JAP&T
TPA-Timişoara

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Journal of Agroalimentary Processes and Technologies 2009, *15*(1), 168-171

Journal of Agroalimentary Processes and Technologies

Comparative study of the food products quality estimation

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Abstract

The estimation of food products quality could be a problem for researchers. It is possible to have a lot of good physical and chemical determinations and the estimation of food products quality to be wrong. This was the main reason for elaborate this paper. Three methods of the food products quality estimation will be present in this study. For accomplish a practical example was choose the Telemea cheese. Five samples of the cheese were used for this analysis. The results of determinations (Stef, 2003) are presented in the full paper. Hence from these data were calculated the quality of cheese in three diversely way. There are a lot of differences among the results of three methods which are presented in this paper. There are conveniences and disadvantages for each method, the researchers have to handpick the best method for their investigations.

Keywords: quality, food products, estimation

1. Introduction

The estimation and measurements of quality of a foodstuff means: verification of packing and presentation manner; verification of organoleptic properties; verification of physical and chemical properties; microbiologic examination.

It is considered that in case of foodstuff the proportion of psycho sensorial characteristics in appreciation of quality is between 50 and 90% function of products nature: fresh fruits and vegetables – 90; alcoholic drinks – 60; preserved meet and sausages 50, etc.(Segal, 1982 and Banu, 2002).

The comparatively estimation of food products quality could be a problem for researchers. It is possible to have a lot of good determinations and the estimation of food products quality to be wrong. This was the main reason for elaborate this paper.

Three methods of the food products quality estimation will be present in this study. For accomplish a practical example was choose the Telemea cheese. Five samples of the cheese were used for this analysis.

2. Materials and Method

Three methods of quality estimation were used in this paper: nourishing value VN_{10} (Segal, 1983); nutritive value (Drugă, 2002) and total index of quality (Ştef, 2006).

Segal and all, 1983 suggest that for the nutritive value of food to take in consideration only 10 components those are indispensable for the organism: proteins, lipids, carbohydrates, Ca, P, Fe, vitamins A, B_1, B_2 and C. The index is named *the nutritive value of 10 components* **(VN_{10})** and it is calculated as follow:

$$VN_{10} = \mathbf{1/10\ (Pr \cdot F_{pr} + L \cdot F_L + G \cdot F_G + Ca \cdot F_{Ca} + P \cdot F_P + Fe \cdot F_{Fe} + A \cdot F_A + B_1 \cdot F_{B1} + B_2 \cdot F_{B2} + C \cdot F_C)}$$

P_r = protein content in the product, g/100g;
L = lipids content, g/100g;
G = carbohydrates content, g/100g;
Ca = Ca content, g/100g;
P = P content, g /100g;

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Fe = Fe content, g/100g;
A, B_1, B_2, C = the corresponding vitamins, mg/100g.

For the F coefficients establish was taken in consideration the utilization coefficients of the components, the biological value coefficients, the daily requirements for each component. In *table 1* are presented the value of this factor for some of the mainly groups alimentary products.

Table 1: The value of F coefficient for nutritive components from the mainly groups alimentary products

Products	F_{Pr}	F_L	F_G	F_{Ca}	F_P	F_{Fe}	F_A	F_{B1}	F_{B2}	F_C
Milk	1,02	0,95	0,22	69	80	6,9	67	67	52	1,25
Meat	1,09	0,95	0,22	69	80	3,8	67	53	42	1,00
Vegetable	0,69	0,55	0,10	54	60	6,1	17	53	42	0,50
Fruits	0,69	0,55	0,10	54	60	6,1	27	53	-	1,00

Using the F values it could be calculated the nutritive value for each alimentary product and in this manner could be demonstrated its value for the metabolism.
In the second variant, Drugă and all, 2002, used for the nutritive value estimation only chemical characteristics: the protein; the fat; the dry matter and the water content. Next are presented the mathematical relations for the nutritive value calculating:

- the utility value (UV) = dry matter / water content;
- the energetic index (EI) = fat % / protein % ;
- the plasticity index (PI) = protein % / fat %;
- the energetic value (EV) = UV x EI;
- the plasticity value (PV) = UV x PI;
- the nutritive value (NV) = EV x SV.

Third variant for quality estimation is the total index of quality. The simple indices are calculated for each parameter with one of following relations:

$$I_a = \frac{X_a}{X_b} \quad \text{or} \quad I_a = \frac{X_b}{X_a}$$

where:
I_a – value of analytical indices of quality;
X_a – characteristic range for the analysed product;
X_b - characteristic range for STAS product.

The use of one or another relation is function of nature characteristic quality that is analysed. If is calculated the analytical index for nutritional substances is used the first relation; if are calculated the impurities from the product, the analytical index of quality will by calculated with the second relation.

The total index of product quality was obtained by summing the simple balanced indices (indices X gravity of indices). The participation was established as it follows: presentation manner - 0.15; aspect - 0.15; odour - 0.15; taste – 0.15; dry matter - 0.10; proteins - 0.10; fats -0.10; water content - 0.10.

3. Results and discussions

The estimation and measurements of quality of a foodstuff means: verification of packing and presentation manner; verification of organoleptical properties; verification of physic-chemical properties.

The sensorial appreciation of samples was made in laboratory of discipline Science of commodities of foodstuff and the physic-chemical examination in the Nutrition laboratory.

The results of sensorial and chemical determinations (Stef, 2003) are presented in table 2.

Table 2: The results of sensorial and chemical determinations

Specification	The samples				
	1	**2**	**3**	**4**	**5**
Presentation manner	very good	very good	very good	very good	very good
Aspect	very good	good	very good	very good	good
Taste	very good	good	good	very good	very good
Odour	good	good	very good	very good	very good
Dry matter	48.82	49.46	47.87	48.33	48.62
Proteins	13.93	14.08	13.57	14.01	13.89
Fat	24.55	24.93	24.33	24.72	24.63
Mineral substances	7.14	6.99	6.82	6.93	6.97
Water content	51.18	50.54	52.13	51.67	51.38

Hence from these data were calculated the quality of cheese in three diversely way. Because first and second methods are easy to calculate the results are presented in table 3.

The methodology for the total index quality (I_{cq}) estimation is presented in tables 4a and 4b.

Table 3: The results of second methods are easy to calculate

Specification	Nutritive value 1		Nutritive value 2	
	Estimated	Hierarchy	Estimated	Hierarchy
The sample 1	12.73	3	0.902	2
The sample 2	12.94	1	0.963	1
The sample 3	12.54	5	0.858	5
The sample 4	12.67	4	0.864	3
The sample 5	12.85	2	0.863	4

Table 4a: The estimation of the total index of quality

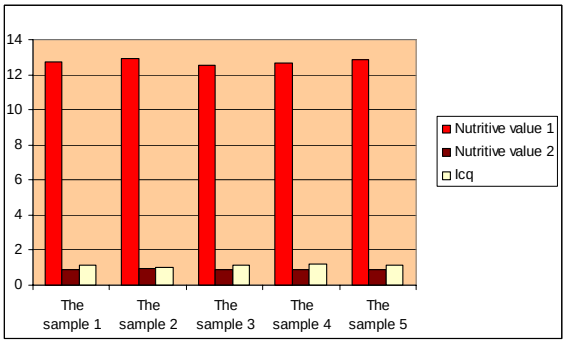
Specification	STAS (X_b)	p**	Sample 1			Sample 2			Sample 3		
			X_a	I_a	I_{ap}	X_a	I_a	I_{ap}	X_a	I_a	I_{ap}
Presentation manner	0.67*	0.15	1.0	1.49	0.22	1.0	1.49	0.22	1.0	1.49	0.22
Aspect	0.67	0.15	1.0	1.49	0.22	0.67	1.0	0.15	1.0	1.49	0.22
Taste	0.67	0.15	1.0	1.49	0.22	0.67	1.0	0.15	0.67	1.0	0.15
Odour	0.67	0.15	0.67	1.0	0.15	0.67	1.0	0.15	1.0	1.49	0.22
Dry matter, min.	45 %	0.10	48.82	1.08	0.10	49.46	1.09	0.10	47.87	1.06	0.10
Proteins, min.	16.0 %	0.10	13.93	0.87	0.08	14.08	0.88	0.08	13.57	0.84	0.08
Fat, min.	47 %	0.10	24.55	0.52	0.05	24.93	0.53	0.05	24.33	0.51	0.05
Water content, max.	55 %	0.10	51.18	1.07	0.10	50.54	1.08	0.10	52.13	1.05	0.10
Total	-	1,00	-	-	**1.14**	-	-	**1.00**	-	-	**1.14**

Table 4b: The estimation of the total index of quality

Specification	STAS (X_b)	p**	Sample 4			Sample 5		
			X_a	I_a	I_{ap}	X_a	I_a	I_{ap}
Presentation manner	0.67*	0.15	1.0	1.49	0.22	1.0	1.49	0.22
Aspect	0.67	0.15	1.0	1.49	0.22	0.67	1.0	0.15
Taste	0.67	0.15	1.0	1.49	0.22	1.0	1.49	0.22
Odour	0.67	0.15	1.0	1.49	0.22	1.0	1.49	0.22
Dry matter, min.	45 %	0.10	48.33	1.07	0.10	48.62	1.08	0.10
Proteins, min.	16.0 %	0.10	14.01	0.87	0.08	13.89	0.86	0.08
Fat, min.	47 %	0.10	24.72	0.52	0.05	24.63	0.52	0.05
Water content, max.	55 %	0.10	51.67	1.06	0.10	51.38	1.07	0.10
Total	-	1,00	-	-	**1.21**	-	-	**1.14**

* for the psycho sensorial characteristics STAS gives a good sample; ** the gravity given to each characteristics.

For a good comprehension the results of all estimations are illustrated in next chart.



4. Conclusions

There are a lot of differences among the results of three methods which are presented in this paper.

There are conveniences and disadvantages for each method, the researchers have to handpick the best method for their investigations.

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