THE ECONOMICAL DIMENSION OF FOOD QUALITY

Luminița Pîrvulescu, Claudia Sîrbulescu, Carmen Dumitrescu, Vladislava Radovan
Banat's University of Agriculture Sciences and Veterinary Medicine
e-mail : pirvulescu_1@yahoo.com

Abstract

The need of monitoring the quality through specific indices has lead to the use of mathematics and statistic methods, considering quality (Q) as a function of the main characteristics analysed according to the consumers' needs and requests. There are different ways of calculating analytical indices of economic efficiency, mainly of the total production cost index, for different dairy products. In this paper, the total production cost index was obtained by assessing each expense element within the technological process with the help of measurements, corroborations and calculus.
Key words: *food quality, synthetic of quality, indices of economic efficiency, economic characteristics of quality*

Introduction

The same of properties that a product owns, as an expression of the level in which the needs of the society are fulfilled, taking into consideration the technique, economic and aesthetic parameters, the level of usage and economic efficiency in usage, are known with the usual term of quality.

Due to the complex character of the quality of products in practice it is used an aggregate system of indices which measures the level of each characteristic separately or for each group of characteristics, as well as for the product as a synthesis of all. An important position within the system is held by the synthetic index of quality which reflects the contribution of characteristics classified accordingly to their importance, expressed, i.e. numerically and attributively.

The indices of the quality systematization allows their arrangement in a pyramid shape with three levels (figure 1)
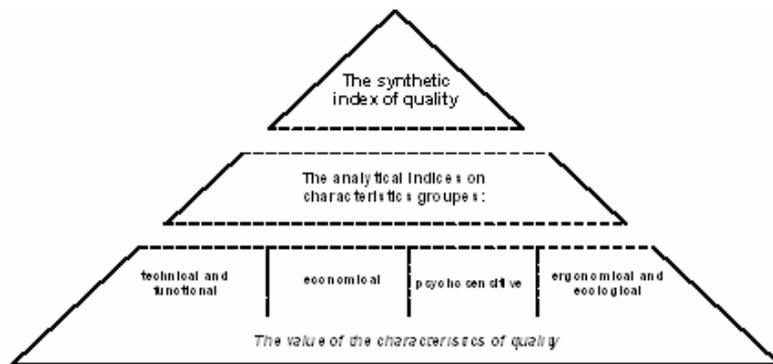
Fig. 1. The pyramid like shape of the indices of the quality of products

On the basis of the pyramid stand the values of the characteristics of the quality, divided in groups (level I), then analytical indices of the groups of characteristics (level II) and on the top there is the synthetic (complex) index of quality, which expresses the usefulness level, accordingly to the need that it has been created for (level III). It may be observed the existence of four group of characteristics, this paper analysing the group of economic characteristics of quality. (Stanciu, 1998)

In the case of food products, the level of sensorial characteristics in appreciating the quality is between 50-90%, these holding an important role in the consumers' reaction to the food products, in accepting or rejecting them. To decrease the inherent subjectivity in appreciating the sensorial properties, adequate methods and techniques must be used, there for, the establishing of economic indices in order to constitute the group of economic characteristics becomes important. At the same time, these economical indices hold a great importance in establishing the quality – price connection and in the improving of this connection within the quality management. (Stanciu, 1999)

The economic efficiency is an economic category, which broadly expresses the relation between work and results. In food industry the economic efficiency has a complex character, because the production is characterised by a great variety of resources, which can be valued through different combinations, but with different results. This is why it is so important to find that combination of resources which leads to maximum results with minimal expenses in the terms of social work time. (Apostu, 1994, Csosz, 1997)

Experimental

To calculate the economic efficiency, in current activity it is used a great number of indices, according to the specific characteristics of the analysed field. This allows the detailed analysis of the economic process, the revealing of the reserves and of the lines of increasing the economic efficiency. There are different ways of calculating the analytical indices of economic efficiency, mainly the total production cost index for different products obtained through the food processing. (Apostu, 1994)

In this paper, the total production cost index was obtained by assessing each expense element within the technological process in the milk industry with the help of measurements, corroboration and calculus.

The principal analytical indices take in count as part of milk production are: raw material expenses, building and equipment pays, energy expenses, labor expenses, and expenses taken from incomes.

Synthetic indices most used in economical practice are those that refer to production cost, income and product price, profit, profit rate and labor productivity.

For study have been chosen the following variants of consumption milk:

- milk with 1.8 % fat from C.S. Macea Ltd.
- milk with 1.8 % fat from C.S. RomHolz Ltd.
- milk with 1.8 % fat from C.S. DesnaLact Ltd.

In tables 1 and 2 are centralized the data referring to economical efficiency calculation of milk production at the three units taken in study, as well as the results obtained after having calculated economical indices (figures 2 and 3).

The mathematical expression of integral complex (synthetic) indicator is:

$$I_{cq} = I_t \cdot p_1 + I_e \cdot p_2 + I_{ps} \cdot p_3 + I_{ee} \cdot p_4 + I_f \cdot p_5$$

where: I_{cq} - the integral complex (synthetic) index of quality;

$\quad$ I_t - the index of technical characteristics group;

I_e - the index of economical characteristics group;

I_{ps} - the index of sensorial characteristics group;

I_{ee} - the index of ergonomical and ecological characteristics group;

I_f - the index of functional characteristics group;

$p_1...p_5$ – the relative hefts of characteristics groups, their sum being equal with 1.

Table 1. Economical efficiency calculation

Analytical indices	C.S. Macea Ltd.	C.S. Romholz Ltd.	C.S. Desna Lact Ltd.
	yearly	yearly	Yearly
Processed quantity, liters	907200	108000	288000
Acquisition price/liter	0.6	0.7	0.72
Raw material expenses	544320	75600	207360
Total raw material exp.	**544320**	**75600**	**207360**
Water expenses	8709.12	0	1612.8
Fuel expenses	108864	10908	27619.2
Energy expenses	61780.32	6423.6	11779.2
Total energy expenses	**179353.4**	**17331.6**	**41011.2**
Total salaries expenses	**75960**	**32800**	**36600**
Indirect salaries expenses	**25256.7**	**10906**	**12169.5**
Other expenses	**79963.3**	**14780.9**	**19856.4**
Interest expenses	**399816.7**	**0**	**132812.8**
Total expenses	**1304670.2**	**151418.5**	**449810**
Incomes	1727308.8	179928	548352
Total incomes	**1727308.8**	**179928**	**548352**

Expenses and incoming in RON

Table 2. Economical indices calculation

Economical indices	C.S. Macea Ltd.	C.S. Romholz Ltd.	C.S. Dezna Lact Ltd.
Profit, RON	422639	28509.5	98542
Profit rate, %	32.39	18.82	21.90
Productivity of work, RON/pers.	157028.07	29988	78336
Profit/employees number, RON	38421.72	3907.66	14077.43
Production cost, RON/l	1.43	1.4	1.56
Profit/measure unit	0.47	0.26	0.15

Fig. 2. Profit rate, %

Fig. 3. Production cost, RON/l
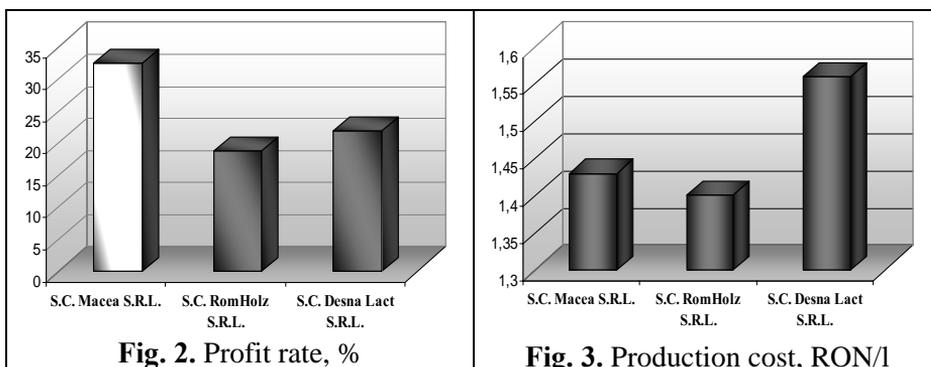
Integral complex (synthetic) index (I_{cq}) may have under unitary values (analyzed product is inferior to the reference one), or over unitary (analyzed product is superior to the references one).

Quality index calculation on characteristics groups is made by referring to a reference product (essential standard), thus:

$$I_g = \sum_{i=1}^{n} \frac{x_{ai}}{x_{ri}} \cdot p_i \qquad \text{or} \qquad I_g = \sum_{j=1}^{m} \frac{x_{ri}}{x_{ai}} \cdot p_j$$

where: I_g – the quality index on characteristics groups;

X_a – the characteristic value of the analyzed product;

X_r – the characteristic value of the referent product;

p_i, p_j – characteristics hefts directly proportional to the quality, (p_i), and characteristics heft invert proportional to the quality (p_j). Hefts sum equals 1. (Stanciu, 1998)

Selected quality characteristics are: acidity (˚T), energy value (Kcal/100g), taste and smell, colour, presentation way, profit rate (%), production cost (RON/liter), and validity (days)

Table 3 contains the numeric and attributive quality characteristics values (preliminary converted into points, to a quality point's scale from 0 to 1), characteristic hefts values (determined by expertise method) and integral complex (synthetic) indicators values, for the products that have been studied.

Figure 4 represents the studied products hierarchy, according to the integral synthetic indicator values (I_{cq}).

Table 3. Centralizing the data as part of integral synthetic index of quality method

| Reference and analyzed product	Quality characteristics								Icq
	Technical characteristics		Sensorial characteristics			Economical characteristics		Functional characteristics	
	Acidity, °T	Energy value, Kcal/100g	Taste and smell	Colour	Presentation way	Profit rate, %	Production cost, Ron/l	Validity, days	
CS Macea Ltd	19	194	1	1	0.75	32.39	1.43	10	1
CS RomHolz Ltd	20	143	0.66	1	0.50	18.82	1.40	7	0.806
CS DesnaLact Ltd	20	130	0.66	0.66	0.25	21.9	1.56	8	0.746
Quality characteristic hefts	**0.1769**	**0.1115**	**0.15**	**0.1364**	**0.1153**	**0.073**	**0.0692**	**0.1692**	
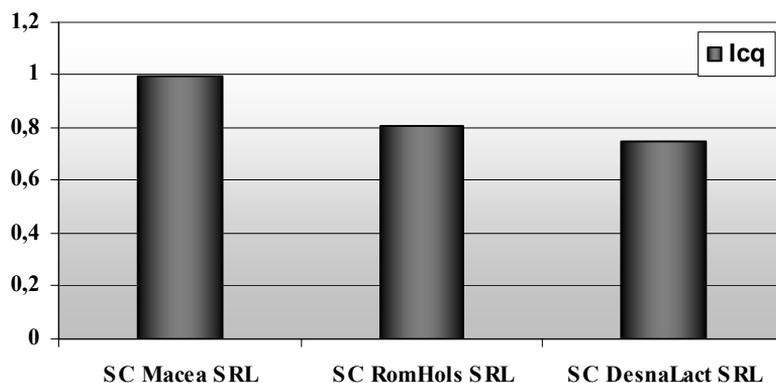
Fig. 4. Product hierarchy according to I_{cq} values

Conclusions

Analyzing all the results that have been obtained using the calculation alternatives, we can say that the system of indices of the quality of products represents an important part within the management of the company, through which decision are taken regarding the strategy of quality. Because in the case of food products the appreciation of sensorial properties is a subjective one, it is necessary to establish certain economic characteristics which, together with technique quality characteristics to take part to the analysis of the quality through specific mathematics methods.

The indices of economic efficiency hold a great importance in establishing the quality – price connection and, at the same time, in improving this connection within the quality management. The synthetic indices calculated form the economic characteristics group of quality in a ulterior analysis of quality of the specific food product. The integral synthetic indicator of quality (I_{cq}) has a large area of applicability in the comparative analysis of many products and services (we refer to the products of the same group or subgroup, using a fiducially product or service which is considered to be standard); it permits the comparison of the products which have numerical or notional characteristics. Thus, we can demonstrate the high degree of applicability of this method for food products.

References

Apostu, D. (1994). *Calculul eficientei economice in industria alimentara*, Lito, Universitatea Galati.

Csosz, I. (1997). *Economia intreprinderilor agroalimentare*, Ed. Agroprint, Timisoara.

Stanciu, I. (1998). *Calimetrie*, Ed. Oscar Print, Bucuresti.

Stanciu, I., Olaru, M. (1999). *Bazele merceologiei*, Ed. Uranus, Bucuresti.