FOOD FOR COLLECTIVES

DOI: 10.12957/demetra.2019.38974

DEMETRA
Alimentação, Nutrição & Saúde

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Gastronomic interventions and acceptability analysis at a university restaurant in the city of Belém, state of Pará, Brazil

Intervenções gastronômicas e análise da aceitabilidade em um restaurante universitário na cidade de Belém-PA

Abstract

Introduction: Gastronomic interventions are an innovative initiative that enriches the work of the nutritionist and add value to prepared meals. ***Objective:*** The objective of this research was to perform gastronomic interventions on the menu of a university restaurant in the city of Belém, state of Pará, to analyze the acceptability, the rest ingestion and the appearance of the meals. ***Methods:*** This is a descriptive and qualitative-quantitative study, in which a gastronomy team observed the production of three usual menus of the university restaurant in the pre-intervention subsequently applying gastronomic interventions such as cutting type, cooking methods, among others. Before and after the application of the interventions was performed an acceptability test, rest ingestion, and photographic record. ***Results and Discussion:*** The survey had an average participation of 84% of the customers in both stages. The photographic record showed few differences in appearance, since the changes occurred in palatability. With the interventions, the acceptability

test showed that there was a reduction in the users' dissatisfaction with the main dishes, besides raising the percentage of acceptability of the menus to above 85%, which is the minimum percentage according to the reference values. After the interventions the rest ingestion was reduced and the dirty leftover food reached zero. The results were positive and similar to other studies that performed gastronomic interventions on the menu. ***Conclusion:*** Although there were no visual alterations of the meals on the trays, it was the modification of the taste and texture of the food that contributed to the success of the results. Associating the knowledge of Nutrition with the gastronomic practices promotes improvement in the menus, besides awakening and encouraging studies with this subject.

Keywords: Restaurant. University. Menu Planning. Dietetics.

Resumo

Introdução: As intervenções gastronômicas são uma iniciativa inovadora que enriquece o trabalho do nutricionista e agrega valor às refeições preparadas. ***Objetivo:*** A pesquisa teve por objetivo executar intervenções gastronômicas no cardápio de um restaurante universitário da cidade de Belém-PA, para analisar a aceitabilidade, o resto-ingestão e a aparências das refeições. ***Métodos:*** Estudo descritivo e quali-quantitativo, no qual uma equipe de gastronomia observou a produção de três cardápios usuais do restaurante universitário na pré-intervenção, aplicando, posteriormente, intervenções gastronômicas como tipo de corte, métodos de cocção, entre outros. Antes e após a aplicação das intervenções, foi realizado teste de aceitabilidade, resto-ingestão e registro fotográfico. ***Resultados e Discussões:*** A pesquisa teve participação média de 84% dos comensais nas duas etapas. O registro fotográfico mostrou poucas diferenças na aparência, pois as mudanças ocorreram na palatabilidade. Com as intervenções, o teste de aceitabilidade mostrou que houve redução na insatisfação dos usuários quanto aos pratos principais, além de elevar a porcentagem de aceitabilidade dos cardápios para acima de 85%, que é o mínimo segundo os valores de referência. Após as intervenções, o resto-ingestão foi reduzido e as sobras sujas chegaram a zero. Os resultados obtidos foram positivos e semelhantes a outras pesquisas que realizaram intervenções gastronômicas no cardápio. ***Conclusão:*** Mesmo não havendo alterações visuais das refeições nas bandejas, foi a modificação do sabor e textura dos alimentos que contribuiu para o sucesso dos resultados. Associar os conhecimentos de Nutrição às práticas gastronômicas promove aperfeiçoamento nos cardápios, além de despertar e incentivar estudos sobre esse assunto.

Palavras-chave: Restaurante. Universidade. Planejamento de Cardápio. Dietética.

INTRODUCTION

The Nutrition always seeks to offer food that provides health maintenance or recovery. For this, it is based on the diet laws created by Pedro Escudeiro in 1937, which aims to provide a sufficiently quantitative diet; qualitatively complete; harmonious in proportion and balance of nutrients; and appropriate to the needs and specificities of each individual.[1]

Food is considered a fundamental right of all, according to article 6th of the Brazilian Constitution, ensuring access to safe and quality food. One of the means of this access is through the Meal Producing Units (MPUs), which can be represented by industries, hotels, schools, companies, hospitals, popular restaurants, university restaurants, day care centers and other establishments.[2,3]

The MPUs also called Food and Nutrition Units (FNUs) are a food production and distribution system in which meals must be nutritionally balanced, within hygienic-sanitary standards, with appropriate sensory characteristics that meet dietary habits of users in order to maintain the health of those who enjoy the service - all within the unit's food and financial resources.[4,5]

The FNUs, in general, have aroused interest from various segments of gastronomy, valuing the use of knowledge and innovation in the area. The word "gastronomy" has a Greek origin and it means "study of the laws of the stomach", but it has other definitions, such as being the "art of preparing delicacies, making them more digestive, for the greatest pleasure possible".[6]

So, it can be defined that gastronomy is an art whereby it is possible to select, manipulate, prepare and serve the same dish in different ways, according to the taste of the public with which one wants to work.[7] Thus, it is possible to state that the integration of nutrition with gastronomy is essential, since it allows the menus to offer a nutritious and adequate diet, also providing attractive meals, stimulating the pleasure that the taste can offer.[8,9]

Among the examples of FNUs we can include the university restaurants (URs) that have the same purpose of the FNUs providing a safe, tasty and nutritious diet that meets the nu-

tritional needs of users according to the meal offered. The first UR was created in the 1950s by the Universidade do Brasil (University of Brazil), in Rio de Janeiro, and served the university staff and students.[10]

The studies in FNUs about the aggregation of gastronomy with nutrition have been more frequent in recent years but they are still scarce. However, researches about this theme in the URs are practically non-existent, since studies in those locations are based on menu acceptability and food waste, as shown by the literature review of Santos,[11] which evaluated researches conducted in the URs between 1996 and 2016. With this, further analysis concludes that in order to improve acceptability and reduce the waste of food, it would be critical to improve the sensory characteristics of foods, modify or replace preparations, innovate and optimize with the unit's own resources.[12-15]

Facing this fact, this research aimed to perform gastronomic interventions in the existing menu of an UR in the city of Belém, with the purpose of analyzing the acceptability, the waste and the appearance of menu preparations. In addition, the study will contribute to innovation and knowledge for the restaurant and its staff, giving support for further researches on this topic.

METHODS

The study is defined as descriptive and qualitative-quantitative, which analyzed, interpreted and described the numerical and non-numerical data collected in a university restaurant in Belém, state of Pará, Brazil.

The data collection site was an university restaurant that currently provides 600 daily meals (lunch), being 500 meals for undergraduate students that represent the priority audience at the UR and 100 meals for servers and postgraduate students. The UR has a staff of 20 employees and the meals are distributed by a partial self-service system on patterned trays. The unit's menu is classified as the popular type, consisting of simple and inexpensive preparations. It is planned on a monthly basis by RU's nutritionists and the purchase of raw materials and ingredients is scheduled thereafter. Possible changes in the menu may occur due to the availability of raw materials and other complications.

The research presented two execution stages: the first, called pre-intervention that took place in September / 2018; and the second, post intervention, was performed in October / 2018. To carry out the research, three conventional URs menus were chosen, presented in Table 1. The choice of menus was based on the ones with the highest rejection by the costumers, according to the satisfaction survey conducted every six months by the unit's management.

The pre and post intervention steps were organized into four actions. Therefore, in the pre-intervention, the action (1) was the analysis of the execution of the UR conventional menu, in which a gastronomy team accompanied and analyzed the pre-preparation, preparation and distribution of meals. The menus were made available to the team to plan the possible interventions on them and the same ingredients should be used in the preferred amounts of the team as well as the same utensils, equipment and time available to prepare the menu.

From those analyzes, the interventions to be applied were defined: in Menu 1 - change of the cut and preparation of the chicken, and at the moment of the addition of the sauce; in Menu 2 - increased cooking time and addition of carrots in rice; and in Menu 3 - alteration in the hydration of textured soy protein (TSP). And in the three menus, it was suggested to increase the cooking time of ***farofa***.

In the post-intervention, the action (1) was the application of gastronomic interventions in the UR menu, in which the gastronomy team intervened practically in the execution of the menus, with some modifications, as shown in table 1. The other actions followed the same, both pre-intervention and post-intervention, as follows: (2) photographic record of preparations on the tray; (3) acceptability test application; and (4) rest ingestion.

The photographic record of the trays with all the preparations of each chosen menu was done through the camera of two smartphones models, a Positivo Twist and a Samsung Galaxy J6, which allowed us to compare the appearance of the final presentation.

The test chosen to carry out the research was the same test provided in the manual for the application of the National School Feeding Program (NSFP) acceptability tests. Participants were asked to enter their name, evaluate the menu using a five-point mixed facial hedonic scale and answer two questions about menu preparations: "What did you like the most about the preparation?" And "What did you least like about the preparation?"[16]

The test was distributed among the 600 users while waiting for the turn in line to serve themselves. Pens were made available for participants to answer the test, and a ballot box was used to deposit it. Only after the last participant deposited the test in the ballot box, it was opened for the results conference.

The rest ingestion was performed using a Lider-LD2051 digital scale, with a maximum capacity of 300kg. First, all the containers used to pack the food until its distribution were weighed and the values were discounted to obtain only the weight of the food. Subsequently, all the production, except the fruits, was weighed and at the end of the distribution, the remaining food left on the trays (dirty leftover and clean leftover) was weighed. From those results, the formula% rest ingestion = weight of rest x 100 / weight of distributed meal was used to obtain the value of rest ingestion.[17]

All results were analyzed using the Microsoft Office Excel program through mean ± standard deviation, using the statistical program Bioestat 5.3.

RESULTS AND DISCUSSION

In the pre-intervention, only 50% of users answered the test, a demand that can be justified by approaching the recess week of university classes. On average 41.5% were male, 39% female and 26% did not identify themselves. And after the intervention, about 68% of the users answered the test, 12.5% male, 15% female and 72% not identified.

Table 1 shows how the menus were prepared before the interventions and the interventions applied to the menus.

From this, the presentation of the preparations through the photographic record in the pre-intervention and post-intervention stages was evaluated, as shown in figure 1.

It was observed that after the interventions, it was possible to promote a more pleasant taste and better food appearance; As a result, there was a reduction in the amount of food left on the trays.

In sample 1A, the protein was served in the form of oven-roasted chicken fillet with the bahian sauce later added over the fillet. The intervention in 2A was the change in protein cutting and the way the chicken fillet was cooked, and the bahian sauce was gradually added, respecting the sequence: chicken, palm oil and coconut milk. A noticeable change in color is observed in the chicken, after being diced, it has been added to the sauce and cooked.

In 1B, the stew was dry and tough, and the rice was regular. In 2B, the menu is already with interventions: the meat was exposed to a longer cooking time and, therefore, it was necessary to add the amount of water in the cooking process, in order to obtain a more juicy and tender meat. In addition, there was an appreciation of rice, with the addition of carrots.

In 1C and 2C, there were no changes in appearance, because the main intervention occurred in the TSP hydration method: in 1C, the TSP was hydrated only in water, and in 2C, after interventions, it was hydrated in a reduced fat sauce from the ground beef trimmings (BT), plus soy sauce, rosemary, mixed seasoning of pepper and cumin and oregano. The ***farinha d'água*** was replaced by ***farofa***, since there was no more ***farinha d'água*** in the stock.

To better understand the results of the photographic record, it is important to remember that gastronomy aims to provide pleasure, related to the quality of food and the sensations aroused in those who evaluate and eat it.[18] With this, it becomes important to associate the nutrition knowledge to gastronomic practices to promote knowledge and innovation, encouraging better acceptance and food ingestion and providing pleasure and well-being through different forms of presentation of preparations. In addition, the taste, texture and the way such foods are presented improve acceptability and reduce rest ingestion rates.

Table 1. Conventional menus of the university restaurant chosen for the execution of gastronomic interventions and ways of execution with and without interventions. Belém-PA, 2018.

	Menu	Usual execution	Gastronomic interventions performed
1	Chicken in bahian sauce Seasoned rice Brindle beans with vegetables (pumpkin and cabbage) Baked salad of cabbage, potatoes, green beans, carrots and chayote Yellow ***farofa*** Apple	Baked whole chicken fillet, bahian sauce added after cutting the breast in two portion Usual cooking time of ***farofa***	Diced chicken breast stewed with bahian sauce Increase in the cooking time of ***farofa***
2	Beef stew Seasoned rice Brindle beans with vegetables (pumpkin and kale) Raw salad of cabbage, tomatoes, carrots and beets ***Farinha d'água*** Melon	Usual cooking time of meat Rice with conventional seasoning Usual cooking time of ***farofa***	Increased cooking time of meat Rice with carrot Increase in the cooking time of ***farofa***
3	Ground beef with soy Seasoned rice Brindle beans with vegetables (pumpkin and kale) Mashed Potatoes and Carrots Yellow ***farofa*** Orange	Hydration of soy with water	Hydrated soy with shavings of ground beef, shoyu, rosemary, mixed spice of pepper and cumin and oregano. Increase in the cooking time of ***farofa***

Figure 1. Visual comparison of trays with all preparations of the university restaurant menu, before interventions (1A, 1B and 1C) and after interventions (2A, 2B and 2C). Belém-PA, 2018.

In the participants' answers about what they disliked in the three menus with and without intervention, it was found that the highest percentages of dissatisfaction were with the main dishes, followed by toasted manioc flour, according to table 2.

The menu 1 without intervention showed the main dissatisfactions regarding the bahian sauce, the cooking point of chicken and ***farofa***. After the interventions, there was a reduction of 11% in the percentage of dissatisfaction of the main course, and 8% in the percentage of ***farofa***. In menu 2 without intervention, dissatisfaction consisted of the cooking point of meat and ***farofa***. With the interventions, there was a 20% decrease in dissatisfaction with the main

Table 2. Percentage result of answers to the question "What did you dislike most in the preparation?" Contained in the acceptability test applied to the university restaurant before and after menu intervention. Belém-PA, 2018.

Menu	Preparation	Least liked	
		Without intervention (%)	With intervention (%)
1	Chicken in bahian souce	25	14
	Farofa	12	4
2	Beef stew	39	19
	Farofa	11	2
3	Ground beef with soy	25	23
	Farofa	20	3

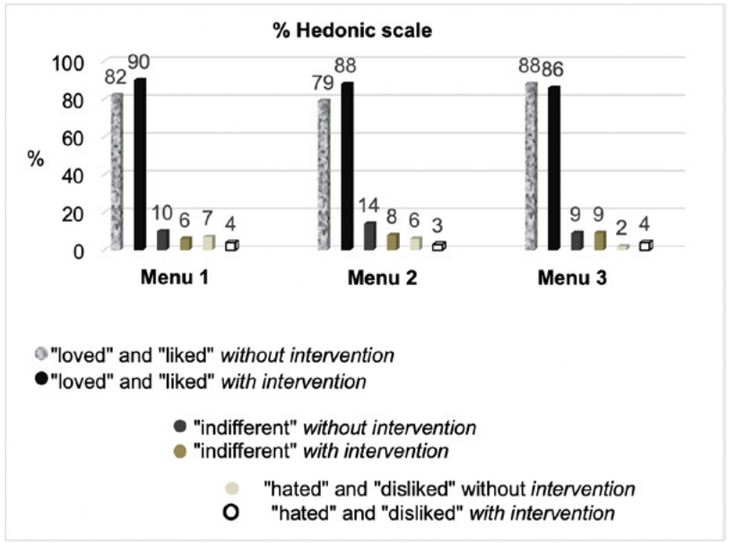
course and 9% with ***farofa***. And in menu 3, the dissatisfactions were about the palatability of BT with TSP and the cooking point of ***farofa***, which reduced 2% and 17%, respectively.

The figure 2 presents the results of the hedonic scale, which shows in columns the sum of the percentages of the expressions "liked" and "loved", the percentage of the expression "indifferent" and the sum of the percentages of the expressions "disliked" and "hated" of the three menus before and after the interventions.

With the execution of the interventions, the following results were observed: in menu 1, there was a reduction of 3% in the sum of the percentages of the expressions "disliked" and "hated" and 4% in the percentage of the expression "indifferent"; There was an increase of 8% in the sum of the percentage of the samples of the expressions "liked" and "loved". In menu 2, there was a decrease of 3% in the sum of the percentages of the expressions "disliked" and "hated" and 6% in the expression "indifferent"; There was a 9% increase in the percentages of the expressions "liked" and "loved".

Considering that the preparation / food obtained good acceptability and thus remain on the menu, the results of the hedonic scale require that the sum of the percentage of the sample of "liked" and "loved" expressions is greater than 85% .[16] In this research, we observed that the acceptability indices of menus 1 and 2 were below 85%; Thus, it is proven that the application of gastronomic interventions contributed to the acceptance percentage reaching rates above 85%, ensuring the permanence of the menu in the UR.

Figure 2. Percentage result of the facial hedonic scale of the acceptability test with and without intervention in the university restaurant menu. Belém-PA, 2018.



In the study made by Moraes,[15] a sensory assessment was performed through a nine-point acceptability test and a five-point hedonic acceptability test to determine the degree of acceptance of recipes developed along with gastronomic interventions on less common vegetables. This study obtained good results, since the three elaborated preparations presented in average 80% of acceptability.

In Mangabeira Júnior's research,[19] a seven-point hedonic scale test was applied in a self-service restaurant. Without interventions, the average acceptability of the menu was 74.2%; after interventions, this rate increased to 88.4%. Relating these studies to the research conducted in the UR, it appears that applying interventions on the FNUs menu in general represents an important bias to improve and adjust acceptability at the reference value.

Considering that the eating habits developed during the university period are heterogeneous, the results of the test may have been influenced by the following factors: religious and cultural beliefs; family rearing; dietary restrictions due to intolerances, allergies and / or other pathologies in need of dietary control; personal taste for a specific food or ingredient; socioeconomic and demographic status; cost; age; educational level; improper diet, with wrong eating habits and altered taste.[20,21]

Regarding the comparison of results obtained before and after interventions in menu 3, it was observed that the percentage of the expression "indifferent" remained at 9%; the percentage of the sum of the words "disliked" and "hated" was reduced by 2%, just as the percentage of the expressions "liked" and "loved" decreased by 2%.

The result in the percentage of menu 3 does not compromise its acceptability because the percentage value of the sum among the expressions "liked" and "loved" was kept above 85%, which ensures the permanence of the menu in the UR.

The research conducted by Calza[22] evaluated through the five-point mixed facial hedonic scale test, the acceptance and inclusion of preparations in the menu of a hospital that is a reference in the treatment of pediatric oncological patients. The results showed that even with the inclusion of new preparations, the percentage of acceptance of breakfast, lunch and dinner meals remained below 85%. The largest rejection was from a menu containing a preparation with tuna where the percentage acceptability was only 27.5%.

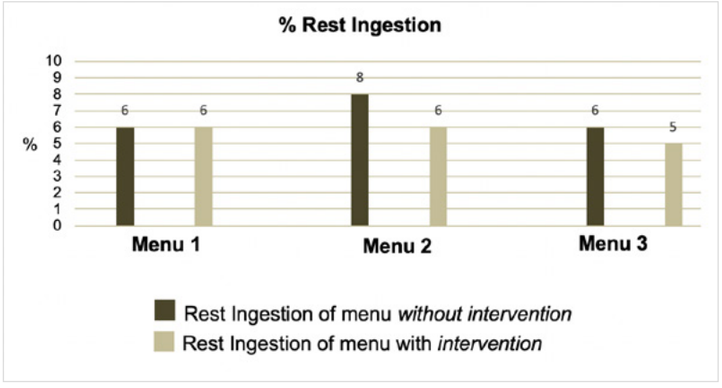
It is important to highlight that the participants of this research may dislike a single item and evaluate the menu negatively as a whole unsatisfactorily. This justifies the result obtained in menu 3, in which the main dish was BT with TSP, because according to a study made by Woyniak,[23] the TSP is not yet part of the eating habits of the brazilian population, because effective preparation techniques to reduce restrictions related to its characteristic flavor are still unknown.

At a school in Guarapuava, in the state of Paraná, Vicente[24] applied a hedonic scale test and evaluated the low acceptability of a hamburger prepared 100% with TSP. Thus, the study proved that, for preparations containing TSP to be well accepted, it is important to follow the appropriate ratio of BT to TSP in the preparations, which should be 70% to 30% or 80% to 20%, respectively.[21] In the main course of menu 3, the proportion of 71% BT to 29% TSP was harmonic.

The figure 3 shows the results of rest ingestion before and after menu interventions. Considering the data from menu 1, it was observed that there was no difference in the comparison of the percentages between the rest value. Regarding the percentage of rest ingestion, the menu 2 decreased by 2% and the menu 3 decreased by 1%.

All the percentages of rest ingestion found in the three menus, both pre-intervention and post-intervention are adequate according to the reference value set forth in CFN Resolution No. 380/2005,[25] in which, for healthy communities, indices of less than 10% of rest ingestion are appropriate. The research result also fits the principle that if the food is well prepared, the rest should be very close to zero.[26]

Figura 3. Resultado percentual do resto-ingestão das preparações com e sem intervenções do cardápio do restaurante universitário. Belém-PA, 2018.



The result of rest ingestion from the UR menus was lower than that obtained in the Moura's study,[27] where the percentage value was 10,41% in a FNU evaluated for seven days. The author attributed that result to the presentation of preparations at the distribution counters.

Other studies have obtained higher percentages than those found in the University Restaurant (RU), such as Rabelo's,[17] conducted in a FNU serving 700 meals / day, which achieved 13% of rest ingestion in the lunch distribution. According to the author, this high index indicates possible failures in the quantity produced, which cause unnecessary expenses.

According to Augustini,[28] the preferences, tastes, the emotional state of consumers, among others factors can interfere with the amount of food rejection and, consequently, with the value of the rest ingestion. Alves[29] found different results of rest ingestion in the surveyed FNUs, being 5% in one and 20% in the other.

The waste in FNUs is related to leftovers and food scraps. Some concepts are relevant to analyze the results of the rest ingestion, such as: dirty leftovers, which are the food that remained in the distribution counter vats after the end of the distribution and should not be reused, but discarded; clean leftovers, which are foods that have been prepared but not distributed and should be refrigerated and monitored (time/temperature) until their consumption; and the rest, which are the uneaten food left on the trays, which consumers discard in the wastebasket.[30]

The records of those quantities are fundamental, as they serve as subsidies to implement rationalization, waste reduction and productivity optimization measures.[28] Table 3 presents the amounts of dirty leftovers from the three UR menus.

It was observed that after the interventions there was no dirty leftover of the main dishes, which demonstrates better acceptability of the menus and reduction in food waste in the UR. Similar results were found in the study by Chaves,[31] also with favorable rates in his campaign against waste in a FNU.

Table 3. Results in Kg of dirty leftovers of the main dishes of the menus with and without intervention of the university restaurant. Belém-PA, 2018.

Dirty leftover	Without intervention	With intervention
Chicken in bahian souce	3,250 kg	-
Beef stew	0,150 kg	-
Ground beef with soy	1,400 kg	-

CONCLUSION

It can be concluded that this research has achieved important results for the UR and to support other studies in the area. The acceptability tests and rest ingestion are complementary tools, because when they are applied together, they produce more concrete and comprehensive results because they help to identify menus with high levels of rejection and waste, as well as specific points of dissatisfaction of customers. From that it is possible to take appropriate measures to correct the irregularities in the menu and / or in the production process.

Finally, the gastronomic interventions in FNUs are of paramount importance, since they do not demand huge interventions, but they need small changes that help to value the menu preparations with the same ingredients without changing costs, as well as increasing the acceptability and reducing waste. Further research with this company is needed in university restaurants. It is really necessary to expand research with this theme in university restaurants.

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Contributers

Maciel IJL participated in the distribution, data collection of the acceptability test of the usual menus and after interventions, and the writing of the subject in the article. Andrade NC participated in visual analysis before and after intervention, based on photographic records and his writing in the article. Souza VCS participated in the analysis of rest ingestion indexes before and after gastronomic intervention, and his writing in the article. Conceição LKM participated by supervising in all stages, from the conception and execution of the study, the writing of the article, the analysis and data interpretation, until the final version. Morais BHS participated guiding in all stages, from the conception and execution of the study, the writing of the article, the analysis and data interpretation until the final version.

Conflict of interest: The authors declare that there is no conflict of interest.

Received: December 18, 2018
Reviewed: May 3, 2019
Accepted: July 25, 2019