Nutritional composition and cost of preparations of commercial restaurants

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Abstract

This paper aimed to assess the nutritional composition and cost of preparations of commercial restaurants in the city of Goiania, Brazil. The study was conducted in three restaurants in which three different preparations, cooked white rice, beans in broth and grilled chicken, were evaluated on three non-consecutive days. The cost was different every day for each restaurant and comparing the restaurants. The nutritional values also varied at the same restaurant and between restaurants. The percentage of salt and oil in the preparation of white rice and beans in broth was higher than recommended in the literature. Therefore, it was found that the lack of standardized preparations resulted in changes in production costs and the nutritional composition of preparations evaluated in restaurants. Thus we recommend the adoption of technical cards, as a management tool that enables standardization, controlling the cost of production so as to obtain higher nutritional quality of preparations.

Key words: Food service. Meals. Restaurants. Management.

Introduction

According to the 2008-2009 Household Budget Survey (HBS), the expenditure on eating out in Brazil is on the rise. Data from the 2002-2003 HBS indicated that 24.1% of the family income was spent on eating out, and the 2008-2009 HBS reported an increase to 31.1%. The Southeast had the highest expenditure on eating out, representing 37.2% in 2009; the Midwest ranked second with 30.1%, close to the national average (31.1%).[1]

The eating-out sector is segmented into collective and commercial food service. Collective establishments (dining halls in companies, schools, hospitals, etc.) are traditionally named Food and Nutrition Units (FNU), and commercial ones (commercial restaurants of different sorts, fast food outlets, self-service buffets with weight-based pricing, restaurants specialized in regional cuisines, bars and cafes, etc.) are referred to as Meal Production Units (MPU).[2]

With the growth of the eating-out market, the competition between companies has also increased, and then came the need for continuous improvement in the quality of the product (meals) being offered to the population. Thus, it is imperative that control methods are effectively implemented by the eating-out sector in the production process in order to ensure the high quality of the meals and the proper management of related costs.[2,3]

For a meal to be prepared, its raw materials (food items) go through several stages, such as pre-preparation and preparation. These procedures can modify the chemical composition, appearance and weight of foodstuffs. Thus, there are also consequences for the production costs.[2-4]

During pre-preparation, alterations in the weight and nutritional value of foodstuffs may take place as a result of cleaning, peeling, cutting and using additives. In the preparation stage, the cooking process may cause: nutrient loss; dehydration or hydration with decrease or increase in the weight or yield of the recipe; increased fat, salt and sugar content; oxidation of fats and vitamins; formation of toxic compounds such as acrolein in oils and of heterocyclic amines in high-protein foods.[4-6]

Changes in the sensory characteristics of foodstuffs occur during the cooking process. The cooking time is crucial to avoid excessive heat, hydration or dehydration, which can affect the weight, yield, texture, color and flavor of the food, as well as promote the formation of toxic compounds. The use of additives, particularly salt and fat, requires special attention to prevent excesses that lead to losses in the nutritional value of foodstuffs.[4-6]

At last, the pre-preparation and preparation stages, as well as the proportion of ingredients used in the production process, directly interfere with the nutritional quality, sensory quality, and cost of meals. The techniques and methods for preparation must be determined, the quantities of

ingredients must be standardized, and the production of meals must be planned and controlled by means of management tools that ensure quality processing in order to generate products (food products and meals) that are actually healthy, tasty and with a competitive cost for the MPU.[7]

Production planning and control (PPC) advocates the organization, standardization and systematization of the production process. In doing so, companies can produce with better quality, more safety, higher speed and at a lower cost. In order to achieve this goal, this system (PPC) intends to draw up operational policies that guide the production and serve as a monitoring tool. The production scheduling through the PPC system aims to ensure the conformity of products, availability of raw materials for production and effective control of production costs.[8]

In the context of meal production, the first step and tool in the production planning would be planning the menu, which is a list of preparations comprising a given meal, or a list of preparations that comprise all daily meals or meals over a certain period of time. The menu will guide the production, stating what products (preparations) should be produced in a given period.[9]

Writing up the menu is the first step in the meal planning process, and, once this is done, the preparations listed must be standardized (as far as ingredient quantities and preparation techniques go) using technical data sheets (TDSs).[3,9] Thus, the menu and the TDSs are important instruments and documents that complement each other and are part of the production planning and control (PPC) framework for meals, as they provide the amount of ingredients required for the production and information on total quantities and number of servings produced.

A TDS is an operational management tool, a standard collection of recipes. It contains information on ingredients and quantities (gross weight, net weight, per capita, correction factor, % of salt and oil, unit cost of each ingredient, cost of preparation and per serving, number of servings, total weight of the preparation after cooking and of the serving, and yield factor), the description of the preparation method, the nutritional composition of the preparation, the number of employees involved in the production, the required equipment, the pre-preparation and preparation time.[3,9]

Because the TDS describes the stages of the production process in detail, it is possible to calculate the nutritional composition of the menus, prepare a shopping list and control the purchase of food items, draw up and control the costs associated with the preparations and the menu, optimize production time and organize the routine of the staff.[3,9]

The calculation of the nutritional composition of the menu is facilitated, for each preparation has its nutritional value per serving described in the TDS.[3] The shopping list can be prepared with more precision, since the per capita values, correction factor and numbers of servings/meals will be made available. This way, the exact quantity to be bought of each ingredient will be known.[3,6]

By using a TDS, it will be possible to control costs, as the real cost of raw materials used in each preparation of the menu will be informed, thus enabling the combination of preparations to achieve the target cost.[3,9] The organization of the staff's routine and the optimization of the production time will be controlled with the proper use of TDSs, which describe step-by-step each stage in the meal production, as well as the time spent in each preparation.[3,6]

TDSs are also useful in increasing the consistency of sensory properties of the preparation by standardizing the quantities and types of ingredients to be used, as well as the method to produce each preparation. In doing so, the meal keeps the same sensory traits such as color, flavor, texture and aroma in each production cycle. This way, it is possible to build customer loyalty through sensory quality.[3,9]

For all these characteristics, TDSs are an essential tool for management and operational support in the production of meals. Their design and implementation can provide greater nutritional and sensory quality to the meals prepared, other than optimizing the control of the production costs of the MPU. Nevertheless, their use is not widespread in commercial MPUs, such as 'kilo' (pay-by-weight) restaurants.

Hence, this study aimed to analyze the nutritional composition and raw material cost of three preparations at 'kilo' restaurants in the city of Goiânia, in the state of Goiás, Brazil.

Methodology

This is an observational, descriptive study carried out at 'kilo' (pay-by-weight) restaurants from the city of Goiânia (GO) registered with the Union of Hotels, Restaurants, Bars and Similar Establishments of the State of Goiás.

We evaluated three restaurants selected by random drawing from a list of 45 establishments registered with the Union in the city of Goiânia. The number of restaurants was determined according to the size of the team and the time available to conduct the fieldwork.

Data collection was conducted in July 2011, with three evaluations on different days at each restaurant and the calculation of the average of the three samples. We evaluated three preparations, namely: cooked white rice, beans in broth and grilled chicken. These preparations were chosen because they are the most common in 'kilo' restaurant menus.

Data collection was performed by monitoring the production of the meals, with direct weighing of foodstuffs using a food scale (of the brand Toledo, with readability of 10 g and a maximum capacity of 15 kg), and by entering the data in a specific form for evaluating the method to make the preparations. In this form, we entered the gross weight (GW) and the net weight (NW) of

foodstuffs, the weight of the preparation after cooking (WPAC) and the weight of a regular serving. From these data, we calculated the correction factor (CF = GW/NW) and the yield factor for each preparation (YF = WPAC/sum of NW of all ingredients). Armed with these data, we calculated the cost of raw materials and the nutritional composition (energy, carbohydrate, protein, lipid, fiber and sodium) of each preparation.

The weights of the utensils used to store the food were discounted, so as to obtain the actual weight of the ingredients and the preparations after cooking. The amounts of money in Brazilian reals (R$) used for calculating the cost of raw materials were the ones current at the time of data collection (July 2011), set by the supplier of one of the restaurants, and the supplier with the lowest price was the chosen one. We used the same value of cost per unit in the calculation for all restaurants in order to allow comparison of the data and evaluate the interference of the preparation method with the production cost.

The regular serving weight used as a reference for the calculation at the three restaurants was determined by weighing the food on the utensils used by the MPU to serve the customers. The three restaurants use the same types of utensils: a serving spoon for the rice and medium-sized ladle for the beans in broth. The grilled chicken is served by the unit. In each establishment, the preparations were weighed on the utensils used by the customers in triplicate for calculating the weight of a regular serving for each restaurant. With the weights obtained from each restaurant, we calculated the weight of a regular serving, taking into account the average of each establishment. This standardization of the weight of a regular serving was necessary to allow data comparison between restaurants; that is, the information on nutritional composition and costs refers to the same amount of food after cooking, and the weight of one serving of rice is 123 g (1 serving spoon of rice), of beans is 118 g (1 medium-sized ladle), and of grilled chicken, 68 g (1 medium steak). We chose to show the data relative to the weight of regular servings instead of 100 g of food because servings are more related to food consumption.

The nutritional composition was calculated using the Brazilian Food Composition Table.[10] By adding up the values of the chemical-nutritional composition of each ingredient of the preparation (net weight), we obtained the nutritional composition of the preparation (energy value and macronutrient, sodium and fiber contents) relative to the weight of the preparation after cooking (total yield or weight of the preparation after cooking). Subsequently, in order to obtain the energy value and the macronutrient contents for the weight of one serving, we applied the Rule of Three between the nutritional composition of the entire preparation and the weight of the serving.[11,12]

Data analysis was performed by descriptive analysis, with calculation of mean and standard deviation.

Results and discussion

TDSs are not used by any of the restaurants because in all of them cooks have discretion to decide the amounts of ingredients and the method to make the preparations of the day.

The findings about the nutritional composition, yield factor and cost of preparations (cooked white rice, beans in broth and grilled chicken) of the three restaurants are shown in Tables 1, 2 and 3.

According to what is shown in Table 1, each restaurant has a different value for the Yield Factor (YF) of rice. The YF measures the yield of the preparation, i.e., if there was gain or loss of weight in the preparation after cooking, as compared to the initial weight of the raw ingredients (YF = weight of the preparation after cooking ÷ sum of the weights of the raw ingredients).

At restaurant C, the YF was lower than in the other establishments, which can be explained by the lower amount of water added to the preparation, when compared to the other restaurants. The higher the proportion of water, the greater the cooking yield of the rice.[5] It should be noted that the three restaurants used polished, type-1 rice of the same brand.

Table 1. Yield factor of the preparation, percentage of salt and vegetable oil, nutritional composition and cost per serving of cooked white rice in commercial restaurants of the city of Goiânia (GO), 2011.

Serving of cooked white rice*		Restaurants		
		A (Mean ± SD)	B (Mean ± SD)	C (Mean ± SD)
Yield Factor		2.32 ± 0.18	2.20 ± 0.03	1.69 ± 0.16
Percentage of salt and vegetable oil**	Salt (%)	2.93 ± 0.41	2.32 ± 0.99	1.92 ± 0.25
	Vegetable oil (%)	14.11 ± 1.53	14.32 ± 2.2	12.48 ± 1.03
Nutritional composition	Carbohydrate (g)	35.82 ± 2.52	37.44 ± 1.36	49.84 ± 5.36
	Protein (g)	3.29 ± 0.23	3.46 ± 0.12	4.61 ± 0.50
	Lipid (g)	6.56 ± 1.03	6.89 ± 0.78	8.00 ± 0.37
	Fiber (g)	0.74 ± 0.05	0.79 ± 0.03	1.06 ± 0.1
	Sodium (mg)	520.47 ± 100.39	423.02 ± 166.2	468.69 ± 27.28
	Energy (Kcal)	215.40 ± 19.24	255.61 ± 2.25	289.8 ± 25.83
Production cost (R$)		0.09 ± 0.01	0.09 ± 0.006	0.09 ± 0.01

* Serving weight = 123 g

** Percentage of salt and oil added to the preparation in relation to the main ingredient of the preparation

These YF values are lower than indicated by Ornellas[5] (YF for rice equal to 3.0), that is, during the cooking process the rice grains would increase twice their initial weight. The values found in this study are consistent with those reported by Martinez & Silva[9] (YF for rice between 2 and 3) and by Martins[7] (YF for rice of 2.13). YF values for rice lower than the average reported in the literature mean lower weight and yield of the preparation after cooking and may represent an increase in production costs.

It was observed that there are no fluctuations of costs, with an average cost of R$ 0.09 per serving of cooked white rice at all restaurants.

With regard to the energy value, the rice from restaurant C showed the highest value. This can be explained by the fact that its YF was lower, which allowed for a higher concentration of nutrients in the preparation.

When evaluating whether there are variations each day, per restaurant, in the preparation of rice, we could observe that the nutritional composition, YF and percentage of salt and vegetable oil per serving are different for the same preparation. In other words, the production process is different every day, for there are no standardized raw material quantities and production techniques.

Regazone et al.[13] found different ways of preparing rice and beans at a FNU in the city of Rio de Janeiro (RJ). The authors emphasize the importance of the standardization of preparation methods in order to ensure the nutritional and sensory quality of preparations and reduce variability in the production process, thus increasing productivity and quality in the production of meals.

The data regarding the preparation of beans in broth are shown in Table 2. Regarding the YF, restaurant C showed the highest value (4.04±0.97). This may be due to the amount of water added for cooking or the quality of the grains used, given that all restaurants used 'carioca', type-1 beans, but of different brands. Ornellas[5] suggests a YF value ranging from 2 to 3 for beans. Thus, the YF data for beans found at the restaurants evaluated in this study are higher than recommended due to the greater amount of water added for cooking. This greater addition of water may be a strategy to increase the yield of the preparation (the weight of the preparation after cooking will be greater due to the amount of water added rather than to a higher proportion of grains), reduce production costs and also increase profits from the sale of the preparation.

Martins,[7] who conducted a study at a commercial restaurant from Taquatinga (FD), observed a YF for beans in broth of 3.83, a value similar to those found in this study. A study carried out in Rio de Janeiro reported that there are no quality standards for the preparation of beans in broth, which results in varying consistencies and flavors, for either lack or excess of additives and dilution of the preparation.[13]

At the restaurants evaluated by this study, the technique of soaking beans is not adopted. Soaking beans and discarding the water is a technique recommended for the preparation of beans that can bring nutritional benefits as it increases the bioavailability of nutrients and reduces flatulence compounds, such as oligosaccharides.[14] Furthermore, the soaking process can make the cooking easier, reducing preparation time and gas consumption.[15]

We can observe that the YF for beans is different every day at the same restaurant. Thus, due to this difference, the cost will also vary over the days. The production cost was different over

the analyzed days at the same restaurant, i.e., for the preparation of 118 g of beans in broth, the costs are either higher or lower, although the preparation and the amount produced are the same every day. This stems from the fact that in none of the restaurants evaluated is the production process for this preparation standardized (as far as the quantities of ingredients and method of preparation are concerned), which resulted in differences in the cost of preparation each day. These differences in costs may interfere with financial matters and with the profits obtained by the company over time.

Table 2. Yield factor of the preparation, percentage of salt and oil, nutritional composition and cost per serving of beans in broth in commercial restaurants of the city of Goiânia (GO), 2011.

Serving of beans in broth*		Restaurants		
		A (Mean ± SD)	B (Mean ± SD)	C (Mean ± SD)
Yield Factor		3.57 ± 0.62	3.15 ± 0.96	4.04 ± 0.97
Percentage of salt and vegetable oil**	Salt (%)	2.16 ± 1.22	2.45 ± 0.84	3.37 ± 1.11
	Vegetable oil (%)	8.35 ± 1.14	16.97 ± 7.93	12.95 ± 1.25
Nutritional composition	Carbohydrate (g)	18.61 ± 3.11	20.94 ± 8.95	15.76 ± 3.54
	Protein (g)	6.08 ± 1.02	6.84 ± 2.93	5.15 ± 1.16
	Lipid (g)	2.95 ± 0.78	5.47 ± 0.35	3.59 ± 0.54
	Fiber (g)	5.59 ± 0.93	6.28 ± 2.69	4.72 ± 1.06
	Sodium (mg)	265.21 ± 159.05	292.53 ± 17.87	322.43 ± 18.00
	Energy (Kcal)	125.33 ± 23.34	160.29 ± 44.46	115.95 ± 23.65
Production cost (R$)		0.09 ± 0.02	0.11 ± 0.04	0.08 ± 0.02

* Serving weight = 118 g

** Percentage of salt and oil added to the preparation in relation to the main ingredient of the preparation

The nutritional composition of this preparation showed variations for all nutrients, especially sodium and lipids. That is, for the same serving of beans in broth, the nutritional value is different between the restaurants. It is important to highlight that different lipid contents are influenced by the amount of oil added for cooking, with restaurant B being the one to use the highest percentage of oil; as a result, it has the highest energy value and lipid content in its nutritional composition. Variations in the sodium content are due to different proportions of salt added as a flavoring. Thus, the lack of TDSs and standardization in the production process also interferes with the nutritional composition of the preparation, for nutritional values fluctuate on a daily basis, which may influence the nutritional composition of the diet of diners.

Finally, Table 3 presents the results of the production process of grilled chicken.

Table 3. Yield factor of the preparation, percentage of salt and oil, nutritional composition and cost per serving of grilled chicken in commercial restaurants of the city of Goiânia (GO), 2011.

Serving of grilled chicken*		Restaurants		
		A (Mean ± SD)	B (Mean ± SD)	C (Mean ± SD)
Yield Factor		0.60 ± 0.21	0.63 ± 0.03	0.49 ± 0.04
Percentage of salt and vegetable oil**	Salt (%)	0.82 ± 0.35	0.33 ± 0.12	1.24 ± 0.21
	Vegetable oil (%)	2.16 ± 0.37	2.68 ± 1.36	0.22 ± 0.04
Nutritional composition	Carbohydrate (g)	0.07 ± 0.05	0.16 ± 0.10	0.20 ± 0.03
	Protein (g)	25.12 ± 10.29	21.65 ± 1.12	22.84 ± 1.81
	Lipid (g)	5.95 ± 2.12	5.71 ± 1.39	13.35 ± 1.02
	Fiber (g)	0.01 ± 0.01	0.03 ± 0.02	0.03 ± 0.006
	Sodium (mg)	446.29 ± 262.14	186.30 ± 45.29	768.83 ± 120.1
	Energy (Kcal)	154.23 ± 60.38	138.61 ± 13.98	212.36 ± 16.32
Production cost (R$)		0.43 ± 0.18	0.38 ± 0.02	0.70 ± 0.06

* Serving weight = 68 g

** Percentage of salt and oil added to the preparation in relation to the main ingredient of the preparation

For the YF evaluation, meat is categorized as fatty or lean by Martinez & Silva[9]. Thus, the grilled chicken is included in the 'lean meat' category, whose YF should be between 0.6 and 0.7. These literature values are similar to those found at the restaurants, except for restaurant C, which showed a YF of 0.49 for this preparation.

The YF of 0.49 is far below the values reported in the literature (YF between 0.6 and 0.7) for grilled chicken. This value suggests a great loss of moisture, an excessive dehydration caused by cooking at a high temperature and for a long time. This result shows the influence of the preparation technique on the yield of the preparation.

In the evaluation of the cost of the high-protein dish, we found different costs over the days at the same restaurant. Comparing the restaurants, costs varied, most notably at restaurant C (R$ 0.70), which shows a much greater value than restaurants A and B. The higher production cost of the grilled chicken at restaurant C is related to its YF value being below average for this preparation, as the lower yield means larger volume losses and, consequently, a reduced amount of preparation after cooking and a lower number of servings prepared and available for commercialization. Therefore, there is a great difference in cost per serving of the same preparation, indicating management failures that may incur possible financial losses over time.

We can observe that the grilled chicken also showed variation in the nutritional composition at the same restaurant and between restaurants. These differences are due to the lack of standardization of the quantities and proportions of ingredients used in the preparation.

Regarding the percentage of salt used for cooking the rice, it was found that restaurant A uses more salt than the other restaurants (Table 1). Restaurant C used the highest salt percentage in the preparation of beans in broth and grilled chicken (Tables 2 and 3).

It is known that high levels of salt in the diet can cause systemic arterial hypertension (SAH).[16] The *Dietary Guidelines for the Brazilian Population*[17] recommends a daily intake of 5 g of sodium chloride or table salt (equivalent to 2,000 mg of sodium / day).

In a study carried out by Dumas,[18] all preparations analyzed (baked kibbeh, 'tropeiro'-style beans and *farofa*) were above the recommended levels of sodium, set at 200 mg of sodium per serving. This value was determined based on the recommendation of the Ministry of Health[17] suggesting that lunch should provide a maximum of 1,000 mg of the daily intake of sodium. Since in Brazil lunch usually comprises a main course (meat), garnishes (pasta or sautéed vegetables), side dishes (rice and beans) and salad (raw or cooked vegetables), this recommendation was divided into five items and, so, each serving of each item of the menu should provide no more than 200 mg of sodium.

Of the preparations of this study, only the grilled chicken from restaurant B is in accordance with the amount of sodium per serving of each preparation (<200 mg) recommended by the Ministry of Health[17].

It should be noted that the commercial restaurant customers are not given nutritional information as are diners in the Food and Nutrition Units (FNU), which are managed by nutritionists, and that they are allowed to serve themselves portions of food larger or smaller than those recommended by the guidelines of national and international organizations on food, nutrition and health.

Selecting serving sizes adjusted to their needs is a major difficulty for consumers. Thus, we emphasize that the work of a nutritionist in commercial restaurants would be of great importance for creating environments which foster healthy food choices and thus contribute to the promotion of the population's health.[19,20]

Due to their particularities (food variety, affordability, quickness and convenience), 'kilo' restaurants can encourage healthy choices, as long as nutritional interventions are incorporated in the context of the selection of the preparations which will compose the buffet (menu) and of the method to prepare the food, providing guidance to the public so that it can choose foods that constitute a healthy meal.[20,21]

The percentage of oil used at restaurant B was the highest for all preparations (Tables 1, 2 and 3). It is known that the excess of fat in the diet can increase its energy value, as well as contribute to the development of obesity and insulin resistance and increase total cholesterol and its fractions.[22]

The *Dietary Guidelines for the Brazilian Population*[17] recommends a tablespoon of vegetable oil (8 g oil per person) for cooking foodstuffs. Thus, in order for the production of meals to meet the recommendations, 1 g vegetable oil per capita should be used per preparation, or the percentage of 1% to 2% vegetable oil in relation to the weight of the main ingredient of the preparation should be applied.[17,23]

The proportions of vegetable oil to prepare the grilled chicken, at restaurant C (0.22%), were lower than recommended in the literature, and at restaurants A and B, were slightly higher than recommended. The percentage of oil in relation to the main ingredient in the preparations cooked white rice (above 12%) and beans in broth (above 8%) of the restaurants evaluated in this study is higher than the recommended (1 to 2%). It is important to emphasize that the World Health Organization (WHO) recommends a reduction in fat consumption as a strategy for the promotion of the population's health.[24,25]

The three preparations at all restaurants showed variations in the nutritional composition and cost of production over the days, at the same restaurant and from one restaurant to another. The variation in the cost of production may affect the earnings of the establishment. This fluctuation demonstrates the lack of standardization of the meals, with different amounts of ingredients and water for cooking over the days evaluated. This variation in the proportion of ingredients, particularly the larger amount of oil added, requires special attention, as the habitual consumption of preparations with high fat content can lead to an increase in the energy density of the diet.[25] We must bear in mind that commercial restaurants will influence more and more the food consumption of the population.

A study conducted in a MPU in the city of Brasilia (FD) also found large variations in the nutritional composition of white rice, beans in broth and grilled chicken. The authors note that preparations that are given the same name cannot be considered nutritionally equivalent, due to different methods of preparation and proportions of ingredients. The nutritional composition of preparations in the aforementioned study was also different from the values reported for them in the food composition tables, which, according to the authors, can lead to distortions between dietary prescriptions (which take into account the values in the tables) and the diners' consumption (subject to the interference of the methods of preparation).[26]

Considering these results, it is clear that the food preparation techniques are decisive for the nutritional quality of the preparations.[15,25] Despite this direct influence on nutritional composition, the decisions on the method of preparation seem to be determined by operational matters, that is, situations that make the execution of the preparation easier, at the expense of techniques that preserve and / or improve the nutritional and sensory quality of the preparations.[15]

The lack of standardization in meal production, especially regarding the method of preparation and the quantities of ingredients used, probably leads to great differences in the sensory properties of foodstuffs, with significant changes in color, taste, aroma and appearance of the preparation. Based on this assumption, we understand that the variability of these sensory characteristics may interfere with the acceptance by diners of the perceived inconsistency in the preparations, favoring rejection, waste, and even customer loss.[3,7]

Hence, the work of a nutritionist in commercial restaurants is of central importance to ensure the production of meals that are nutritionally-appropriate to the population, which visit these establishments more and more often.[20]

Conclusion

We found that the lack of standardization of the preparations resulted in changes in the production costs and in the nutritional composition of the preparations evaluated at the restaurants.

The TDSs can help control costs in the production process, as they provide the advantages of dynamizing the work, assessing the real amount of money spent with raw materials, evaluating the yield of each preparation and possible losses due to trimmings from the raw materials, other than reducing food waste. In addition, they help control nutritional quality by standardizing the quantities of raw materials used for the preparation, especially the proportions of oil and salt, which interfere so greatly with the composition of the preparations. Finally, this standardization ensures that the costs and the nutritional composition are held constant at each cycle of production of the preparations.

Given all that has been discussed, we conclude that production planning is essential to increase the quality and competitiveness of commercial restaurants. The standardization of preparations, through TDSs, is recommended for restaurants as a tool for the management of the production process.

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