Progress in Nutrition 2020; Vol. 22, N. 1: 48-57 DOI: 10.23751/pn.v22i1.8110

Original article

Standardizing the recipes mainly used in the menus of commercially operating institutional food services: their nutritional values and cost analysis

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Summary. *Objective:* This research was carried out at Bilkent University cafeterias to standardize the recipes that are not available for specific dishes which are mainly used by commercially operating mass feeding institutions. Throughout the study, 75 food recipes classified under 9 categories (soups, meat, chicken, fish, vegetables cooked with meat, cold vegetable dishes cooked with olive oil, pastries, salads and desserts) were standardized for 100 portions and written to the forms redeveloped by the researchers. All of the dishes were prepared, cooked and served by the cooks working at Bilkent University main kitchen. Recipe base line information was created by combining the data collected both from the well experienced cooks and famous cook books. The organoleptic evaluation of the recipes to be standardized were made by using a 5 points scale evaluation form which was based on 5 criteria (colour-shape, general appearance, flavour-taste, texture-consistency, portion size) and graded by the panellists composed of dietitians, university students, university staff and cooks. Fifty nine of these recipes were standardized following their initial, 9 after their second, and 7 after their third trial of production. The recipes which were perceived to be average and/or below by the panellists were produced again considering their shortcomings until the desired points were achieved. Energy and nutrient content of the recipes were calculated using BEBİS (computerized program giving the energy and nutrient values of given food and recipes that are specific for Turkish dishes) program. The cost of the recipes was calculated as food cost and the total cost. The food cost was calculated by the ingredients' cost indexed to the value of American Dollar is due to its consistent rate compared to Turkish Liras. Total cost was achieved by the factors affecting the cost of the dish such as the cost of employee and other technical costs. Total cost was calculated to determine the sale price of the dishes. Energy and nutrient content and the total cost of the dishes were shown on the standardized recipe forms. It was found that the percentages of the food, labour and the operational cost of the total cost were 33.3 %, 29.9 % and 26.4% of the total cost respectively.

Key words: standardized recipes, cost evaluation, food cost, nutritional values.

Introduction

Standard recipes are one of the factors influencing the quality, effectiveness and the cost control at food service establishments together with purchasing methods, well trained staff, layout and equipments and quality control procedures. By using standardized recipes, it is possible to serve the food with the same cost, quality, consistency, and taste. They also allow the operators to control the portion size and the total yield to be produced (1-12).

The first advantage of using standardized recipes is consistency. Standard recipes are one of the four factors that help achieve the quality, consistency and control-

ling costs at Institutional Food Services. By using standardized recipes, prepared foods will have the same cost, quality, portion control, consistency, and taste, regardless of whom they are prepared for, who prepared the food and the time of preparation. The other factors that help achieve quality, consistency and controlling costs are standardized purchasing methods, well trained staff and quality control procedures (3,10,13-15).

Standardized recipes and standard portions are the main pillars of cost control program, and give constant and valid information for the program. By using the information gathered from standardized recipes, exact cost of items and services could be calculated and analyzed. This is very critical for the strategic planning and control of the business (5,12).

Today most of the commercially operating institutions in Turkey do not use standardized recipes, thus nutritional value of foods served are not known and the cost analysis of the foods is not easy to substantiate (16). This study was planned and carried out to standardize the recipes that are not available for the dishes mostly served in the commercially operating institutions and to define their nutritional values and total cost.

Materials and Methods

The recipes chosen for standardization

In this study seventy-five different dishes were standardized for one hundred portions. The criteria for the selection of the dishes for their recipe standardization were

1) to be seen in the menus of commercially operating institutional food services.

2) not having standardized recipes.

The dishes were chosen from 9 different dish groups i.e. soups, meat, chicken, fish, vegetables cooked with meat, cold vegetables dishes cooked with olive oil, börek-pasta, salads and desserts. All recipes were tried and produced at the Bilkent University kitchens by well trained cooks under the supervision of the researchers. The dishes that are chosen for standardization are shown in Table 1.

Bebis 8 (nutrition information system) program is used in the calculation of energy and nutrient content of meals.

Methods Used in WritingThe Recipes to the Forms

Recipes were documented on a form redeveloped by the researchers. This form contains information about the name of the dish, group number of the dish, portion size,

Table 1. The Dishes Chosen for Standardization

Dish Group	Number	Name*
Soups	10	Carrot, broccoli, minestrone, spinach, vegetable, bezir, mushroom, chicken, ezogelin, corn soups.
Meat	18	Kebabs (kağıt, orman, yörük, islim, with puree), lamb tendaur, shepherds sautee, roasted lamb, hünkar beğendi, elbasan tava and meatballs (roast, hasanpaşa, grilled, dalyan).
Chicken	13	Chicken with soybean sauce, chicken stuffed with spinach, sauteed chicken with mushroom, roasted chicken roti, chicken sautee with vegetables, chicken topkapı, köylüm chicken,
Fish	1	Trout sautee.
Vegetables Cooked With Meat	3	Vegetables augratin, cauliflower augratin, zucchini mousakka.
Cold Vegetable Dishes Cooked With Olive Oil**	4	Artichoke, stuffed aubergine, stuffed cabbage, şakşuka.
Böreks, Pastas	5	Spagetti napoletana, su böreği, milföy börek with cheese, yufka böreği with spinach, vermicelli with cheese and walnut.
Salads and Appetizers	7	Salads (Mediterranean, garden, shepherds, aubergine and potatoes), carrot tarator and fava.
Desserts	14	Tulumba tatlısı, kalburabastı, keşkül, şekerpare, revani, irmik tatlısı, lokma tatlısı, fırın sütlaç, kazandibi, sakızlı muhallebi.

**Orginal names of some dishes are given and explained in Table 4, as they don't have direct translation into English.*

*** In Turkish Cuisine, there is a group of dishes titled "Olive Oiled Dishes". These dishes are cooked with olive oil and served cold. Recently others oils (corn, sunflower etc) were started to be used instead of olive oil, but the dishes are still called oliveoiled dishes. Vegetables, legumes, rice are main ingredients of this group. The dish is mostly named after the main ingredients such as olive oiled green beans, olive oiled artchoke, olive oiled stuffed green pepper, etc.*

utensils used to control portion size, equipments used in preparation and cooking, preparation and cooking time, total yield, ingredients; their net, gross weights and average measurements, the steps to be followed for preparation and cooking, the cost and energy and nutrient content of one serving size.

While calculating the energy and nutritional value of the dishes, the net quantity of the foods in the dishes was used. Gross quantities of the foods were shown on a separate column at the form to determine the purchasing amount and transferring amount of the foods from the dry and cold stores to the kitchen on a given day. Net values of the food were calculated by subtracting the waste from the gross values. All net and gross values of the foods were given in kilograms. For simplifying the procedure for the users, third column is allocated for the ingredients average amounts such as pieces, bunches, glass etc. Some foods that were not purchased as kilograms but in pieces, such as lemon, parsley etc, were stated in kilograms to be used in calculating their nutritional values. The order of the ingredients were written as the order of their process in the preparation and the cooking of the dish. Each new step to be processed were separated by a horizontal line to make the recipe easy to follow.

Organoleptic Evaluation of the Dishes

Each dish was evaluated by ten panelists consisting of two dietitians, two staff members, two cooks and four university students from Bilkent University. A form, created by Kurtcan and Gönül (17) based on grading the criteria determined for the evaluation, was given to the panelist to be filled after they tasted the given dish.

The criteria stated on this form were colour-shape, general appearance, flavour-taste, texture-consistency, and portion size of the dish. As the appearance of quality criteria on the forms is important, they were written as above mentioned order. These five criteria have been graded on a 1 to 5 points scale (18) which are: Unacceptable: 1 point, Acceptable: 2 points, Average: 3 points, Good: 4 points, Excellent: 5 points. Each dish would get a minimum of ten and a maximum of fifty points on this grading method with a panel of ten evaluators. The range of points in grading and their explanation are shown in Table 2.

At the end of the evaluation, the dishes that were graded as an average of 34 points and above were considered acceptable and standardized consequently. The dishes that were graded below 34 points were reproduced until they get the acceptable grade.

Each panelist were trained on the purpose and the grading criteria of the study prior to the evaluation. The dishes to be tested were served on the plates standardized for each panelist and the survey. As one of the evaluation criteria is portion adequacy, the dishes were served at lunch time (12.00-13.00) in the cafeteria. Much effort was given to make sure each panelist were served the dishes at the same inner temperature (19).

Points Considered During the Trials of the Recipes

Dishes were prepared by the cooks under the supervision of the researchers and some notes such as preparation and cooking time and measurements results (such as wastes and absorbed oil etc) were taken. The amount of waste during vegetable preparation can be seen in Table 3.

Table 2. The Points of Grading and Their Explanation Used in the Evaluation of the Standardized Recipes

Points of Grading	Explanation
10 -17	Unacceptable
18 - 25	Acceptable
26 - 33	Average
34 - 41	Good
42 +	Excellent

Table 3. Percentage of the Vegetable Waste

Vegetable	Waste (%)	Vegetable	Waste (%)
Potato		Tomato	
Peeling By Hand	25	Pitting only the top	1
Peeling By Machine	10	Peeling	20
Peeling After Boiling	10	Scooping	30
Zucchini	20	Onion	12
Scooping	45	Spring onion	30
Celery Root	35	Aubergine	20
Carrot	20	Cabbage	30
Cauliflower	45	Radish	25
Garlic	5	Green Pepper	10
Dill	35	Parsley	40
Broccoli	25	Spinach	25+
Brussel Sprout	10	Iceberg	25
Garden Cress	30	Lemon (80g) juice	25 g

Preparation Time

The time spent for preparation was categorized into 3 groups to show the time spent by the cooks (during washing, peeling, chopping etc.), the time that passes to hold the food for specific reason (soaking the beans in water, the rising of dough etc.) and time spent by the cooks after cooking the food (slicing the roasted meat etc.).

Cooking Time

The time spent for cooking was also categorized into 3 to show the time spent by cooks (frying, sautéing, stirring the food etc.), the time not needed staff interference (in the oven, boiling in the pots etc.) and the time needed to make the dish ready to serve (holding rice to become fluffy, cooling deserts and olive oil dishes that are served cold etc.) Preparation and cooking times that are seen on the recipe forms are the averages of the staff performance for one person.

Cost Analysis of the Recipes

Standardized recipes' portion food costs were calculated with the help of an MRP (Material Requirement Program) system and the unit prices that were used on food cost analysis were taken from purchasing lists of the production kitchen. Food Cost was calculated by taking into consideration the gross weights of the ingredients and the prices were indexed to the American Dollar due to its consistent rate. While calculating energy and nutritional value of the fried foods, oil absorption were taken into consideration and noted on the recipe charts. In addition to the above mentioned analysis, labor cost and operational cost were also calculated to find the total cost of the dishes. In determining these costs the following procedure was used. Food costs were calculated with the help of an MRP (Material Requirement Program) system, labor and running costs were calculated by dividing the number of meals produced annually by the number of cafeterias producing meals.

Results and Discussion

From the seventy nine foods produced, fifty nine (79%) were standardized during the first, nine (12%) were standardized during the second, and seven (9%) were standardized during the third trial of the production. All recipes were written into a specific standardization form redeveloped by the researchers. Table 4 shows an example of a standardized recipe for "Chicken Stuffed with Spinach". The nutritional value, food cost and the total cost of the standardized recipes are given in Table 4. The components which are the basis for cost analysis and their percentages are shown in Table 5. Food cost were found to be as 33.3% of the total cost. Labor cost and the operational cost were 29.9% and 26.4% respectively Table 6.

The first step in the preparation process is washing of food.Thus, food, stone, mud, dust, pesticides harmful to health are largely purified (20). The extraction of food from all kinds of foreign matter and bruises affects not only health and economy but also the taste of food (21). In this study, the purchased food items were first extracted and washed. After the extraction process, the shear rates between the gross and net quantities were calculated.

Time, temperature and humidity control are the most important factors in giving proper shape and consistency to the food. The better these three factors are set, the better the quality of the food (1). In this study, these three factors which have a direct effect on the quality of the food were meticulously followed, the preparation and cooking times, the cooking temperatures were checked.

Standardization of the recipes was achieved mostly after the first trial. Dissatisfaction reasons stated by the panelists for the dishes that were needed to be tried for second and third time concentrated on two evaluation criteria, consistency and taste. Taste stands much higher between other sensory quality factors for acceptance of food by the consumer and differs widely from individual to individual. When dissatisfaction reasons were analyzed; surface dryness, undercooking, too much fat content, mushy, unsatisfactory taste, improper cooking time were found to be the mostly stated points. No inadequacy was found on color-shape and portion size criteria of the dishes. There were no low grading for the portion size showing the quantity of foods that form the standardized portion size of the recipes were normal. As the energy value of the lunch meal is suggested to be one third of the daily energy

Table 4. An Example of the Standardized Recipes.

Total Amount: 100 PORTION					
Name	**:**	**Chıcken Stuffed Wıth Spınach**	**Preparation Time**	**:**	1 s. 3' - 0 - 25'
Group	**:**	1	**Cooking Time**	**:**	12' - 1 h. 25' – 0
Portion Size	**:**	250 g	**Total Weight (Kg)**	**:**	25
Portion Measurement	**:**	1 piece	**Food Cost**	**:**	0.60.- USD
Cooking Pots	**:**	Caserol, Oven Tray, Oven	**Total Cost**	**:**	1.17.-USD

Ingredıents	Weıght		Measure	Procedure	Period	Notes
	GROSS (kg)	NET (kg)				
Chicken Steak	15.000	15.000	100 Piece	Wash the chicken steaks and pound, prepare to wrap.	(10 ')	As they will wait till the filling is ready keep cold or make ready while the filling is prepared by someone else.
Spinach	8.000	6.000		Clean, wash carefully and chop the spinach.	(15 ')	
				Braise the spinach.	10 '	
Onion	1.500	1.320	10 MS	Peel, wash and finely chop the onion.	(9 ')	
Mushroom	2.000	2.000		Clean mushroom and slice to a case which is filled with water.**	(8 ')	
				Strain when to be used.	(3 ')	
Margarine	1.000	1.000	4 Pack	Melt the margarine in a pan, add onion, mushroom and spinach and sautee.	10 '	
Black Pepper	0.050	0.050	3 Spoon	Add black pepper, red pepper and salt to the sautéed mixture.	2 '	
Red Pepper	0.050	0.050	3 Spoon			
Salt	0.100	0.100	3 Spoon			
				Spread mixture on the beefs which were prepared before and wrap up like roll.	(20 ')	
Tomato	1.500	1.485	10 MS	Clean and wash tomatoes. Slice tomato's middle size.	(5 ')	
Green Pepper	1.500	1.350		Clean and wash the green pepper and cut into two pieces.	(10 ')	
				Place the rolls to the oven tray and decorate surface of the rolled beefs with a slice of tomatoes and pepper.	(3 ')	
Boiling Water	1.000	1.000	5 Glass	Add the boiling water to the oven tray and put it into the oven (175 ^{0}C).	75 '	

Energy and Nutritent Content of One Serving

Energy	Protein	Fat	CHO	Calcium	Iron	Vitamin C	Thiamin	Riboflavin	Niacin	β. Karoten	Cholesterol
308.4 kal	46.4 g	12.2 g	2.3 mg	294.8 mg	3.6 mg	36.5 mg	0.2 mg	0.4 mg	13.4 mg	3.6 mg	93.2 mg

***Vegetables loose much of their nutritional value while holding in water. Darkening of vegetables is also important during mass production, thus holding time of vegetables in water must be kept as short as possible.*

value, the energy content of the dishes were also consequently indicating the adequacy as most of the meals consist of three course and bread.

Vegetable waste percentages found in this study were in accordance with another study (1) carried out for standardization of the recipes mostly used in public institutions. In another study, the differences between the wastage rates in the comparison with the wastage ratios were determined. In this study, since the dishes are produced according to 6-8 portions and in the laboratory environment, the difference between the controlled production in this environment and the number of serv-

Table 5. Energy and Nutrient Content, Food Cost and Total Cost of the Standardized Recipes

Name of the Dish	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)	Vitamin A (µg.)	Vitamin C (mg.)	Ca (mg.)	Vitamin B1 (mg.)	Vitamin B2 (mg.)	Niacin (mg.)	Fe (mg.)	Food Cost (USD)	Total Cost (USD)
Chicken sautee with soy sauce	315.1	39.9	13.9	7.3	88.0	0.1	27.7	0.1	0.1	12.4	1.1	0.51.-	1.07.-
Chicken stuffed with spinach	308.4	46.4	12.2	2.3	708.6	36.5	294.8	0.2	0.4	13.4	3.6	0.60.-	1.17.-
Roasted chicken	405.3	43.0	23.0	6.7	85.8	0.8	35.5	0.2	0.4	10.6	3.0	0.50.-	1.07.-
Chicken sautee with mushroom	229.7	34.1	9.0	2.6	138.3	15.8	42.8	0.1	0.3	12.5	1.5	0.48.-	1.05.-
Chinese chicken	302.9	34.0	12.6	13.3	1041.8	6.1	75.6	0.2	0.2	10.6	2.3	0.45.-	1.01.-
Roasted chicken thighs	359.2	43.3	18.7	4.2	112.0	12.8	42.3	0.2	0.4	10.7	3.3	0.49.-	1.06.-
Chicken sautee with vegetable	299.0	35.2	10.0	16.3	490.9	17.7	46.5	0.2	0.2	11.2	1.5	0.46.-	1.02.-
Chicken ball	491.8	34.5	17.0	49.1	95.9	12.9	105.0	0.2	0.2	9.1	1.7	0.43.-	1.00.-
Piliç Topkapı[1]	306.1	40.7	11.6	9.4	88.3	0.8	42.2	0.1	0.1	12.4	2.3	0.51.-	1.07.-
Broiled chicken	337.6	47.8	13.2	6.5	675.5	18.4	81.3	0.2	0.2	14.4	1.9	0.62.-	1.19.-
Köylüm Chicken[2]	444.4	40.5	23.5	17.4	461.2	14.0	212.1	0.2	0.3	11.4	1.5	0.52.-	1.09.-
Chicken schinitzel	534.2	54.7	16.8	40.2	740.9	18.1	95.8	0.3	0.3	14.7	2.8	0.76.-	1.33.-
Chicken sautee	360.1	34.5	17.7	15.3	146.6	24.4	49.7	0.2	0.2	11.2	1.6	0.46.-	1.02.-
Rainbow trout Sautee	489.6	52.3	16.4	31.8	233.0	33.0	94.1	0.3	0.2	6.9	3.0	0.82.-	1.43.-
Kağıt Kebap[3]	367.8	36.2	19.2	12.4	657.1	13.9	80.9	0.2	0.3	5.9	4.9	1.01.-	1.58.-
Yörük Kebap[4]	457.1	42.2	23.9	18.1	138.1	17.4	169.0	0.2	0.5	6.5	5.2	0.97.-	1.54.-
İslim Kebap[5]	452.4	38.5	25.7	16.2	237.7	48.6	95.5	0.2	0.4	6.5	4.7	1.16.-	1.73.-
Orman Kebap[6]	401.4	35.6	22.4	14.3	856.3	9.3	59.6	0.1	0.3	5.2	5.8	0.85.-	1.43.-
Kebab with puree	409.7	38.5	20.4	17.3	139.8	32.0	70.6	0.2	0.4	5.9	4.9	0.88.-	1.44.-
Lamb tendour	363.1	27.9	27.5	1.6	6.4	1.9	50.4	0.1	0.3	4.6	2.6	1.52.-	2.09.-
Roasted lamb	416.6	43.0	20.9	13.9	5626.1	10.0	84.8	0.2	1.5	10.2	8.9	1.56.-	2.13.-
Ankara Tava[7]	385.2	42.0	20.2	8.6	141.1	21.4	54.7	0.1	0.3	6.4	4.0	1.75.-	232.-
Çoban Kavurma[8]	349.4	25.1	25.9	4.1	107.0	35.7	35.4	0.2	0.3	6.2	3.4	0.86.-	1.97.-
Boiled veal	369.4	36.6	17.9	15.5	1048.6	8.8	32.4	0.1	0.3	5.4	4.6	0.87.-	1.43.-
Beef with mashroom sauce	453.3	38.9	22.5	23.2	48.2	14.7	68.3	0.2	0.4	5.8	5.0	1.00.-	1.56.-
Hünkar Beğendi[9]	491.1	44.2	21.4	29.5	139.2	239.7	11.2	4.3	0.2	0.5	6.1	1.17.-	1.73.-
Roasted Köfte	339.2	30.9	18.3	12.6	114.6	56.1	18.8	3.9	0.2	0.3	5.4	0.63.-	1.19.-
Hasanpaşa Köfte[10]	468.6	36.0	21.8	31.5	117.0	248.5	18.2	3.9	0.2	0.4	5.8	0.66.-	1.22.-
Grilled meatballs	370.9	32.1	18.4	18.8	372.2	66.6	19.1	4.3	0.2	0.3	5.6	0.69.-	1.26.-
Dalyan Köfte[11]	439.3	36.4	21.4	25.2	780.2	86.4	19.6	4.9	0.2	0.4	5.8	0.67.-	1.23.-
Elbasan Tava[12]	456.4	35.7	26.2	19.1	108.3	182.3	14.7	3.9	0.2	0.4	5.0	0.80.-	1.36.-
Vegetables au gratin	409.7	24.5	25.5	20.4	561.1	253.6	16.0	2.8	0.2	0.4	3.7	0.49.-	1.05.-
Cauliflower au gratin	355.3	27.7	15.4	25.8	113.3	276.3	52.7	2.8	0.2	0.4	3.3	0.70.-	1.26.-
Zuccini mousakka	257.4	17.8	17.0	8.2	159.4	77.5	22.8	4.4	0.2	0.3	3.3	0.32.-	0.88.-
Veal sautee with mushrooms	346.1	36.1	19.5	6.5	84.2	34.7	24.0	4.9	0.2	0.5	6.8	0.95.-	1.51.-

Table 5. Energy and Nutrient Content, Food Cost and Total Cost of the Standardized Recipes

Name of the Dish	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)	Vitamin A (µg.)	Vitamin C (mg.)	Ca (mg.)	Vitamin B1 (mg.)	Vitamin B2 (mg.)	Niacin (mg.)	Fe (mg.)	Food Cost (USD)	Total Cost (USD)
Artichokes cooked with olive oil	231.8	4.8	17.3	14.0	660.7	98.3	11.6	2.1	0.1	0.1	1.2	0.75.-	1.31.-
Stuffed aubergines cooked with oilve oil	278.7	4.2	22.5	15.0	96.7	51.5	14.3	2.2	0.1	0.1	1.1	0.23.-	0.79.-
Fava[13]	141.7	4.9	10.3	7.5	223.7	30.3	2.7	1.1	0.1	0.1	0.5	0.07.-	0.64.-
Stuffed cabbage cooked with olive oil	238.2	4.4	17.3	16.2	82.7	103.6	49.4	2.5	0.1	0.1	1.8	0.16.-	0.72.-
Şakşuka[14]	171.6	2.1	14.3	8.5	87.2	28.5	26.4	0.8	0.1	0.1	0.7	0.11.-	0.67.-
Spaghetti Napoliten	391.1	8.5	19.8	44.6	141.4	34.6	28.7	1.4	0.1	0.1	1.7	0.07.-	0.66.-
Layered börek	293.1	9.4	15.5	29.0	182.2	138.0	6.7	1.0	0.1	0.2	0.4	0.11.-	0.68.-
Vermicelli with walnuts and cheese	399.9	12.9	19.3	43.3	29.0	154.7	0.1	1.2	0.1	0.1	1.3	0.16.-	0.73.-
Phyllo pastry stuffed with cheese	559.7	15.2	38.2	39.4	330.9	261.9	3.6	1.1	0.1	0.3	0.8	0.18.-	0.73.-
Börek with spinach	368.5	11.1	14.3	48.0	726.9	177.7	22.4	4.1	0.1	0.2	0.8	0.17.-	0.75.-
Carrot soup	131.5	1.4	10.5	8.3	709.0	36.1	4.1	0.5	-	-	0.2	0.02.-	0.59.-
Broccoli soup	168.2	2.0	15.8	5.0	40.8	58.3	15.5	0.4	-	0.1	0.2	0.06.-	0.62.-
Minestrone Çorba	122.9	2.5	6.0	14.5	437.0	28.9	11.8	0.8	0.1	0.1	0.7	0.04.-	0.61.-
Spinach soup with cream	156.4	2.0	14.7	4.2	401.6	73.9	8.7	1.5	-	0.1	0.2	0.11.-	0.68.-
Vegetables soup with cream	149.8	1.5	12.6	7.8	255.7	27.9	3.6	0.4	-	-	0.3	0.08.-	0.65.-
Mushrooms soup with cream	178.1	1.9	15.6	7.9	54.9	21.0	1.1	0.4	-	0.1	1.0	0.10.-	0.67.-
Kremalı Bezir çorba[15]	241.3	9.7	17.7	10.9	207.4	99.6	5.9	1.1	0.1	0.2	2.4	0.18.-	0.75.-
Chicken soup with cream	181.5	6.3	14.7	6.4	58.0	21.6	0.2	0.3	-	-	1.7	0.13.-	0.69.-
Ezogelin çorba[16]	114.7	2.7	6.6	11.1	60.5	20.3	2.4	1.5	-	-	0.5	0.03.-	0.60.-
Corn soup	142.7	2.0	10.7	9.8	32.3	27.3	6.1	0.4	-	0.1	0.4	0.05.-	0.61.-
Carrot sautee with yoghurt	269.8	6.0	21.8	13.4	1997.2	128.5	6.1	1.2	0.1	0.2	0.6	0.25.-	0.82.-
Meditarranean salad	130.1	3.7	9.6	7.0	1071	92.2	14.9	0.8	0.1	0.1	0.7	0.14.-	0.70.-
Garden salad	106.1	1.4	8.3	6.2	1089.4	37.1	18.7	0.9	0.1	0.1	0.6	0.11.-	0.68.-
Shepherds salad	113.0	1.8	8.4	7.0	184.2	41.9	52.2	1.2	0.1	0.1	0.8	0.11.-	0.68.-
Aubergine salad	207.0	2.6	18.4	7.7	178.9	44.5	55.2	1.2	0.1	0.1	1.0	0.20.-	0.76.-
Potatoes salad	184.9	3.8	7.1	25.2	116.9	32.0	63.5	1.2	0.2	0.1	2.0	0.07.-	0.64.-
Cheesecake	610.2	12.3	41.2	47.6	458.5	145.1	0.8	0.7	0.1	0.3	0.2	0.92.-	1.48.-
Triamisu	549.0	14.2	28.5	57.4	207.6	75.0	0.3	3.2	0.4	0.6	3.7	0.65.-	1.21.-
Tulumba Tatlısı[17]	512.3	4.3	11.9	95.8	42.7	15.6	0.2	0.8	-	0.1	0.1	0.17.-	0.73.-
Kalburabastı[18]	411.4	4.5	12.2	70.1	102.1	23.1	0.2	1.1	0.1	0.1	0.9	0.10.-	0.67.-
Keşkül[19]	455.0	8.4	13.5	74.0	69.5	260.5	1.8	0.7	0.1	0.3	0.4	0.20.-	0.77.-
Şekerpare[20]	482.6	5.0	13.6	84.2	122.2	25.3	0.2	0.9	-	0.1	0.2	0.15.-	0.71.-
Revani[21]	367.6	4.8	11.4	60.9	145.4	19.6	0.2	0.8	-	0.1	0.1	0.11.-	0.68.-

Table 5. Energy and Nutrient Content, Food Cost and Total Cost of the Standardized Recipes

Name of the Dish	Energy (kcal)	Protein (g)	Fat (g)	CHO (g)	Vitamin A (µg.)	Vitamin C (mg.)	Ca (mg.)	Vitamin B1 (mg.)	Vitamin B2 (mg.)	Niacin (mg.)	Fe (mg.)	Food Cost (USD)	Total Cost (USD)
İrmik Tatlısı[22]	270.4	5.2	5.4	49.4	45.0	183.8	1.3	0.2	-	0.2	0.1	0.12.-	0.69.-
Supangle[23]	408.5	9.2	11.1	66.7	66.1	270.8	1.7	1.0	0.1	0.4	0.3	0.19.-	0.75.-
Lokma Tatlısı[24]	383.3	3.9	10.0	66.7	14.5	9.0	0.3	0.9	0.1	0.1	0.5	0.13.-	0.70.-
Fırın Sütlaç[25]	355.0	7.0	7.2	64.4	60.0	244.7	1.7	0.2	-	0.3	0.2	0.16.-	0.72.-
Krem Şokola[26]	447.6	7.4	13.9	72.3	54.0	216.2	1.1	1.2	0.1	0.3	0.3	0.23.-	0.80.-
Kazandibi[27]	306.8	5.1	6.2	56.8	51.1	183.5	1.3	0.2	-	0.2	0.1	0.12.-	0.69.-
Sakızlı Muhallebi[28]	431.6	9.1	11.7	71.3	56.5	235.0	2.3	1.0	0.1	0.3	0.6	0.38.-	0.95.-

[1]Grilled chicken stuffed with rice.
[2]Oven grilled chicken breast with vegetables.
[3] Sautee lamb pieces wrapped in grease-proof paper with vegetables and cooked in the oven.
[4]Poached and sautéed veal finished in the oven with vegetables and served over vermicelli.
[5]Roasted pieces of lamb wrapped with aubergine and cooked in the oven.
[6]Sauteed lamb with potatoes, carrots and onions.
[7]Poached lamb, cooked in the oven over rice.
[8]Sauteed lamb with tomatoes, onions and green peppers.
[9]Sauteed lamb served over aubergine puree with roux.
[10]Stuffed meatballs with potatoes puree.
[11]Roasted meatball stuffed with cucumbers, eggs and beans.
[12]Sauteed veal and vegetables with béchamel au gratin
[13]Broad bean puree.
[14]Fried vegetable cubes (aubergine, green pepper and potatoes) garnished with tomatoes sauce.
[15]Chicken and bean soup with creamy roux.
[16]Lentil, whole wheat and rice soup.
[17]Syrup soaked pastry (flat and round shaped).
[18]Syrup soaked pastry (big flat round shaped).
[19]Milk pudding with almonds.
[20]Syrup soaked pastry (ball shaped, fried).
[21]A sweet made of semolina, flour and eggs.
[22]Cooked semolina with milk and vanilla.
[23]Chocolate pudding.
[24]Syrupy fried pastry.
[25]Baked rice pudding.
[26]Cream chocolate.
[27]A kind of pudding, bottom part is burnt.
[28]Milk pudding with mastica.

ings and the rate of wastage in our study is considered normal (22). It can be concluded that these vegetable wastage values can be used as a guidance for institutional food services to calculate the amount to purchase and to calculate the nutritional value of foods served.

Standardized recipes are the main component of the food services to maintain the quality and cost control in a desired level. With the help of this study, food cost, total cost, energy and nutritional value of the dishes mostly used in commercially operating establishments were standardized. This may help the institutions where quality and cost control is the primary objective.

Increased competitiveness in the field of mass catering industry has decreased the flexibility for errors. For this reason, companies could achieve customer satisfaction through using standardization recipes which

Table 6. Total Cost Criteria and their Percentages.

Cost component	(%)
• Food Cost	33,3
• Labor cost	29,9
• Operational	26,4
Transportation	*7,6*
Cleaning	*2,8*
Energy-Fuel	*2,9*
Investment Expenses	*2,8*
Washing	*2,2*
Uniform	*1,4*
Care-Repair	*1,5*
Amortizaton	*1,2*
Consumables	*0,8*
Health	*0,4*
Stationery-Documents	*0,3*
Telephone-Fax	*0,3*
Disinfectation	*0,2*
Laboratory	*0,2*
Insurance	*0,2*
Other	*1,6*
• Profit	10,4

would improve their productivity and decrease costs in every aspect of their work, from procurement to cooking and service.

Standardized recipes are not just lists of cooking procedures. At the same time they are preparation and service directions for the people who are responsible for these. In addition, these are used by managers when deciding on the equipment and amount to buy for the company as well as personnel needs and qualities.

By using standardized recipes the production stages of food can be tracked. Besides, food cost control, the quality, taste and portion standards and nutrient ingredients can be achieved. For this reason, recipes should be standardized in all mass feeding institutions and these should be made available in bulletin boards, a feeding list, and calculation folders and the control mechanism should be established accordingly.

When standardizing recipes it is essential that HACCP regulations should be considered when producing meals with the risk of hygienic concerns, especially those which are prepared without cooking.

Moreover, price determination strategies can be created by using standardized recipes. Price determination strategies and cost controls are important not only for a lot of catering services but also for institutional food services as well. All companies should check their costs. Commercial institutions should do this in order to have appropriate profit. In addition, institutional food services should also do this within their budget.

Food cost was found to be as 33,3% of the total cost. This result was between 30-35 % in the studies carried out in other countries (23-28). Running costs were calculated as 26,4% and this is a much higher ratio than other studies' 20% ratio (23-26). Energy prices (electricity, natural gas, gasoline etc), corporate tax ratio, VAT ratio and income tax ratios, transportation, and sanitation costs are all affecting factors of this cost which are much higher in Turkey than other countries. Labor costs were found to be 29,9% of total cost. This result is consistent with other studies. One would expect a lower cost with the industries' wage rate, however lack of technology in kitchens and unqualified personnel increases the labor cost. This affects the profit. As it is seen in Table 6, the profit is 10.4 % for our study which is lower than other studies of 15-20 % (23-26).

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