

## Investigations on Physical and Chemical Characteristics of Some Pomegranate Genotypes (*Punica granatum L.*) of Tokat Province in Turkey

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The physical and chemical analyses of five different pomegranate genotypes (*Punica granatum L.*) were investigated for two years. The average fruit weight lies between 140.9–281.1 g, skin bottom colour is yellow in all types, skin upper colour pink–red, skin thickness 2.82–3.59 mm, fruitlet colour clear pink–dark red, the weight of 100 kernels 24.1–41.4 g and the percentage of kernels ranged between 43.4–61.3%. In addition, the total soluble solid content was found between 13.5–16.7%, while total acid varied between 2.66–3.58%.

**Key Words:** Pomegranate, Physical and chemical characteristics, Plant biodiversity.

### INTRODUCTION

The production and consumption of pomegranate grown in the tropics and subtropics zones are less as compared to other fruits but it is used in different branches of industry as fruit juice, conserve, vinegar, citric acid, dye and medicine<sup>1-3</sup>. Anatolia, Caucasus and Iran are known as the motherland of pomegranate<sup>4</sup>.

In Turkey, in recent years, pomegranate has been started growing in orderly fruit orchards as parallel to increase of profit obtained from it while it was grown as hedge in the past<sup>5</sup>. Pomegranate growing has important advantages such as easy multiplication, producing in different soil and climatic conditions and high yield per area. In recent years, it is estimated that the production of pomegranate has reached 60.000 tons in Turkey<sup>6</sup>. Also, increase in the domestic consumption and export of pomegranate have increased the interest of producers in this fruit. Studies related to determination of many varieties and types of pomegranate grown in almost all regions of Turkey and their characteristics and getting variety standardization have contributed significantly to this development. Up to now, many researches aiming at determination of the characteristics of pomegranate varieties and types grown in different parts of Turkey and breeding of pomegranate by way have been selection done<sup>2, 5, 7-12</sup>.

With twenty thousand tons of pomegranate production, Turkey is first in Mediterranean region and constitutes 35% of total production<sup>13</sup>. Although the central county of Tokat province is not suitable for pomegranate growing economically, but it can be advised in the counties of Niksar and Erbaa of Tokat, having microclimate characteristics for temperate-zone pomology. In Tokat, the number of pomegranate trees is about 1100 and annual production is approximately 9 tons. Especially, farmers have been growing pomegranate for a long time in Niksar district. The essential aim of this study is to contribute to the conservation of Turkey's plant gene resources and determine the fruit characteristics of pomegranate types.

## EXPERIMENTAL

This research was carried out at the University of Gaziosmanpaşa, Faculty of Agriculture, Department of Horticulture and Inspect Laboratory in Tokat, Ministry of Agriculture and Rural Affairs in the years 1997 and 1998. In the research, eleven pomegranate types of Niksar district were used as material. Five fruits from each type were taken and these were used for analysis. In fruit samples, physical and chemical characteristics such as fruit weight (g), skin bottom colour, skin upper colour and ratio, skin thickness (mm), fruitlet colour, the weight of 100 kernels (g), the percentage of kernel, fruitlet hardness, cracking of fruit skin, the total soluble solid content (%), taste and total acid (%) were investigated.

## RESULTS AND DISCUSSION

Some pomological characteristics of the types were investigated as average of two years (Table-1). The average fruit weight in trial varied between 140.9 g for Acar 4 and 281.1 g for Leblebicioğlu. These figures are low when compared to the figures of other researchers. For example, fruit weights were found between 250.84 and 461.77 g by Polat *et al.*<sup>12</sup>, between 223.5 and 493.1 g by Tibet and Onur<sup>6</sup>, between 253.6 and 308.3 g by Yilmaz *et al.*<sup>5</sup> The skin bottom colour of all types was obtained as yellow. The skin upper colour varied between pink and red. The skin thickness varied between 2.82 and 3.59 mm. Skin thickness was found between 2.41 and 4.33 mm by Polat *et al.*<sup>12</sup> between 1.50 and 5.43 mm by Yilmaz *et al.*<sup>5</sup>

The percentage of kernel was determined between 43.4% (Acar 4) and 61.3% (Taş 1) while the weight of 100 kernels varied between 24.1 and 41.4 g. The percentage of kernels of the types investigated is found low, compared to those of previous findings<sup>5, 6, 12</sup>. The hardness of seed varied from hard to soft. The fruit skin of Acar 3, Hekimoğlu 1, Hekimoğlu 2 and Hekimoğlu 3 cracked, but did not crack in other types (Table-1). All types of pomegranates were categorized under sour group because total acid content was found more than 2%. As seen from Table-1, total soluble solid content varied between 13.5 and 16.7%. The values of total soluble solid content were higher than those of others<sup>5, 6, 12</sup>. In trial, total acid values were determined between 2.66% (Acar 1) and 3.58 % (Leblebicioğlu). It can be said that the pomegranate types are suitable for using in industry instead of table use. In the selection of new pomegranate types, especially in varieties

TABLE-1  
SOME PHYSICAL AND CHEMICAL CHARACTERISTICS OF POMEGRANATE TYPES INVESTIGATED (1997-1998)

Types* →	Acar 1	Acar 2	Acar 3	Acar 4	Hek. 1	Hek. 2	Hek. 3	Taş 1	Taş 2	Leb.	Deniz
Fruit weight (g)	173.3	169.0	176.7	140.9	150.6	163.0	156.6	187.8	229.7	281.1	158.8
Skin bottom colour	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Skin upper colour and ratio (%)	Pink 70	Red 85	Pink 30	Pink 75	Pink 35	Red 65	Pink 50	Red 90	Red 60	Red 40	Pink 55
Skin thickness (mm)	3.23	3.19	2.82	3.24	3.37	3.46	3.38	3.59	3.22	2.64	3.56
Kernel colour	Clear pink	Dark red	Pink	Red	Pink	Dark pink	Clear pink	Red	Dark pink	Dark red	Dark pink
Wt. of 100 kernels (g)	24.1	28.4	32.6	29.7	27.3	32.8	26.4	27.8	41.4	32.5	27.8
Kernels (%)	56.2	59.7	54.6	43.4	50.8	60.6	48.5	61.3	60.9	51.8	52.6
Fruitlet hardness	Middle hard	Soft	Soft	Middle hard	Middle hard	Middle hard	Hard	Hard	Hard	Soft	Middle hard
Cracking	-	-	+	-	+	+	+	-	-	-	-
Taste	Sour	Sour	Sour	Sour	Sour	Sour	Sour	Sour	Sour	Sour	Sour
TSSC (%)	15.2	16.6	15.9	13.5	14.7	16.7	15.6	14.9	14.6	13.9	13.6
Total acid (%)	2.66	2.72	2.85	2.80	2.83	3.06	2.82	3.34	3.16	3.58	3.46

\* Hek: Hekimoglu; † Leb: Leblebicioglu

meant for table purpose, total acid requirement is less than 1% and red kernel colour<sup>4-6</sup>.

Consequently, in this study the present situation of pomegranate population in the region was determined by investigation of general characteristics of types. It is expected that this study will show a way to the future studies on especially plant biodiversity and conservation of pomegranate genotypes.

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