

Specific Consumption Efficiency in Tourism Industry

PASCA PASCARIU Gabriela

Transilvania University of Brasov, Romania, imit201058@yahoo.com

MĂRĂSCU-KLEIN Vladimir

Transilvania University of Brasov, Romania, klein@unitbv.ro

Abstract

The algorithm for calculating the specific consumptions (SC) is an innovative application for the tourism industry, restaurants and similar units (bars, pizzerias, fast-food units, snack-bars and other public food service units). The determination of the consumptions is obtained through the production recipes, named „New/modified product chart”. These contain all the raw materials of the product on sale in the restaurant, in the established quantities for each material, including the loss coefficients.

According to the loss coefficients of raw materials, one can estimate the weight of the final product of the prepared food without actually weighing it. According to the acquisition price of the raw materials and the quantities used in the recipes, the F&B systems (Food&Beverage) automatically calculate the price of the final product. A declared trade margin is added to the price from the system, thus obtaining the sale price of the product, or, according to the imposed sale price, a new quota is calculated.

Keywords

bettering, specific expenditures, algorithm, food products

1. Introduction

In tourism industry, the production of culinary products is a complex activity, due to the variety of the operations that transform edible raw materials and culinary products, which are made according to the specifications of the production recipes and menu plans.

Just like in other areas, the efficiency of the processes must be a major concern for the managers; the profit must be an incentive in the execution of the production program, as well as the improvement of the quality and the diversification of the brand. The ways of increasing profit are: reducing production costs without affecting quality, having a correct correspondence between sale price level and profit, the growth of the volume of the sold products and services as well as the bettering of the quality of the products and services.

In today's sense, by menu one understands an array of culinary products and confectionery and bakery products, made after classical gastronomical rules, but taking into account the new nutritional concepts [7].

Marie Antoine Carême (1784-1833, author of a treatise on culinary art and Napoleon's chef) claims that the success of a meal is in the composition of the menu, assuming that the preparation is impeccable [1].

Păstorel Teodoreanu viewed gastronomy as an art „... cooking is an art too, when the cook is an artist”. In fact, the phrase „culinary art” has long surpassed the status of a mere metaphor. He also wrote about cooking: „being practiced for a long time, perfected by a welcome French influence, which blended and counterpointed the Russian, Greek and Turkish influences, adapted to the cooks' talent, to the national taste, it must be attentively analyzed and well guided” [2].

The culinary production takes place according to the recipe book existing in every work center, recipe book which contains: the name of the prepared products, raw materials, gross quantity needed, unitary weight (per helping), technological process (preliminary operations, preparation technique, presentation and serving mode) [5].

Currently for the new production recipes, in order to establish the final weight per helping, the product is tested through technological samplings in 10 helpings quantities. The technological samplings imply additional costs, the writing a record of proceedings for inventory deduction of the raw materials used at a price of system and time.

In such cases the activity of the kitchen section is hampered or blocked, is the number of the staff is reduced, by the execution of these technological samples for new dishes, which is carried out in parallel to the current activities of the main kitchen production department (raw material receiving, storing,

culinary processing, assembly of finished products, proper cleaning of premises, etc.) for breakfast, lunch, dinner in buffet or à la carte system.

The situation becomes more complicated when the restaurant's menu list is updated or at the opening of a new public food service unit, when the number of culinary products is very high.

The diversity of the menu list corresponding to classic restaurants determines high expenses. According to PARETO's law, 20% of the products carry out 80% of the turnover [2].

2. The Algorithm of the Calculation for Determining the Specific Consumptions

In the light of the shortcomings outlined above, this work aims to develop a procedure for calculating the costs of raw materials, based on a specific algorithm, in order to make them more efficient.

The algorithm of calculation achieves, through product records, the determination of costs of raw materials, pricing system (raw material purchase price excluding VAT) and the selling price of the finished products.

The logical scheme of the algorithm is presented in Figure 1.

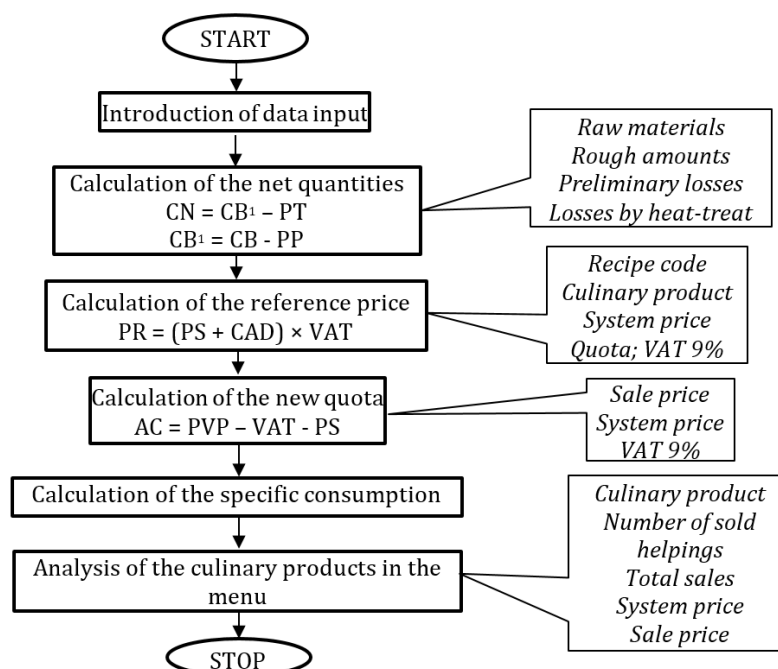


Fig. 1. The logical scheme of the algorithm of the calculation for determining the specific consumption at meals

The calculation algorithm steps are:

- Step 1: Introduction of data input: raw materials, rough amounts, preliminary losses and losses by heat treatment.
- Step 2: Calculation of the net quantities of the finished product and the alternative of culinary preparation/serving.
- Step 3: Calculation of the reference price of culinary preparation with the application of a commercial quota of 250% filler and VAT of 9%.
- Step 4: Calculation of the selling price of culinary preparation and the new quota.
- Step 5: Calculation of the specific consumption of raw material use efficiency in achieving culinary products.
- Step 6: Analyze the average profit for dishes from the menu.

The case study who uses the computational algorithm to the new or modified product is made to the culinary product "The castle of the Carpathians", documented recipe by product sheet new/modified code RP 77 SA/2016, coding for the identification of products in the nomenclature of the establishment of catering (Table 1).

Table 1. Culinary products nomenclature (basic)

Product code	Name of the product	Weight of finished product
RP77SA/2016	“The castle of the Carpathians“ Steak combined with sautéed colored peppers and Knight’s sauce	220/130/50 g
RP78SA/2016	Lightly smoked duck breast with cranberry sauce, accompanied by pork tenderloin in bacon crust and vegetable tart	40/30/50/60/40/20 g

Input data (raw materials, rough amounts) are taken from the recipe, namely new/modified product sheet, Table 2, and loss in weight shares through cleaning and thermal treatment of food are taken from Table 3.

Table 2. New/modified product sheet

1. NAME OF THE PRODUCT	The CASTLE of the CARPATHIANS 220/130/50 g (Steak combined with multi-color peppers Sauté and Knight’s sauce)			CODE RP 77/2016
2. RAW MATERIALS				
UR	Raw MP	U.M.	Gross amount CB - 10 servings	Comments
Combined roast				
1.	Beef Tenderloin	kg	0.750	
2.	Pork Tenderloin	kg	0.750	

Table 3. Loss shares through cleaning and thermal treatment of food

UR	Product names	Cleaning [%]	Boiling [%]	Grilling/Roasting [%]
BBQ products				
1	Beef entrecote, sirloin and tenderloin	-	-	32
2	Pork tenderloin, entrecote and brisket	-	-	31

Preliminary losses at percentages and losses through heat treatment are approximate and for guidance because they are depending upon a number of variable factors: weather, storage conditions, cleaning, cooking, grilling, roasting, the specific of the product, regional specifics, etc. These percentages with some deviations in more or less, combined with the results of experiments on each culinary product formed the basis for the compilation of recipes, from the general recipe [5].

According to the coefficients of losses one can set the weight of the finished product of culinary preparation without actually weighing it.

The computation algorithm for determining the amount of net quantity CN:

$$CN = CB^1 - PT \quad (1)$$

$$CB^1 = CB - PP = 750 \text{ g} - 75 \text{ g} = 675 \text{ g} \quad (2)$$

For the case study presented, data for raw beef fillet are as follows: 750 g are used, gross amounts CB for 10 portions, preliminary loss through trimming PP is 10% and the loss through heat treatment PT, which consists of grilling on the barbecue, is 32%.

$$CN = CB^1 - PT = 675 \text{ g} - 216 \text{ g} = 459 \text{ g} \quad (3)$$

Net quantity (CN) will be:

$$(CN) = 459 \text{ g, amounts for 10 portions, the finished weight 45.9 g/portion.} \quad (4)$$

The results of the calculations of the net quantities for all the ingredients are shown in Table 4.

Table 4. Net quantity according to calculation algorithm

Name of the product Code 77SA RP/2016			"The castle of the Carpathians"			Roast pork tenderloin, Sirloin combined beef, chicken with colored peppers sauté and Knight's sauce					Finished weight/portion 218/136/49/19 g	
UR	MP	UM	CB 10 servings	PP [%]	PP [g]	CB ¹ [g]	PT1 [%]	PT2 [%]	PT3 [%]	P T [g]	CN [g]	CN [g/portion]
Combined roast pork tenderloin, sirloin beef, chicken breast												
1	Beef Tenderloin	g	750	10	75	675	-	-	32	216	459	45.9
2	Pork Tenderloin	g	750	0	-	750	-	-	31	232.5	517.5	51.75
3	Chicken breast	g	750	5	37.5	712.5	-	-	28	199.5	513	51.3
4	Camembert	g	600	0	-	600	-	-	10	60	540	54.0
5	Mushrooms	g	300	25	75	225	-	-	35	78.5	146.5	14.65
											Net amount	217.6
Garnish: color bell pepper sauté												
1	Bell pepper	g	2000	20	400	1600	-	-	15	240	1360	136.0
Knight's sauce												
1	Soy sauce	g	125	-	-	-	40	-	-	50	75	7.5
2	Ketchup	g	250	-	-	-	30	-	-	75	175	17.5
3	Wine	ml	250	-	-	-	40	-	-	100	150	15.0
4	Butter	g	125	-	-	-	30	-	-	37.5	87.5	8.75
											Net amount	48.75
Decoration												
1	Cherry tomatoes	g	250	12	30	220	-	-	15	33	187	18.7

Notations used: MP = raw materials, UM = unit of measure, CB = gross amounts, PP = preliminary processing (primary), CB¹ = preliminary gross amounts, PT1 = boiling - heat processing, PT2 = thermal processing - roasting, PT3 = thermal processing-grilling, PT = thermal processing, CN = net amounts

Depending on the purchase price of raw materials and quantities used in recipes, F & B systems (Food and Beverage) automatically calculate the price of the finished product.

The selling price of culinary preparations was calculated from a reference price with a quota of 250%. This trade margin quota is an average quota for the restaurant for which the case study was made.

The average quota is a statistic indicator.

In the tourism industry the problems of costs, trade margin, sale price and obtained profit represent the basic information for the analysis of activity-based results. The purchase price of raw materials, the addition of trade margin, the total value or the profitability criteria are elements of managerial decision and therefore must be known.

Sales prices used in catering enterprises must cover all costs and achieve a profit justifying the efficient use of the invested capital.

Separate highlighting is needed to assess directly whether measures taken in connection with the increase or decrease in prices have been effective and contributed to the growth of the value of the mass of the trade margin [1].

Through this algorithm the reference price can be calculated with any trade margin, according to the trader (orientation after costs, competition and application). In catering, the price of one and the same culinary product is changed often due to fluctuation of prices of raw materials and purchased products, a situation that requires recalculation of the selling price of culinary products.

The sale price has been proposed as a result of the market analysis, the selling price of culinary products of the competition, even though the trade margin obtained is less than 250%. In the case of the example used, "T-bone steak cooked on the stove topped with sour cherry sauce, served alongside grilled vegetables, mashed potatoes and rucola salad with pesto", the new trade margin is 130%, but realizing an average of trade margin over the total added menu an average rate of over 250% trade margin is obtained (Table 5).

Table 5. Calculation of sales prices and obtained trade margin
Project list menu of 5 * classic restaurant

Recipe code	Name of the culinary product	Package weight [g]	System price P.S. [lei]	Reference price P.R., calculating with 250% trade margin + VAT [lei]	Proposed sale price P.V.P. [lei]	The new addition quota [%]
RP 77SA/2016	The castle of the Carpathians	220/130/50	19.33	73.74	59.00	180
RP 85SA/2013	T-bone steak cooked on the stove, topped with sour cherry sauce, served alongside grilled vegetables, mashed potatoes and rucola salad with pesto	280/30/100/80	38.83	148.14	98.00	132
RP 38SA/2013	Chicken breast in Parmesan crust on a bed of tagliatelle and gorgonzola sauce	140/150	7.24	27.62	29.00	223
RP11/2012; RP5/2007; RP82/2013; RP4/2009	Turkey medallion with mushrooms, garnished with basmati rice and almonds, pea purée and gorgonzola sauce	150/100/50/30	8.42	32.12	35.00	235
RP 1/2009	Duck breast served alongside caramelized Quince and raspberry sauce	130/100/50	10.18	38.84	45.00	256

Notations used: PR = reference price calculated with the addition of a commercial quota stated by 250% plus VAT (9%), PS = system price (purchase price without VAT), VAT = value added tax, CAD = trade margin declared in %, PVP = proposed sale price, AC = trade margin in lei, CAN = new trade margin in %

The amount of trade margin is important because all specific costs of the restaurant's activity are borne by the trade margin, so the trade margin must cover them all [1].

Input data for the calculation of the selling price and the obtained trade margin are: code of the recipe, culinary product's name, the finished weight/portion, the system price, reference price (calculated with 250% declared trade margin) and sale price.

A declared trade margin is added to the system price obtained, thus getting the sale price of the product or, according to the imposed sale price, a new trade margin is calculated.

Value added tax (VAT) is an indirect tax that applies to the change of ownership for goods and services. VAT applies in legal 9% share on the cumulative value of the purchase price of raw materials and commercial margin increases the selling price of culinary preparations and products [1].

Starting from the 1st of June 2015 comes in force the expansion of the application of the VAT reduced rate of 9% for food, including drinks, except for alcoholic beverages, intended for human consumption, seeds, plants and ingredients used in preparing food, as well as for restaurant services and catering, with the exception of alcoholic beverages [6].

Example calculation:

"T-bone steak cooked on the stove, topped with sour cherry sauce, served alongside grilled vegetables, mashed potatoes and rucola salad with pesto."

Calculation relationships:

$$PR = (PS + CAD) \times VAT \quad (5)$$

$$PR = [38.83 + (38.83 \times 250/100)] \times 1.09 = (38.83 + 97.075) \times 1.09 = 148.14 \text{ lei} \quad (6)$$

$$CAN = \frac{AC}{PS} \times 100 \quad (7)$$

$$AC = PVP - VAT - PS \quad (8)$$

$$CAN = \frac{PVP - VAT - PS}{PS} \times 100 \quad (9)$$

$$VAT = \frac{PVP \times 9}{109} = \frac{98 \times 9}{109} = 8.092 \text{ lei} \quad (10)$$

$$CAN = \frac{98 - 8.092 - 38.83}{38.83} \times 100 = \frac{51.078}{38.83} \times 100 = 1.315 \times 100 = 131.5 \quad (11)$$

The trade margin of the restaurant is the sum of money that is added to the sale price of the goods, intended to cover all expenditures. After covering their whole expenditures the profit of all establishments in the tourism industry is achieved. The trade margin is the source of commercial profit after all expenses have been met.

The used trade margin characterizes the prices of the dishes and products offered.

The practiced trade margin and quota are not limited. Restaurants can use sale prices no matter how large the trade margins [1].

In such cases the raw materials which have a high purchase price (e.g. the beef, foie grass and other specialties) one can calculate a selling price of culinary preparation with a smaller trade margin. Products with a lower purchase price of raw ingredients in recipe (e.g. salads, chicken dishes, fish dishes, pork, etc.) can set a sale price with a larger trade margin. In a section of the production (kitchen, buffet, confectionery and pastry laboratory) stock turnover of raw materials is very important, considering the freshness of raw materials, their periods of validity as well as their perishability. These dishes can be promoted in daily menu or the menus according to the share of total trade margin obtained per total menu (Table 6).

By «menu» we understand the totality of culinary products, confectionery products and pastries, which are presented in a specific order.

For the establishment of products and of beverages from the menu list it is necessary to take into account the concrete relationships existing in each catering unit namely: the conditions of production from the kitchen, the service elected for providing the respective products, the structure of the client base (national or international tourism), the possibilities of purchasing, the buying-in prices of the raw materials which are in the composition of the said culinary products [3].

Table 6. Average trade margin obtained

Recipe code	Name of the product	Package weight [g]	System price [lei]	Proposed sale price [lei]	New addition quota [%]
85SA RP/2013	T-bone steak with cherry sauce	280/30/100/80	38.83	98.00	131
85SA RP/2013	Chicken Salad with mango	240	3.31	31.00	759
Compound recipe	Spaghetti with gorgonzola sauce	200/60/40	2.75	29.00	867
85SA RP/2013	Fruit salad	330	2.10	22.00	861
Average rate achieved			46.99	180.00	251

In order to simplify calculation and management of raw materials during the production process, the specialty literature recommends and accounting practice uses balanced average prices, standard prices or calculated prices.

If in the course of a calendar month, the raw materials are acquired at different prices, the average price gain is calculated as such:

$$PMP = \frac{C1 \times P1 + C2 \times P2 + \dots + Cn \times Pn}{C1 + C2 + \dots + Cn}, \tag{12}$$

where: PMP = average weight gain or loss, C = quantity of raw materials, and P = the purchase price of raw materials.

An indicator of the efficiency of the use of the raw materials used for the finished product is specific consumption. It includes the technological flow losses (with preliminary operations, with thermal treatments and with storage). Coefficients of technological losses in certain foodstuffs are presented in Table 3.

These determinations are indicative and take into account the characteristics of the raw material, the season, the conditions of storage, cleaning/peeling, cooking, grilling, frying, and the worker's skill.

CS-specific consumption is defined as the ratio of the quantity of raw materials used and the quantity of the finished product. It indicates how much of the raw material was used for a unit of product, a portion, a piece:

$$CS = \frac{\text{Raw materials (gross amount for 10 servings)}}{\text{Finished product (10 servings)}} > 1 \tag{13}$$

$$CS \text{ "The castle of the Carpathians"} = \frac{6.150 \text{ (gross amount for 10 servings)}}{4.200 \text{ (10 servings)}} = 1.464 > 1 \tag{14}$$

Specific consumption includes the losses during the manufacturing flow that can relate to the total raw materials involved, the total production achieved or the product [1].

Specific consumption and technological losses represent the ratio between the quantities of raw edible materials in the rough, used in the structure of the recipes, and after all technological operations, results the quantity of the finished product, reported to the resulted quantity of consumption products.

Specific consumption results through the experimentation of a culinary preparation on a recipe, starting from weighing raw material/measurement in rough, weighing again after defrosting, cleaning, washing (primary deduction), assembling the foods prepared for cold or hot processes (baking, frying, simmering, smoking, etc.), weighing the finished product and the quantities reported to the planned quantities (%) [4].

The algorithm of calculation achieves, through product records, the determination of costs of raw materials, the remaining quantity (commodity package obtained by subtracting the preliminary losses),

the calculation of the reference price, the calculation of the selling price, and analysis of the culinary products on the menu (the average profit) [3], Table 7.

Table 7. Analysis of the culinary products on the menu

Name of the product	No. portions sold	% of total sales [c1 x 100: 2000]	System price [lei]	Sale price [lei]	Gross Profit [c4 - c3]	Total system price [c1 x c3]	Total selling price [c1 x c4]	Quantitative [c7- c6]	% [c8 x 100: total c8]
0	c1	c2	c3	c4	c5	c6	c7	c8	c9
T-bone steak with cherry sauce	280	14	38.83	98.00	59	10872.4	27440	16567.6	29.6
Chicken breast in crust	250	12.5	7.24	29.00	22	1810	7250	5440	9.7
"The castle of the Carpathians"	315	15.75	19.33	59.00	51	6088.95	18585	12496.05	22.3
Duck breast	90	4.5	10.18	45.00	35	916.2	4050	3133,8	5.6
Chicken Salad	105	5.25	3.31	16.00	13	347.55	1680	1332.4	2.4
Caprese Salad	270	13.5	6.15	23.00	17	1660.5	6210	4549.5	8.1
Norwegian Salad	95	4.75	11.44	39.00	28	1086.8	3705	2618.2	4.7
Salad with chicken and chickpeas	120	6	5.40	24.00	19	648	2880	2232	4.0
Micro-salad	140	7	2.47	12.00	10	345.8	1680	1334.2	2.4
Chicken breast with vegetables	335	16.75	5.03	24.00	19	1685.05	8040	6354.9	11.3
	2000	100				22030.6	73967	56059.75	
Average profit								28.02 lei	

Input data are: name of culinary products, number of servings sold, a percentage (%) of total food sales, price (lei) and the selling price (lei). After analysis it can be seen that the culinary product "T-bone steak with cherry sauce," gets the highest profit (29.6%), achieved within the menu, and followed by the culinary product "the castle of the Carpathians" (22.3%). The dishes with the lowest profit within the menu are "Micro-salad" and "Chicken salad (2.4%).

From the analysis carried out the dishes with small profits are removed from the menu, these being replaced by other new or changed products. You can remove the production preparations which require intensive work and which do not bring profit.

Currently particular attention is paid to the latest information in the field of culinary products, information used in the partial amendment of the recipes, in order to bring about qualitative improvements of a particular culinary product [4].

3. Conclusion

The goal of the effective activities in the tourism industry is to provide balanced, nutritional food with aesthetic and hygienic characteristics, at affordable prices and in sufficient quantities, under reducing

costs concerning the raw materials, utilities, technological losses through preliminary processing and heat treatment, and of the labor cost [1].

Through the algorithm for determining the specific consumption product/package fee is determined, without using technological sampling, the unit price calculated by the package specified in the menu list, the selling price of culinary preparations with a commercial or an added declared selling price, resulting in a new trade margin quota, and profit analysis on each culinary product from the menu.

The higher the profit, the higher the level of profitability is. The level of profitability depends on the internal activity of economic agents, on the relations with the external environment and the attitude to adapt to market requirements.

By using the proposed computing algorithm some control over the quality and the system price of menu of culinary preparations may be achieved, as well as the standardized use of culinary recipes. This includes quantities of raw materials necessary for the manufacture of each product, serve to the system price calculation of sales prices. The algorithm of calculation is important for establishing the daily menu plan. In the menu plan the daily quantities each assortment decided to be produced are input, as well as the stock left at the end of the day, the total demand for raw materials for the realization of the production of the day. By drawing up the menu plan one seeks to establish assortment structures that aim to satisfy consumer demand, under conditions of minimal production costs.

Using the algorithm for calculation, businesses in the tourism industry can perform analysis in food sales at different periods of time (daily, weekly, monthly). The determination of the theoretical rate of acquisition cost of raw materials, per total and per each group of culinary dishes separately (*cold/hot snacks, soups, creams, soups, borsches, consommé, fish dishes and seafood entrées, cold and/or warm, basic dishes, vegetable side dishes and salads/cheeses, sweets, confectionery-pastry, fruit*) [1].

Fixed-price menus, tourist menus, à la carte menus, drinks, children's menus, banqueting activities can be analyzed. One can also determine the share of total sales that correspond to each group of culinary products.

The analysis of sales from a physical point of view can be highlighted for each product separately, the number of days of presence in the menu list/menu for organized events and the total number of portions sold. The analysis is done by determining the average number of portions sold from every culinary product during one day of being present on the menu list or by calculating the index of response of the customers (sales index /presentation index) [3]. Thus the degree of demand for each product is determined, and the person responsible for the work on F & B can decide to amend the menu list.

References

1. Băcanu, B. (2009): *Management strategic în turism (Strategic management in tourism)*. Editura Polirom, ISBN 978-973-46-1262-8, București, Romania (in Romanian)
2. Lupu, N. (2005): *Hotelul – Economie și management (The Hotel – economics and management)*. 5th ed., Editura All Beck, ISBN 973-655-781-2, Colecția Oeconomica, București, Romania (in Romanian)
3. Nicolescu, R. (1981): *Tehnologia activității în restaurant și bar (The Technology work in restaurant and bar)*. Editura Sport-Turism, București, Romania (in Romanian)
4. Stavrositu, S. (2008): *Arta serviciilor în restaurante și baruri, tehnologie culinară, servicii hoteliere (Art services in restaurants and bars, culinary technology, hotel services)*. Editura Fundația „Arta serviciilor în turism”, ISBN 978-973-0-05861-1, București, Romania (in Romanian)
5. Stavrositu, S. (1998): *Rețetar de preparate culinare și arta serviciilor în restaurante pentru turismul internațional (The recipe of cuisine and art services in restaurants for international tourism)*. Editura Fundația „Arta serviciilor în turism”, ISBN 973-0-00522-2, Constanța, Romania (in Romanian)
6. *** (2015): *Ordonanța de urgență nr 6/2015 din 07 aprilie 2015 pentru modificarea și completarea Legii nr. 571/2003 privind codul fiscal (The Emergency Ordinance No. 6/2015 of April 07, 2015 amending and supplementing Law no. 571/2003 - the Tax Code)*. <http://legislatie.just.ro/Public/DetaliiDocument/167147> (in Romanian)
7. *** (2011): *Manualul bucătarului (The Practical handbook of the chef)*. Editura Stef, ISBN 978-606-575-100-2, București, Romania (in Romanian)

Received in September 2016