleasing diet should be developed that meets the nutritional needs, especially when it comes to children, so that they may develop normally.

Traditionally, various products, such as cakes, cookies and breads, are made with cow's milk. In the food market there are similar products that are free from cow's milk protein. Thus, the objective of this study was to analyze the acceptability of products free of cow's milk by allergic children.

### Methods

This is a cross-sectional and analytical study with a quantitative approach.

The study was performed at the Integrated Medical Care Center (NAMI), located in the city of Fortaleza in the Edson Queiroz neighborhood.

The Center for Integrated Medical Care of the University of Fortaleza has integral care with the human being, as well as offering health services also has as its main objective to promote quality of life. For this, they bring together professionals and students in a modern and multidisciplinary structure, focused on humanization and the evolution of care, always in line with the academic research developed at the University.

Created in 1978, NAMI is proud to be a reference in the North and Northeast for the quality and differential of medical care provided, which includes services of a secondary nature and, in some cases, even of high complexity. More than 300,000 procedures are performed per year, benefiting about 25,000 patients. NAMI care ranges from medical appointments, laboratory testing, and immunization to specialized imaging, nursing, nutrition, psychology, physiotherapy, and speech therapy, social work, and occupational therapy services. Besides, of course, several groups that deal with topics such as mental health, climacteric, stretching, monitoring pregnant women, among others. The Integrated Medical Care Center (NAMI) has been conducting a Cow Milk Protein Allergy (APLV) program

since 2014, and childcare is provided to the following health professionals: Gastropediatrician, Allergologist and Nutritionist.

The population chosen was the universe of 180 children participating in the NAMI APLV group. The inclusion criteria were children who had a protein allergy to cow's milk and were between two and five years old, and as an exclusion criterion, children who had lactose intolerance and were older than 5 years. The invitation to participate in the research was made when the groups were meeting at NAMI, where the researchers personally explained the benefits of the study and invited them to participate.

Thus, the sample selected all children between two and five years old who had cow's milk protein allergy and their guardians who attended the waiting room for the nutritional care of the group with APLV. Children allergic to cow's milk protein who were lactose intolerant and older than 8 years were excluded from the study. The database currently has 28 participants, but research is still ongoing. Prior to the data collection process, cow's milk protein-free products were evaluated as follows: Analysis of label ingredients, similarity analysis with conventional products and taste. The brands chosen were: 'Liane', 'Xilitoca' and 'Mother Earth'.

All products were carefully chosen, seeking to maintain nutrients and other important characteristics such as fresh foods, for the proper functioning of the body.

Data collection was carried out from February to April 2017. Each participant signed the informed consent form and then filled out the form and were interviewed. The form contained identification questions for the participating child and his / her guardian.

The data of the child and guardian were collected in Part I of the form, which contained information such as: Socioeconomic; Blood type; If you had another type of allergy; Sex; Age; Family data and school data. To perform the sensory analysis, Part II of the same form was used, which has a hedonic scale of facial expression, which was assigned the following values: 1 - I hated it, 2 - I didn't like it, 3 - both makes, 4 - liked and 5 - loved it. Form III asked five questions about the daily food intake of family members. In the test, the child and his guardian received samples of the products, followed blindly. The hedonic scale was marked by the children and their guardian with the help of two trained analysts, so as not to induce and / or interfere with the study participants' responses. For the presentation of the products was made available, in a container, one unit of each selected product.

The samples were used in the same order for all participants. After ingestion, each child and responsible participant marked on the hedonic scale the facial expression that best represented their opinion regarding the tasted food. Between the tasting of the samples, the children ingested at least 50ml of water. Rinsing the mouth between samples is important so that the residual flavor is

restricted and does not interfere with the evaluation of the next sample.

The products tested were selected by the company "Zero% cow's milk", which provided the food products used in the research, with the supervision of the researchers. Sweet and salty cookies were selected, among them: Product A - Salted Cracker Biscuit (Barbecue Flavor); Product B - Tapioca Biscuit (Salty Flavor); Product C - Sweet Cookie (Similar to conventional cornstarch) and Product D - Red Fruit Cookies (Sweet flavor).

**Results**

Fourteen children participated in the study in question, 36% (5) female and 64% (9) male. The average age of participants ranged from 2 to 5 years, with 57% being children from 2 to 3 years old and 43% from 4 to 5 years old. As for blood type 36% (5) have O + blood and 64% (9) did not report. As for other allergies, 64% of children had other allergies and only 36% did not. Regarding socioeconomic status, 36% (5) of the families had an income of one to five minimum wages (Table 1).

**Table 1:** General characterization of children with milk protein allergy.

Variáveis	N	%
<b>Genre</b>		
Male	9	64%
Woman	5	36%
<b>AGE (YEARS)</b>		
2 – 3	8	57%
4 – 5	6	43%
<b>Blood Type</b>		
Uninformed	9	64%
O+	5	36%
<b>Carriers of Other Allergies</b>		
Yes	9	64%
No	5	36%
<b>Parental School</b>		
Higher Education	3	22%
High School	8	57%
Elementary School	3	21%
<b>Does Everyone in the House Match the Child's Diet</b>		
Yes	8	57%
No	6	43%
<b>Family Income</b>		
S ≤ 1	4	29%
1 < S < 5	5	36%
5 < S < 10	1	7%
S > 10	2	14%
Uninformed	2	14%

S = minimum wage

The results of this study showed that of the 14 children evaluated, most were between 2 and 3 years old and were males with 9.64%, while females were 5.57%. The sample is mostly composed of middle- or lower-class people. From the study, we also observed that food allergy in one family member directly influences changes in eating habits of other family members (Table 1).

All the children tasted all the products, having varied acceptance, according to their individuality, so that some showed to like the sweet products more and the salty ones.

Sweet-flavored products had better acceptance than salty-flavored products, as these products are more similar to conventional products (Table 2).

**Table 2:** Child Satisfaction Level x Products.

Variável	Products				N
	A	B	C	D	
I HATED	0	1	1	0	2
I DIDN'T LIKE	2	6	1	0	9
SO MUCH DOES	0	1	0	0	1
I LIKED	11	5	7	10	33
I LOVED	1	1	6	4	12
TOTAL	14	14	14	14	56

Letters = Products

The foods that made up the sensory analysis were chosen to take into account the newest products similar to those already on the market. Only product B (Tapioca cookie) was rated as loathed, with a percentage of 7%. Product A (Salted Cracker Cracker - Barbecue Flavor) and Product D (Red Fruit Cookies - Sweet Flavor) were rated as 'whatever', both with a percentage of 7%, not providing significant information for product evaluation. Adding the percentage obtained in all available products, 64% of the evaluated did not like them. Of the four products evaluated, 79% of children liked product A (Cracker Salted Cracker - Barbecue Flavor), 36% liked product B (Tapioca Cracker), 50% liked product C (Sweet Cracker - Similar to conventional cornstarch) and 71% enjoyed the product D (Red Fruit Cookies - Sweet Flavor). Taking into account the taste, these products are very similar to conventional products, thus justifying their good acceptance (Table 3).

**Table 3:** Satisfaction level of mothers x products in percentage.

	A	B	C	D
I hated	0%	7%	0%	0%
I didn't like	14%	43%	7%	0%
So much does	0	7%	0%	0%
I liked	79%	36%	50%	71%
I loved	7%	7%	43%	29%

letters = products; % = percentage

The products that were rated "Loved" were as follows: 7% of product A (Cracker Salted Cracker - Barbecue Flavor); 7% of product B (Tapioca cookie); 43% of product C (Sweet cookie - Similar to conventional cornstarch) and 29% of product D (Red fruit cookies - Sweet flavor). Ratifying the greater acceptance of sweet tasting products.

In the mothers' forms, the products that were evaluated as I loved them were: Product A (Salted Cracker Cracker - Barbecue Flavor) with 14%; Both products C (Sweet cookie - Similar to conventional cornstarch) and D (Red Fruit Cookies - Sweet flavor) resulted in 29%.

The products evaluated as "Likes" were as follows: 64% of product A (Cracker Salted Cracker - Barbecue Flavor); 50% of product B (Tapioca cookie); 71% of product C (Sweet cookie - Similar to conventional cornstarch) and 64% of product D (Red fruit cookies - Sweet flavor).

Products rated "Disliked" yielded the following results: Both A (Cracker Salted Cracker - Barbecue Flavor) and D (Red Fruit Cookies - Sweet Flavor) products achieved 7%. Already the products evaluated as "detested" had as results: 14% of product A (Cracker Salted Cracker - Barbecue Flavor) and 50% of product B (Tapioca Cracker).

In the analysis of the evaluation of the mothers, it was observed that the products have a good acceptance by most of them, because in the hedonic scale classification were found higher rates of "liked" and "loved". This may be justified because unlike children, who are only aware of tasty foods, mothers also realize the benefits that food brings to health. There were reports of mothers who liked the products because, besides being tasty, having enough nutrients, in order to help the growth and development of the child aligned with a similar diet to other family members (Table 4).

**Table 4:** Satisfaction level of mothers x products in percentage.

	A	B	C	D
I hated	0%	0%	0%	0%
I didn't like	14%	50%	0%	0%
So much does	7	0%	0%	7%
I liked	64%	50%	71%	64%
I loved	14%	0%	29%	29%

letters = products; % = percentage.

Statistical tests were performed using the Turkey, Chi-Square programs, but their results were not considered relevant to the research because the N that participated was small to obtain relevant results.

## Discussion

In recent decades, there have been several studies showing that allergic diseases are significantly influencing the quality of life not only of allergic patients, but also of their families and close

friends [8]. In the study analyzed, it was observed that changes in the eating habits of allergic people influenced the other family members, since there is greater care in food to avoid exposure to foods that aggravate the allergic condition.

There are several factors that affect allergic people, the most common being anxiety and stress, which can impair their cognitive ability and their social environments, resulting in behavioral problems and school development. Dining out is still a factor avoided by parents of children. Activities such as: Going to birthday parties; Playing at friends' houses are examples of some activities that are generally restricted in the daily lives of allergic children, leading to a social withdrawal from them [9]. We identified through the reports on the forms that mothers prepare their children's meals to eat outside the home, in environments ranging from school to festive and travel, being a positive habit in the lives of children, because their social environment is preserved.

Parents of allergic children carry concerns in their daily lives regarding the proper nutrition of their children. The entire process of purchasing, preparation, ingredient checking of products, high cost prices, require planning to meet all the nutritional needs of the child. In most cases, the mother's quality of life is most affected because she is responsible for performing all these tasks [10]. In our research, the report of mothers is similar to what was said by the author, since since the discovery of allergy in their children, their lives are moved primarily to fulfill all these functions with the main goal of the welfare of their children, ie , the quality of life of mothers becomes irrelevant to them, because what they really put first is their children. However, through all this food planning of the allergic child, mothers are positively influenced in relation to their eating habits, because through the knowledge they acquire in all planning they make healthier choices in their meals.

Cow's milk is the food that is often consumed on a daily basis, as it can make up every meal, for this reason, cow's milk allergy is evident today, about 270 billion liters of milk. It is consumed worldwide [11]. In the study carried out, the chosen audience was with children who had been allergic to cow's milk protein since birth, so frequent consumption of cow's milk was not the reason why the children in this study had the onset of allergy.

About 170 foods have been listed as causing food allergy. However, eight main ingredients that cause the most food allergies stand out: milk, fish, eggs, nuts, wheat, crustaceans, peanuts and soy [12].

As a result of food reactions, it generates restrictions and, as a result, allergic individuals need greater care in choosing the foods to replace [13]. In the study we evaluated through reports that the behavior of parents facing the greatest restriction on food to their children who are allergic to cow's milk protein, corresponds to what the author says, because careful choice of these foods has become a priority in life. from parents.

In the food market there are substitutes for dairy drinks that are vegetable drinks, made with: oilseeds, legumes, cereals and pseudo cereal, besides being industrially ready, can be prepared by hand, although they may have limits in relation to the characteristics. Sensory [14]. There is also an option to replace cow's milk, the almond-based drink. It is a drink rich in vitamins, fiber and minerals, and can be found in an industrialized way, but it is not accessible to low-income individuals, as it is a high cost product [15]. There is also rice-based drink, it has low cost, however, it is noteworthy that the glycemic index of rice-based drink is high when compared to cow's milk. Thus, it is essential that its consumption is balanced, because in excess can cause the emergence of chronic diseases, such as diabetes and obesity. Its consumption is not recommended for children under one year [16]. We identified from the reports of mothers that the products used in sensory analysis and the others that are available in the market for the public with APLV are aware of them, but report that there are few stores that sell these products, becoming less accessible to any of them.

One of the most commonly found foods in the market as a replacement for cow's milk is soybeans, but studies report that 60% of people who have allergies to cow's milk also have coincidental reactions to soybeans. It is even more difficult to find substitute foods [17]. In the study population there were some children who, besides being diagnosed with a cow's milk protein allergy, also had soy allergy, so finding foods that can replace cow's milk for this public may be less accessible.

### Conclusion

Based on what was discussed, it can be concluded that the products used in the sensory analysis had a good acceptability of the participants. It was observed that the children analyzed positively by the question of the taste of the products, as the mothers the acceptability was also positive, because they reported that the products were sensorial similar to the conventional products in the market. Parents of children with a cow's milk protein allergy become hypervigilant and careful about feeding them to avoid any contact with foods containing cow's milk protein. In view of this, the demand for foods aimed at this public grows more and more, however, accessibility is still a problem, since there are few stores that sell these products. Given the results, the study was important because it was sensorially analyzed alternative products, which are free of cow's milk, noting the acceptability by the public and the financial conditions of the families of the research participants to purchase them.

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