

RELATIONSHIP OF CHEMICAL COMPOSITION TO QUALITY IN VEGETABLES

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ABSTRACT. The present paper is a study about the role of vegetables and other antioxidant status in human subjects. Vegetables are essential to keep our body healthy and in perfect harmony. Vegetables were characterized and their chemical composition determined. Some of them were not only used for food, but for medicine in minor ailments by the natives. Results of the analysis showed that on dry weight basis, the crude protein content ranged from 23.39 to 27.51 percent. The fat (either extract) ranged from 1.67 to 2.23 percent. Total carbohydrate content ranged from 43.88 to 59.01 percent. The vegetables and leafy vegetables are high in ascorbic acid (Vitamin C). Ascorbic acid content ranged from 38.50 mg/100 g dry sample to 51.34 mg/100g sample.

Keywords: vegetables, chemical composition, ascorbic acid, antioxidant

INTRODUCTION

Vegetables are foods of plant origin with a wide use in human food healthy or sick; important source of nutrients, while they offer the possibility of multiple changes in the menu. The eatable part of vegetables vary from one species to another: to eat roots, stems, bulbs, fruit, flowers, seeds, leaves or whole plant. Of the 1200 known plant species, which could be used as "vegetable plant", the world's 250 species are cultivated and in Romania some 50 – 60 species. (Butnariu M., 2008).

Vegetables are low in calories and packed with vitamins, minerals, antioxidants and phytochemicals. Are you looking for nutritional information for your favorite vegetables? Here is the nutritional information you need. You can also find some healthy recipes for each vegetable, plants or parts of plants cultivated for food (Șerban M., 2000).

As a source of nutrients most of the vegetables are useful sources of vitamin C and minerals and the root vegetables supply carbohydrate. Green and yellow or orange vegetables and fruits are sources of vitamin A as carotene (Banu C., 2000).

Vegetables are essential in a healthy diet. Most vegetables are filling but light, not many calories. Vegetables are ideal for weight loss diets and to fight disease. Vegetables are rich in antioxidants that fight free radicals and help to prevent cancer and keep looking and feeling young (Lupașcu F., 1985).

Carbohydrates provide the bulk of the calories (4 kcal/g) in most diets and starches provide the bulk of that. Age, sex, size, health, and the intensity of physical activity strongly affect the daily need for calories. Moderately active females (19-30 years old) need 1500-2500 kcal/day, while males of the same age need 2500-3300 kcal/day. In some poor countries, too many

children do not receive enough calories to grow properly. In order to maintain blood sugar levels, they attack their own protein (Scurihin M., 1987).

This condition of semi-starvation is known as marasmus. Humans must include adequate amounts of 9 amino acids in their diet. These "essential" amino acids cannot be synthesized from other precursors. However, cysteine can partially meet the need for methionine (they both contain sulfur), and tyrosine can partially substitute for phenylalanine. Two of the essential amino acids, lysine and tryptophan, are poorly represented in most plant proteins. Thus strict vegetarians should take special pains to ensure that their diet contains sufficient amounts of these two amino acids. Ingested fats provide the precursors from which we synthesize our own fat as well as cholesterol and various phospholipids. Fat provides our most concentrated form of energy. Its energy content (9 kcal/g) is over twice as great as carbohydrates and proteins (4 kcal/g) (Butnariu M., 2007).

Humans can synthesize fat from carbohydrates. However, three essential fatty acids cannot be synthesized this way and must be incorporated in the diet. These are: linoleic acid, linolenic acid, arachidonic acid. All are unsaturated and have double bonds. Antioxidants include a group of vitamins, minerals, herbs and enzymes that help to protect the body from the formation of free radicals (Dolejan I., 1980).

Free radicals are substances or electromagnetic fields that cause damage to cells thus impairing the immune system. The genus *Capsicum* comprised all the varied forms of fleshy – fruited peppers grown as herbaceous annuals – the red, green, and yellow pepper rich in vitamins A and C that are used in seasoning and

as a vegetable food. Free radicals are thought to cause aging and diseases such as cancer (Şerban M., 2000).

Substances within our body called free radical scavengers are on alert all the time to identify and disable these harmful processes and the damage that they do to individual cells. Everything goes along fine unless our body can't keep up and/or we don't provide it with the proper nutrition. That's when cancer happens. Tomatoes are now eaten freely throughout the world, and their consumption is believed to benefit the heart among other things. They contain lycopene, one of the most powerful natural antioxidants. In some studies lycopene, especially in cooked tomatoes, has been found to help prevent prostate cancer but other research contradicts this claim. Natural genetic variation in tomatoes and their wild relatives has given a genetic treasure trove of genes that produce lycopene, carotene, anthocyanin, and other antioxidants (Butnariu M., 2006).

Tomato varieties are available with double the normal vitamin C, 40 times normal vitamin A, high levels of anthocyanin, and two to four times the normal amount of lycopene (numerous available cultivars with the high crimson gene). Tomato consumption has been associated with decreased risk of breast cancer, head and neck cancer and might be strongly protective

RESULTS AND DISCUSSIONS

They provide information on the composition of each plant, but the predominant component. Regardless of destination, most plants by the content and ratio of active principles have antioxidant activity.

Antioxidant activity of aqueous extract of active ingredients present in determined to pure vitamin C is presented in the table compared with the vitamin content titrimetric determined. Vitamin C is considered an antioxidant. When used alongside other antioxidants such as vitamin E and beta-carotene, you can keep your immune system strong.

against neurodegenerative diseases (Butnariu M., 2008).

MATERIALS AND METHODS

Sample collection and treatment. The collected sample was thoroughly mixed, had their stalks removed, rinsed with de-ionized water and the residual moisture evaporated at room temperature before sun-drying for 2-3 days on a clean paper with constant turning over to avert fungal growth.

Chemical analysis to determine composition of sample was carried out using standard procedure. Moisture content was determined by air drying, fat by Soxhlet extraction, carbohydrate calculated by difference, ash content by incineration, crude fiber by incineration after acid and base digestion, mineral element composition using the AAS after acid digestion of the samples and protein by the Kjeldahl method (AOAC, 1990).

Estimation of energy value. The sample calorific value was estimated (in Kcal) by multiplying the percentage crude protein, crude lipid and carbohydrate by the recommended factor (2.44, 8.37 and 3.57 respectively) used in vegetable analysis.

The caloric value was determined based on the Atwater factor (FAO, 2006a).

The main compositional data from the investigation of aqueous extract are presented in Table 1.

From the data gathered, it was observed that the antioxidant activity depends on vitamin C content of the aqueous extract of each plant examined; dependence is nonlinear, evidence that this feature is also affected by other components of the composition.

Free radicals are highly reactive molecules with an odd electron (or "free") on orbital external imbalance condition that transform these molecules fragmented very unstable and dangerous agents of biochemical viewpoints.

Table 1

Composition of vegetable				
No.	Nutritional value per 100 g (3.5 oz)	Capsicum <i>Capsicum annuum</i>	Tomato <i>Solanum lycopersicum</i>	Carrot, raw, <i>Daucus carota</i>
1	Moisture content (%)	76.53 ± 0.02	83.39 ± 0.09	88.20 ± 0.09
2	Ash content (%)	7.13 ± 0.03	9.90 ± 0.09	11.37 ± 0.06
3	Crude fat (%)	2.23 ± 0.03	1.67 ± 0.02	1.50 ± 0.02
4	Crude protein (%)	23.39 ± 0.05	25.39 ± 0.00	27.51 ± 0.00
5	Crude fibre (%)	12.14 ± 0.00	9.75 ± 0.04	19.25 ± 0.07
6	Carbohydrate (%)	43.88 ± 0.01	53.29 ± 0.03	59.01 ± 0.05
7	Caloric value	1296.09 ± 1.31kJ/g	1399.41 ± 1.13kJ/gf	1382.40 ± 0.28kJ/g
8	AA, (%)	72.1	92.0	85.0
9	Vit. C [mg/g]	38.50	51.34	43.45

Mean values ± Standard deviation values.

Means differ significantly ($p < 0.05$).

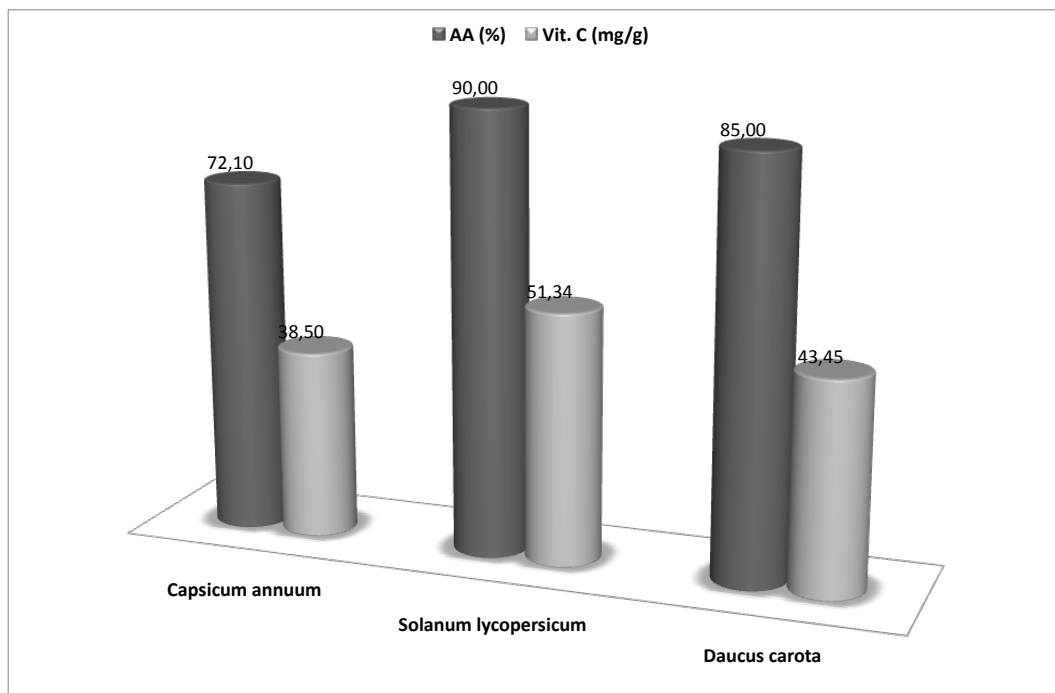


Fig. 1 Composition of vegetable

CONCLUSIONS

The value of vegetables as food factor resides in their content varied energogene substances, minerals and trace elements and vitamins that are added to water and fibrous substances. Free radicals in our body come from toxic residues reached the body from the environment. Complex chemical compounds such as those of human structure, gain stability by parity electron molecules. Every time a free radical attacks a molecule normal to avoid an electron, the molecule changes from the process structure and chemical properties, converting itself into free radical itself. From now on, the unbalanced electrochemical, biochemical unstable and highly reactive organic molecule converted into free radical tried to regain stability by violent stealing an electron from another organic molecule. Out of control, the reaction is going on (radical mechanism).

A human cell unbalanced in this way at the molecular level loses basic functions, converting itself into a source of free radicals, ready to attack other cells, denature them and their functions. Gradually generates a chain of control of biochemical reactions harmful to the body with very serious consequences over time. Ascorbic acid is well known for its antioxidant activity. Ascorbate acts as a reducing agent to reverse oxidation in aqueous solution. When there are more free radicals (Reactive oxygen species) in the body versus antioxidant, a human is under the condition called Oxidative stress induced diseases

encompass cardiovascular diseases, hypertension, chronic inflammatory diseases and diabetes.

Our data show that the leaves of vegetables contain appreciable amount of proteins, fat, fiber, carbohydrate and calorific value, mineral elements, vitamins, amino acids and generally low level of toxicants.

Thus, it can therefore be concluded that vegetables can contribute significantly to the nutrient requirements of man and should be used as a source of nutrients to supplement other major sources. Chemical analysis, however, should not be the sole criterion for judging the nutritional value of this plant. It is necessary to consider other aspects such as the biological evaluation of the nutrient content of the plant in order to determine the bioavailability of the nutrients and also the effects of processing on the chemical and nutritive value of the plant.

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