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OPERATIONAL MARKETING OF VEGETAL PRODUCTS HAVING ANTIOXIDANT BIOCOMPONENTS

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ABSTRACT
Some of the richest sources of compounds with health benefits are fresh fruits and vegetables, which through their richness of bioactive components, are a very effective source of antioxidants to prevent excessive accumulation of free radicals in the body or to interact with the existing ones. This study aims to create a natural product, containing antioxidant biocomponents. For the designed product to meet the current food market and consumer's demands, the study was completed by operational marketing applications. The high quality of the product thus obtained is represented by the ability to easily enter the regular diet of consumers of antioxidant biocomponents. This is also an effective way to prevent power imbalances that can lead to degenerative diseases and maintain a state of optimal health.
Keywords: operational marketing, vegetables, antioxidant biocomponents

INTRODUCTION

Current research, carried out on extensive segments of the population belonging to different geographical areas with different food habits, showed that large consumers of vegetables with antioxidant biocomponents in this case, less prone to neoplasms (Parisi et al., 2010).

Numerous international studies about the role of natural substances on health have shown that vegetables have a protective role against the risk of tumor formation.

Also, high consumption of vegetables protects against cardiovascular disease, metabolic syndrome and macular degeneration, helps control blood pressure and cholesterol levels and prevent various digestive problems.

Activity is directed on getting the body healthy again, recovery processes and rejuvenation are activate (Bottino et al., 2009).

This raises the utility of defining plant–based food products that meet nutritional role on the one hand but also meet consumer pleasure so that they can be consumed by most the population.

In order to define such a product on a highly diversified food market, I tried to apply the operational marketing (Cooper, 2010).

Operational marketing, or marketing mix, tries to control and use several variables that can act on the consumer market and to achieve maximum impact and profit (Temple, 2010).

Operational marketing attempts to calibrate these variables, called tactical marketing tools, to combine them in a mix so as to obtain a response from the market as favorable as possible.

Marketing mix is the most visible aspect of marketing and appears as a determinant factor of product profitability, on a short and medium term. In other words, the marketing mix is a set of tactical marketing tools, controllable, which can be combined so as to produce the desired combination on the chosen strategic segment (Vergara et al., 2011).

As far as the functional food consumer is concerned, too, marketing believes that we have an "average consumer" and consumers differ from each other. Thus in the functional food field, series of medium and small products or individual commands with antioxidant biocomponents must be made (Wegener et al., 2010).

The greatest possible differentiation of products is required, because the desires and needs of consumers are very different and therefore there are a variety of market segments distinguished by different needs.

Thus we sought to identify in our study, groups of users among patients with very frequent pathologies by defining a very large market of potential consumers (Zagros et al., 2002) and secondly, through conducted research, these consumers to be helped with medication and treatment as their base to enjoy simple food to enhance the quality of life and can be considered as an adjunct in the treatment of their disease (McAnulty et al., 2011).

As a matter of fact, the marketing mix involves characterization of the final obtained product–the vegetable salad based on vegetable products with antioxidant biocomponents-through the "4 c" as follows:

- cost–to have affordable, tangible medium or low income consumers, according to the market research conducted this cost varies between 1.3 and 3.7 lei per 500 g finished vegetables salad with antioxidant biocomponents;
- convenience–the product to be available to consumers, since the vegetables were purchased from markets and hypermarkets

within reach of consumers, it is considered that this characteristic is fulfilled;
- to correspond to customer's needs–to satisfy a need, in this case in addition to a nutrient compound to be an add in order to maintain health or to achieve better control of various pathologies; this feature is demonstrated by studying the antioxidant capacity of components of plant products and vegetable salad;
- communication–the information on this product and the impact of use in maintaining the health to reache the consumer as easily as possible.

MATERIALS AND METHODS

Raw materials used to obtain the product studied were vegetables with antioxidant biocomponents.

The samples of crops processing under study went through several stages.

Collection and treatment of plant products harvested samples

Samples of crops were harvested from cultivated flora from places in the surroundings of Timisoara.

For each vegetable three samples were taken (at technological maturity).

Samples were identified, labeled and sample aspect was noted.

A part of each sample was kept in the laboratory of USAMVB Timisoara, for possible verification.

Drying and milling: After harvesting, samples are homogenized, the unused parts are removed, washed with deionized water (residual moisture evaporates at room temperature) and they are left for drying (2–3 days on white paper).

Dried vegetable products are ground in the mill for vegetable products to a fine powder, then homogenized and passed through a sieve having 30 stitches/cm2.

Extraction:

Organic solvents used in extraction of active components with antioxidant effect, according to their behavior are:
- apolar solvents: not dissolve antocianosides, antocianidoli, even at high temperatures, we used benzene and petroleum ether;
- polar organic solvents: dissolve as well as antocianosides antocianidolii and cold use of methanol and ethanol solvents
- amphipolar solvents: anthocyanins provide average solubility compared with other types of solvents, butanol was used;

Treatment scheme for extracting raw materials with antioxidant compounds (anthocyanins, polyphenols, etc.) includes successive extractions with petroleum ether, benzene and alcohols (methanol and ethanol).

The use of solvents varied depending on the components report directly to the raw material (Rigane, 2011).

Methods for identifying the antioxidant biocomponents

Vitamin C was titrationally determined since the ascorbic acid is a strongly reducing agent, which readily loses hydrogen atoms, turning into dehydroascorbic acid which also presents vitamin action.

Vitamin activity is lost when the lactonic cycle of dehydroascorbic acid is hydrolyzed forming dicetogulonic acid. The method used is based on titration of ascorbic acid in plant extracts with 2,6–diclorindofenolul to onset of persistent pink color at least for 5 seconds.

Determination of 2,6–diclorindofenol antibody solution is achieved with a solution of the exact concentration of vitamin C freshly prepared and titrated in the same conditions as the samples were.

The antioxidant activity of aqueous extract of the mixture of vegetable samples collected has been studied and the vitamin C content was tritrimetically determined .In order to determine the total antioxidant capacity, the compensation the ascorbic acid method was used, this being developed at the Department of Chemistry and Vegetal Biochemistry of USAMVB Timisoara.

The advantages of this method are the use of readily available techniques, the rapid and high reproducibility of results.

The most important feature of the method lies in the fact that the sample under review do not add any foreign substance (Fassoula et al., 2011).

RESULTS AND DISCUSSIONS

The rationale behind the choice of vegetables as study material was the fact that vegetables have biological valences for use as functional foods, through energetic value and antioxidant power, bringing real benefits for health as follows:
- they are foods that are characterized by high nutrient density,
- have low energy intake;
- contain many biologically active compounds, vitamins and minerals,
- and they are the main supplier of phytochemicals used in various industries such as those of pharmaceuticals, food, cosmetics, agrochemicals (Kaufer et al., 2010).

Primary and secondary plant metabolites in pharmacodynamic activity and food value have some common characteristics:
- most are non-protein compounds,
- can be separated from plant material by steam stripping, water or organic solvent extraction,
- with some exceptions, there are compounds with weight which implies a low molecular

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quantitative and qualitative control more sustainable.

Antioxidant biocomponents act by counteracting the "cellular oxidative stress" that harms the body.

Thus, there is great interest in research on health effects of antioxidants. (Nikolova, et al, 2011)

Health benefits of diets rich in antioxidants are obvious, but advantages in terms of performance are not too many.

Based on assessment of nutritional properties and sensory preferences expressed by consumers, the vegetables that are used in the studied vegetables salad were selected.

Vitamins are essential organic compounds that the human body cannot synthesize by itself and must therefore, be present in the diet. (Pavlova et al., 2010)

The term vitamin (vital amines) was coined by Casmir Funk from the Latin vita meaning "life" (essential for life) and amine because he thought that all of these compounds contained an amine functional group.

These selected foods are basically intended to be consumed as part of a normal diet and containing active biological components having an antioxidant role and not only, and offers a potential increase in health or disease risk reduction. (Arafat. Et al., 2011) They are described in Tables 1 and 2.

Figures 1 and 2 are suggestive for vegetables nutritional characteristics that were the end product–a salad with antioxidant biocomponents, such as: soy, white cabbage, carrot, celery, cucumber, parsley, onion, peppers and tomatoes.

Products with the highest content of vitamin C stand to be pepper and cabbage, with a content of 100 mg vitamin C / 100 g dry matter, followed by carrots, tomatoes and soybeans, still showing a significant content of this antioxidant vitamin.

Table 1

Vitamin C content (mg/100 SU) for the vegetables in the studied food

No.	Vegetables	No. of determination	Minimum values	Maximum values	Medium values
1	Pepper	5	73	342	134.5
2	Cucumber	5	8	19	5.5
3	Onion	5	6	10	2
4	Carrot	5	4	58	27
5	Parsley	5	3	5	1
6	Soy	5	13	41	14
7	Tomatoes	5	19	48	14,5
8	Celery	5	5	15	5
9	Cabbage	5	20	220	100

Data are presented as mean ±SD

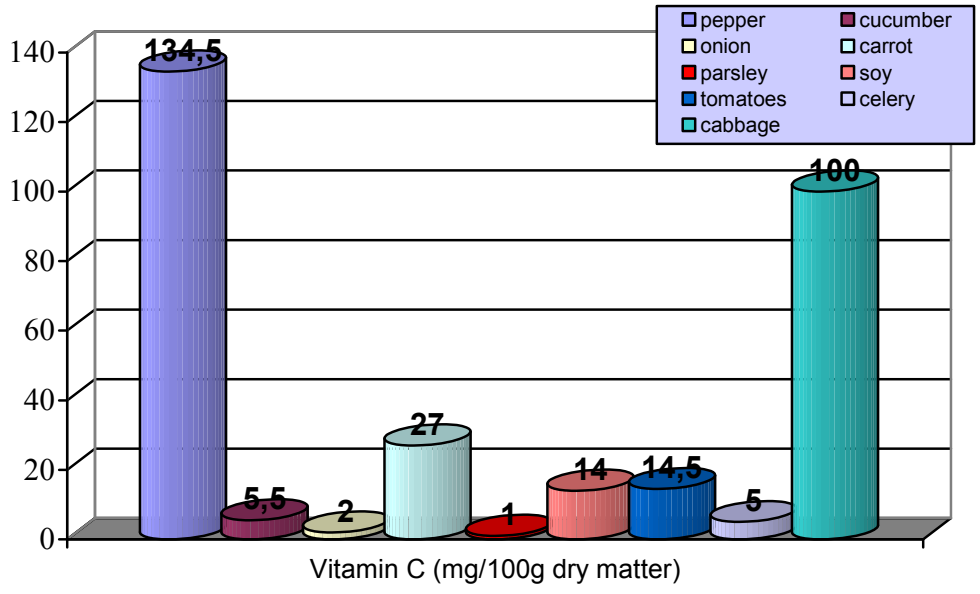

Fig. 1 The average content of vitamin C for samples of vegetables

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The vegetable product that is distinguished by the highest content in carrotenoids is carrot, pepper and cabbage, situated at less than half of its value.

In the study of nutrition, the following items must be considered:

- amount needed;
- bodily requirement for various substances;
- function in body;
- level below which poor health results.

Essential foods supply energy (calories) and supply the necessary chemicals which the body itself cannot synthesize. (Derradji, et al, 2011)

Food provides a variety of substances that are essential for the building, upkeep, and repair of body tissues, and for the efficient functioning of the body.

A complete diet must supply the elements; carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, and at least 18 other inorganic elements.

The major elements are supplied in carbohydrates, lipids, and protein.

In addition, at least 17 vitamins and water are necessary.

If an essential nutrient is omitted from the diet, certain deficiency symptoms appear.

Table 2

Content of total carrotenoids (mg/ 100g SU) for the analyzed vegetables

No.	Vegetables	No. of determinants	Minimum values	Maximum values	Medium values
1	Pepper	5	0.15	2.7	1.275
2	Cucumber	5	0	0.04	0.02
3	Onion	5	0	0.06	0.03
4	Carrot	5	6	13.6	3.8
5	Parsley	5	0	0.07	0.035
6	Soy	5	0.38	0.55	0.085
7	Tomatoes	5	0.19	1.45	0.63
8	Celery	5	0	0.8	0.4
9	Cabbage	5	2.3	4.8	1.25

Data are presented as mean ± SD

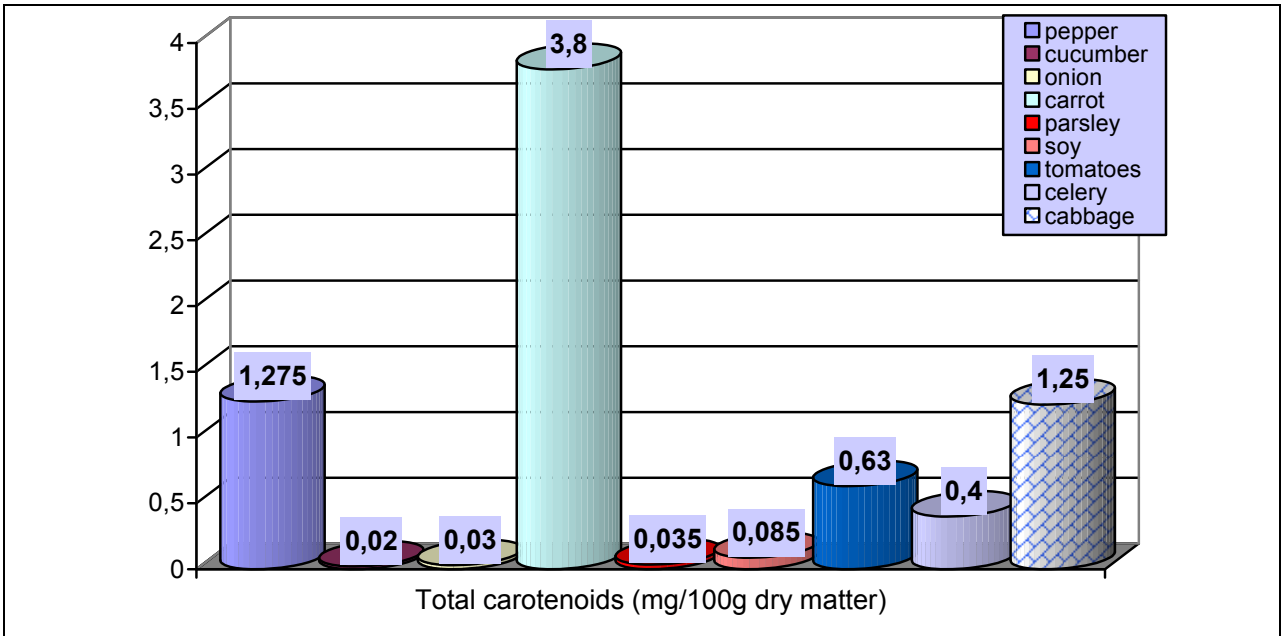

Fig. 2 The average total carrotenoids in vegetable samples studied

CONCLUSIONS

Based on the content of vitamin C and vegetable products containing carrotenoids, we consider that peppers, cabbage, carrots, tomatoes and celery should be required to be disclosed in the final product because of the total amounts of significant values of antioxidant that these vegetables contain.

The salad made from these components is a simple product that can be easily prepared and it is easily reachable by most consumers and their consumption will

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have beneficial effects on health due to the ability to better manage some risk factors for degenerative diseases.

It also stands for the studied product - salad vegetables with antioxidant biocomponents–meeting all the four keys conditions to assure a successful marketing in today's market operations.

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