

Antioxidant activity of fruits of *Cerasus vulgaris* Mill. species in the area of Nakhchivan Autonomous Republic

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Abstract

The percentage of free radical neutralization of fruit juice of *Cerasus vulgaris* Mill. grown in the Nakhchivan Autonomous Republic studied in this article. Flavonoids and polyphenolic compounds have been studied in plant extracts. The antioxidant activity of fruit juice was determined by the 2,2-diphenyl-1-picrylhydrazyl method. The free radical neutralization activity of cherry juice was calculated as a percentage and the result had been $84,3 \pm 0,2$. Thus, it is clear from the experiments that cherries grown in Nakhchivan have a high antioxidant activity. The article also studied the distribution of the species in the regions of the AR and the results are shown in the graph. Cherries are grown more in Shahbuz (27,3%) and Ordubad (22,3%) regions. 66,7% of the gene fund of cherries grown in the Nakhchivan Autonomous Republic are local varieties, 33,3% are introduced varieties.

Keywords: free radical, DPPH, antioxidant, species, genus, fruit

Introduction

The main natural antioxidants present in food and protecting the human body from harmful free radicals are mainly vitamins, carotenoids, polyphenolic compounds and flavonoids. These compounds are mainly found in various vegetables, fruits, grains and herbs. Fruits and vegetables contain many substances necessary for the human body: sugars, organic acids, nitrogenous substances, oils, flavorings and dyes, mineral salts, vitamins, enzymes, glucosides, phytoncides and pectin, which help the human body to resist various diseases and are of great importance in human nutrition [2]. Recently, it is scientifically proved that natural antioxidants is associated with a lower risk of cardiovascular disease and cancer. Thus, the consumption of fruits and fruit juices, which are natural antioxidant sources, have gained increasing interest among consumers. Sour cherry, is a species of *Prunus* in the subgenus *Cerasus*. It is closely related to the wild cherry. Sour cherries contain fewer calories than the sweet varieties, due to their lower sugar content. Sour cherry is considered to be one of the richest sources of antioxidants [3, 5]. Turkey is the first range in the production of sour cherry in the world. Sour cherry may be beneficial for the management and prevention of inflammatory diseases, including inflammatory pain. Beyond the anti-inflammatory benefits, many of the phenolic compounds in cherries may offer protection against heart disease and stroke. Sour cherries require rich, well drained, moist soil for cultivation, although they demand more nitrogen, and water than sweet cherries. During spring, flowers should be protected, and trees weeded, mulched and sprayed with natural seaweed solution [9]. Anthocyanins in sour cherries also might lower blood lipids, thus reducing heart disease risk. Researchers believe sour cherries may have the potential to reduce the risk of colon cancer because of anthocyanins and cyanidin, another type of flavonoid found in cherries. Sour cherries and their compounds appear to aid in diabetes control and in reducing the

complications associated with this disease. Antioxidants are substances that may protect human cells against the effects of free radicals. Free radicals are atoms or groups of atoms with an odd (unpaired) number of electrons and can be formed when oxygen interacts with certain molecules. Free radicals are highly unstable molecules that are naturally formed when you exercise and when your body converts food into energy [6]. Human body can also be exposed to free radicals from a variety of environmental sources, such as cigarette smoke, air pollution, and sunlight. Free radicals can cause "oxidative stress," a process that can trigger cell damage. Antioxidants react with free radicals and stop the chain reaction of them. Our body uses antioxidants to stabilize the free radicals. Human body produces some antioxidants to fight off the free radicals formed by normal body processes. We can also get antioxidants by eating a healthy diet. Examples of antioxidant-rich foods include fruits and vegetables that are high in nutrients such as vitamins A, C and E, beta-carotene, lutein, lycopene and selenium.

The best way to get antioxidants is by eating a diet with lots of vegetables, fruits, whole grains, seeds and nuts. The antioxidant capacities of juices were determined with DPPH antioxidant assays [7, 8].

Material and methods

The purpose of the research is to study the percentage of free radical neutralization of fruit juice of *Cerasus vulgaris* Mill. grown in the Nakhchivan Autonomous Republic. Flavonoids and polyphenolic compounds have been studied in plant extracts. The antioxidant activity of fruit juice was determined by the 2, 2-diphenyl-1-picrylhydrazyl method. The ethanol solution of DPPH is characterized by an intensive maximum of 517 nm in the UV spectrum. When unpaired electrons of DPPH combine with electrons or hydrogen released from phenolic compounds,

the absorption decreases at 517 nm. The degree of discoloration of the ethanol solution of DPPH is an indicator of the reducing ability of components, which determines the antiradical activity. The antiradical activity of flavonoids against free radical DPPH was investigated based on the change in the absorption of flavonoids in the reaction solution at 517 nm in the concentration range of 0-20 μM. The method of free radical neutralization activity of 2, 2-diphenyl-1-picrylhydrazyl (DPPH) was used to determine the antioxidant activity. The method is based on the spectrophotometric measurement of the decrease in color caused by the destruction of the pink compound DPPH radical [1, 4]. First, the juice was obtained from cherry fruits. 0, 0005 M DPPH solution was prepared and stored in the dark for 13 h. The prepared DPPH solution and methanol were prepared separately, and the sample, methanol and DPPH solution were prepared in another container and kept in the dark for 30 minutes. Photometric measurements of the samples were performed on UV-2900 spectrophotometer at a wavelength of 517 nm. The free radical neutralization activity of DPPH was calculated by the following formula

$$DPPH \% = \frac{Ac - As}{Ac} \times 100$$

Ac- the maximum absorption of the sample taken for control

An- maximum absorption of the sample

The distribution of cherries in the regions of Nakhchivan AR was also studied.

Discussion of the Results

A number of studies have shown that the consumption of fresh fruits and vegetables has protective effects against cancer, heart and other diseases, as well as aging. In general, the abundant consumption of fruits is a key factor in maintaining a healthy body and increasing resistance to chronic diseases. Spectra were obtained on a UV spectrophotometer obtained from the juice of cherries collected from the territory of Nakhchivan city and antioxidant activity was determined by DPPH method. The free radical neutralization activity of cherry juice was calculated as a percentage and the result had been 84,3 ± 0,2. Thus, it is clear from the experiments that cherries grown in Nakhchivan have a high antioxidant activity.

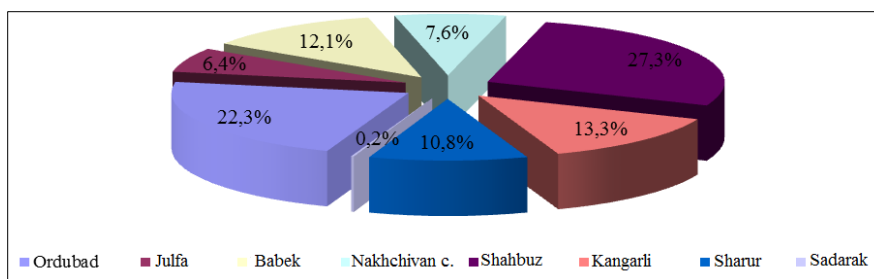


Fig 1: Distribution of cherries by regions in the Nakhchivan Autonomous Republic

The possibility of growing cherries almost everywhere in the Nakhchivan Autonomous Republic up to an altitude of 2000 m and the fact that they form the basis of the raw material base of processing enterprises, giving abundant fruit, has significantly increased the attention to these plants. Local cherry and cherry varieties in the area are more drought tolerant than the introduced varieties. Therefore, the development of local cherry varieties in the plains is very cost-effective. As a result of observations in the area, it was found that the specific gravity of cherry plants in the plain zone is higher than in other zones. According to the percentage of cultivation determined by the research in the regions, cherries are grown more in Shahbuz (27,3%) and Ordubad (22,3%) regions.

66,7% of the gene fund of cherries grown in the Nakhchivan Autonomous Republic are local varieties, 33,3% are introduced varieties. As can be seen from the graph, local varieties in the area (33,3%) and first-discovered forms (50,0%) are numerically superior to introduced varieties (16,7%).

Results

The antioxidant activity of fruit juice was determined by the 2,2-diphenyl-1-picrylhydrazyl method. The free radical neutralization activity of cherry juice was calculated as a percentage and the result had been 84,3 ± 0,2. As a result of observations in the area, it was found that the specific gravity of cherry plants in the plain zone is higher than in other zones. According to the percentage of cultivation determined by the research in the regions, cherries are grown more in Shahbuz (27,3%) and Ordubad (22,3%) regions.

66,7% of the gene fund of cherries grown in the Nakhchivan Autonomous Republic are local varieties, 33,3% are introduced varieties. Also local varieties in the area (33,3%) and first-discovered forms (50,0%) are numerically superior to introduced varieties (16,7%).

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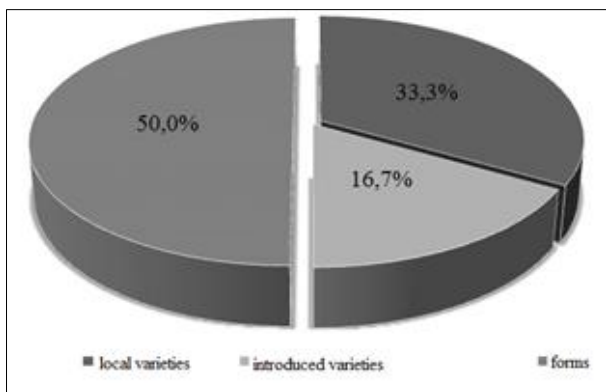


Fig 2: Genetic resources of cherries grown in the Nakhchivan Autonomous Republic

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