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## THE NUTRITIONAL VALUE OF WALNUT

Seyit Mehmet Şen<sup>1</sup>, Turan Karadeniz<sup>2\*</sup>

<sup>1</sup>Faculty of Engineering and Architecture, Kastamonu University,  
Kuzeykent Mh., Kastamonu 37150, Turkey

<sup>2</sup>Faculty of Agriculture, Ordu University, Cumhuriyet Campus, 52200 Ordu, Turkey

\*e-mail: turankaradeniz@hotmail.com

### Abstract

Walnut is a fruit that keeps the essential foods largely that people need to have healthy nourishment. Because, like other hard shell fruits, walnut, in fact is a seed and all seeds are highly rich with regard to nutrient they contain.

Thus, consuming a handful of raw walnut a day largely provides the proteins, fat, antioxidant, some vitamins and minerals that a person needs a day. That's why we have to take into consideration walnut as an enriched food in terms of useful substances for health. Especially, walnut is a rich source in terms of Omega 3 which is useful for a regular health. Walnut contains many healthy food substances, minerals, antioxidants and vitamins.

Walnuts are essential for our health system. When speaking about healthy life, they are considered to be a food that should be eaten every meal.

**Key words:** Walnut, Heart health, Vitamin, Antioxidant, Omega 3.

### 1. Introduction

Walnut is highly rich in terms of mono unsaturated fatty acids. Walnut is a perfect source of Omega 3 (which is essential fatty acid) and a source of arachidonic acid. Walnut has been the symbol of being enlightened since old times. The botanical structure of walnut is compared with human brain, so it is considered as the brain nutrient. Walnut is the rich source of many phyto-chemical substances (Sen, [14]). These substances which have antioxidant effects are the compounds of: melatonin, ellagic acid, vitamin E, carotenoids and polyphenols. These compounds have potential health effects against: aging, cancers, inflammations and neurologic illnesses (Sen, [15]) (Figure 1, Table 1).



Figure 1. Anatolian walnut (*Juglans regia*).

## 2. Walnut

### 2.1 Walnut as vitamin source

Walnut is a perfect source of vitamin E. Vitamin E in walnut fat has two forms: alpha tocopherol and gamma-tocopherol. A 100 gr of walnut has 21 mg gamma-tocopherol (Vitamin E), and this amount provides the 140% of daily need. Vitamin E is a strong fat-soluble antioxidant. Vitamin E is needed to protect the mucus and skin cell membranes against the harmful effects of free radicals and to keep their unity.

Walnut contains important vitamin structures such as: riboflavin, niacin, thiamine, pantothenic acid, vitamin B6, and folate/B9 (Sen, [14]). As walnut has a preventive effects of inflammation, it decreases the risk of high blood pressure; it also prevents arterial illnesses that can result with: heart, and brain stroke, chest diseases, colon and prostate cancer (Marangoni *et. al.*, [8]; Amaral *et. al.*, [1]).

**Table 1. The chemical structure of walnut**

| Energy / Constituents | Nutritional value per 100 grams |
|-----------------------|---------------------------------|
| Energy                | 2,738 kJ (654 kcal)             |
| Carbohydrates         | 13.71                           |
| Starch                | 0.06                            |
| Sugars                | 2.61                            |
| Lactose               | 0                               |
| Dietary fiber         | 6.7                             |
| Total Fat             | 65.21                           |
| Saturated fat         | 6.126                           |
| Monounsaturated fat   | 8.933                           |
| Polyunsaturated fat   | 47.174                          |
| Protein               | 15.23                           |
| Vitamins              | Amount (%)                      |
| Vitamin A equiv.      | 1 µg (0%)                       |
| Beta-carotene         | 12 µg (0%)                      |
| lutein zeaxanthin     | 9 µg (0%)                       |
| Vitamin A             | 20 IU                           |
| Thiamine (B1)         | 0.341 mg (30%)                  |
| Riboflavin (B2)       | 0.15 mg (13%)                   |
| Niacin (B3)           | 1.125 mg (8%)                   |
| Pantothenic acid (B5) | 0.570 mg (11%)                  |
| Vitamin B6            | 0.537 mg (41%)                  |
| Folate (B9)           | 98 µg (25%)                     |
| Vitamin B12           | 0 µg (0%)                       |
| Vitamin C             | 1.3 mg (2%)                     |
| Vitamin D             | 0 µg (0%)                       |
| Vitamin D             | 0 IU (0%)                       |
| Vitamin E             | 0.7 mg (5%)                     |
| Vitamin K             | 2.7 µg (3%)                     |
| Trace metals          | Amount (%)                      |
| Calcium               | 98 mg (10%)                     |
| Iron                  | 2.91 mg (22%)                   |
| Magnesium             | 158 mg (45%)                    |
| Manganese             | 3.414 mg (163%)                 |
| Phosphorus            | 346 mg (49%)                    |
| Potassium             | 441 mg (9%)                     |
| Sodium                | 2 mg (0%)                       |
| Zinc                  | 3.09 mg (33%)                   |
| Other constituents    | Amount (%)                      |
| Water                 | 4.07                            |
| Alcohol (ethanol)     | 0                               |
| Caffeine              | 0                               |

**Legend:** µg = micrograms; mg = milligrams; IU = International units. Percentages are roughly approximated using US recommendations for adults (Source: USDA Nutrient Database).

## 2.2 Walnut as protein, fat, and carbohydrate source

Walnut contains single and multi-unsaturated fat that affect the heart health. 4/3 of the calories in walnut are coming from fats. As it is known, 3 food nutrients provide calories: proteins, fats, and carbohydrates. Proteins and carbohydrates provide 4 calories per gram, whereas fats provide 9 calories per gram. For that reason, while consuming hard shell fruits, we have to be careful about the amount of portion and we shouldn't eat too much (Tapsell *et al.*, [16]; Sen, [15]; Crews *et al.*, [4]).

## 2.3 How walnut is consumed?

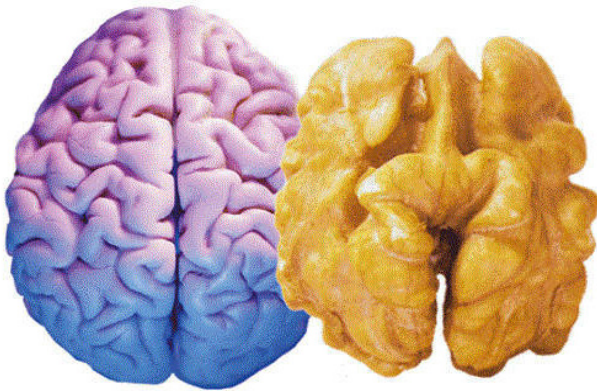
Walnut can be consumed raw, unprocessed, directly, but also it can be consumed as roasted, salted and flavored. The inner part of a walnut has a pleasant taste, so it may be used as flavor enhancer in yoghurt, pizza, cake or it can be stewed on salad, dessert, especially walnut ice-cream and other ice-creams. One of the walnut wide applications is utilization in candy industry by adding in biscuits, cakes and desserts

Little known fact is that candied or chocolate-covered walnut may be consumed when is piled on the top of the seafood. Walnut can be used as paste. Especially, it is widely used by the people who have peanut-allergy. In Middle-east countries, walnut is added to almond, date, grape, and used to prepare a cake called Mamoul in Ramadan (Şen, [15]).

## 2.4 Other walnut properties

In their raw states, theoretically, most of the hard shell fruits and seeds are the perfect food stores. Walnut, which is the most valuable of all hard shell fruits, contains plenty of healthy substances in raw and organic form. The most important and outstanding nutritive characteristics of walnut are feeding and supporting the brain and nervous system. Walnut can be considered as a food drugstore that prevents the harmful health effect that can be caused by other types of food, including vegetables (Sen, [15]).

When we consume enough walnut daily, we can see that walnut is a perfect disease preventer. Due to its walnut taste and medical benefits, walnut desserts have been appreciated for thousands of years. Those who are using walnut are quite aware of its various application as food additive or pure food item, and since it is known as a perfect brain nutrient, they can't live without it in their pockets and meals. Today, we try to learn and understand what and why it is scientifically true. As mentioned in western sources, it is strange that the brain look like a walnut. The rough and hard shell of the walnut is like the skull (cranium) that surrounds the brain. Walnut inside is similar to brain (Figure 2). The two part of inner walnut look like the two lobes of a brain. People are passing the information and experiences they obtained on walnut from past to today.



**Figure 2. Brain and walnut similarities**

Some of the saturated and unsaturated fat acids exist in certain amounts in walnut. Generally, there are 50 grams (47.14) of multi-unsaturated fat acids in 100 gr of walnut, and 40 grams (38.09 g) of it is Omega 6 (linoleic acid), and 10 grams (9.08 g) is Omega 3 (linolenic acid). The rate of Omega 6 to Omega 3 in walnut is very low with respect to other hard shell nuts and it is a positive quality (Şen, [14]; Ma *et. al.*, [13]). In terms of nutritive value, walnut is superior to pistachio, almond, hazelnut, pine nut, and peanut. Vinson *et. al.*, [18] explains it scientifically as: A handful of walnut a day contains two times more antioxidants and vitamins than other hard shell nuts. But, generally, people consume other hard shell nuts except walnut. In fact, walnut must be included in a healthy nutrition programs.

### 2.5 Walnut in terms of heart health

According to researches, consuming walnut daily protects the body against: heart diseases, some certain cancer types, diabetes type 2, and other health problems. Recent researches showed that walnut reduces the risk of heart-attack; as it helps blood run more easily in the vein (Şen, [15]; Fukuda *et. al.*, [6]; Gillenet *al.*,

[7]; Ma *et. al.*, [13]; Anderson *et. al.*, [2]). Walnut fruit is similar to heart shape (Figure 3).

### 2.6 Walnut as antioxidants source

The antioxidant substances in walnut have 15 times more effects than pure vitamin E has. Walnut is considered as the number one heart health friendly hard shell fruit. The reason of this is that walnut contains much more antioxidants than the other hard shell nuts. Antioxidants are the substances that protect the cells against the damages caused by harmful molecules known as free radicals. Walnut reduces: cholesterol, oxidative stresses caused by free radicals, and the inflammations that damage the health (Anderson *et. al.*, [2]; Morgan *et. al.*, [9]). Walnut was the number one when he analyzed the antioxidants in walnut and the other hard shell nuts. Antioxidants in walnut is of better quality than the other hard shell nuts (Vinson and Cai, [18]). The antioxidants in 30 gr walnut is more than the antioxidants that a normal man gets from the fruit and vegetable he eats all day long. But it is just in order to say how sufficient the antioxidant density in walnut is (Reiter *et. al.*, [11]; Canales *et. al.*, [3]; Fukuda *et. al.*, [5]; Negi *et. al.*, [10]).

### 2.7 Walnut eating - is it a good diet?

There is an important false approach for people against hard shell fruits. Many people avoid consuming hard shell fruits in dread that they put on weight (Vinson and Cai, [18]). Truly, walnut has a very high value of calories. But also, walnut contains healthy fats (Sen, [14]). That's why, those who add a handful of walnut or other hard shell nuts in their diet daily keep their weight or lose a bit weight. It is scientifically proved that hard shell nuts support the brain health (Sen, [14]). The calories obtained from the hard shell nuts are not useless calories; but, the calories taken from the hard shell nuts keep the body full till the next meal. The food rich in antioxidants have positive effects on health (Tapsell *et. al.*, [16]; Ueshima *et. al.*, [17]; Ros *et. al.*, [12]).



**Figure 3. Walnut fruit and heart shape**

### 3. Conclusions

- Walnut is very healthy fruit for human health containing vitamins, minerals, proteins and fats.

- In order to increase heart and brain health, walnut should be consumed from the childhood with 20 - 30 gr per day.

- A handful of walnut a day contains two times more antioxidants and vitamins than other hard shell nuts. But, generally, people consume other hard shell nuts except walnut.

- For the long health life, walnut should be included in regular human nutrition and healthy nutrition programs.

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