

PHYSICAL, CHEMICAL AND TECHNOLOGICAL FEATURES OF SOME POTATOES KINDS GROWN IN HATAY PROVINCE OF TURKEY

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ABSTRACT

In this research which aimed to determine of physical, chemical and technological features of some kinds of potatoes which are grown in Hatay, the exams of Agria, Alaska, Anais, Buchan, Daline, Eladie, Goliat, Harmony, Justine, Lilla, Marabel, Mortana, Safrane, Sebastian, Surde, Szazbouzcp, VanGogh and White Lady as material worked to fresh potatoes, chips and finger potatoes are used.

The direction of the knowledge has been obtained Agria, Anais, Alaska, Daline, Harmony, Justine, Safrane, Mortana, Van Gogh and White Lady potatoes varieties are appropriate for potatoes chips process, because of high dry substance rate and low reduced sugar rate. It is determined that the products produced with high dry substance rate potatoes have much more quality and fried products absorb less oil. Sebastian, Szazbouzcp, Goliat and Buchan potatoes varieties are suitable for finger potatoes process. Eladie, Anais, Mortana and Daline are appropriate for boiling process. Because these kinds of potatoes have low dry substance rate. Consequently their absorption rate is high. Van Gogh, Surde, Szazbouzcp, Alaska, Agria and Eladie are suitable for starch production, because of high starch they have. Because it is fixed that starch rates are higher than the others.

At the fresh lump, chips and finger potatoes some physical and chemical analysis had been practiced.

Obtained results; it had been seen that the kinds of Anais, Buchan, Daline, Szazbouzcp, Surde and Mortana is not suitable for been worked to chips and finger potatoes. The other kinds had been seen suitable for been worked to chips and finger potatoes.

INTRODUCTION

Potato are not only good sources of energy due to their carbohydrate content, but also contain various small and secondary metabolites, and are good sources of phenolic compounds (Giusti, Polit, Ayvaz, Tay, & Manrique, 2014). The native of the potato is America. It was brought to Europe by the Spanish and Portuguese in the 16th century (Ilisulu, 1957; Senol, 1970; Incekara, 1973).

The total world potato production is estimated at 382 million tonnes in 2014. Until the early 1990s, most potatoes were grown and consumed in Europe, North America and countries of the former Soviet Union. Since then, there has been a dramatic increase in potato production and demand in Asia, Africa and Latin America, where output rose from less than 30 million tonnes in the early 1960s to more than 165 million tonnes in 2007. China is now the biggest potato producer, and almost a third of all potatoes is harvested in China (96 mt), India (45 mt), Russia (30 mt), Ukraine (22 mt), USA (20 mt), and Turkey (4 mt), respectively (FAO, 2017).

Potato is an important source of carbohydrates, which play a role in human nutrition due to its high starch content. It also has a rich composition of minerals and some vitamins. Value-added products such as chips, frozen french fries, starch, mashed potatoes, potato flour, from potato are manufactured. Significant researches have been carried out in order

to determine the appropriate storage conditions as well as the raw material and variety characteristics in order to obtain the desired quality in the finished product (Samotus et.al., 1974; Talburt and Smith, 1986).

Studies on starch content of potato; it has been reported that starch is in wide limits such as 8-29% depending on the varieties and 63-83% of the potato dry matter is formed from starch (Lisinska and Leszczynski, 1989).

Pala and Saygi (1987) conducted a study on determining the suitability of 15 different types of finger potatoes for processing. After the ovaries have been preliminarily processed in the study, some of them have been boiled in water and some have been directly roasted. As a result of the experiment, P.squire, M.bord, Alpha and Sarıkız varieties were fried after being overcooked in water; Kingtone, Blanka and Nicola varieties were found to be more suitable for direct frying.

Didin (1999), a study on the suitability of 12 different potato cultivars grown in Nevşehir-Niğde region to chips and finger potatoes and the effects of storage on the quality of chips. Apply some physical and chemical analyzes to fresh potato tubers. In the study, eggs were subjected to frying after they had been subjected to necessary pre-treatments. Some physical and chemical analyzes were applied to the obtained chips. In the direction of the findings from this study, it was stated that the varieties of Granula were not suitable for cusing in all conditions, that only the fresh noodles of Quinta were stored for up to 6 months, and Ernie, Panda, Saturna and Tomensa were tolerant to storage for up to 9 months.

In this study; It is aimed to determine the physical and chemical properties of some potato varieties cultivated in Hatay region (36:12 E 36:52 N) of Turkey and to determine the technological characteristics of these potatoes in industrial terms.

MATERIALS AND METHODS

In this study, the tubers of Agria, Alaska, Anais, Buchan, Daline, Eladie, Goliat, Harmony, Justine, Lilla, Marabel, Mortana, Safrane, Sebastian, Surz, Szazbouzcp, Van Gogh and White Lady potatoes were used. Varieties were provided from Mustafa Kemal University in Hatay province and breeding farms operating on Reyhanli city road. In the experiment model was used 18 potato varieties grown on the farm.

Fresh potato varieties used in the research were studied by processing chips and finger potatoes. The assorted varieties were kept in room conditions and processed into chips and finger potatoes every 3 days. Until analysis to be applied, the products processed as chips were stored in polyethylene packages at room conditions while the products processed in finger chips were stored at 0 ° C. The slicing machine used in the slicing of the potatoes was developed as industrial type and the slice thickness was adjustable.

As a frying oil in the study; Hat Mar brand refined edible sunflower oil is used. The frying process was carried out at 180 ° C in a constant temperature, thermostat, fryer with the brand name Karteknik. In a party fry, potato slices weighing approximately 250 g were used, each being the same.

The potato varieties taken from the experiment were processed into potato chips according to the production steps shown in Figure 1. Approximately 1.5 kg of potatoes were used in each application. The potatoes used in the research were put into the peeling machine after washing and peeling of the shells was provided with the IMS brand peeler. The potatoes washed with water were then placed in the Ersoz slicing machine and sliced to a thickness of 1.6 mm.

Frying was carried out at 180 °. The frying time varied between 3-5 minutes depending on the type. Frying continued until the air bubbles ceased. A party of 8 varieties was used to fry potatoes belonging to the family and then changed.

After frying the chips were allowed to stand in room conditions for 5 minutes to drain the oil phase. At the end of this work, the samples were tightly sealed in the mouths of the bags with polyethylene bags. In this way, the bags covering the mouths were taken to the storage room for 15 days. The samples of chips were examined by subjecting them to some physical and chemical analyzes as envisaged after production. In each process, the varieties were processed with six repetitions.

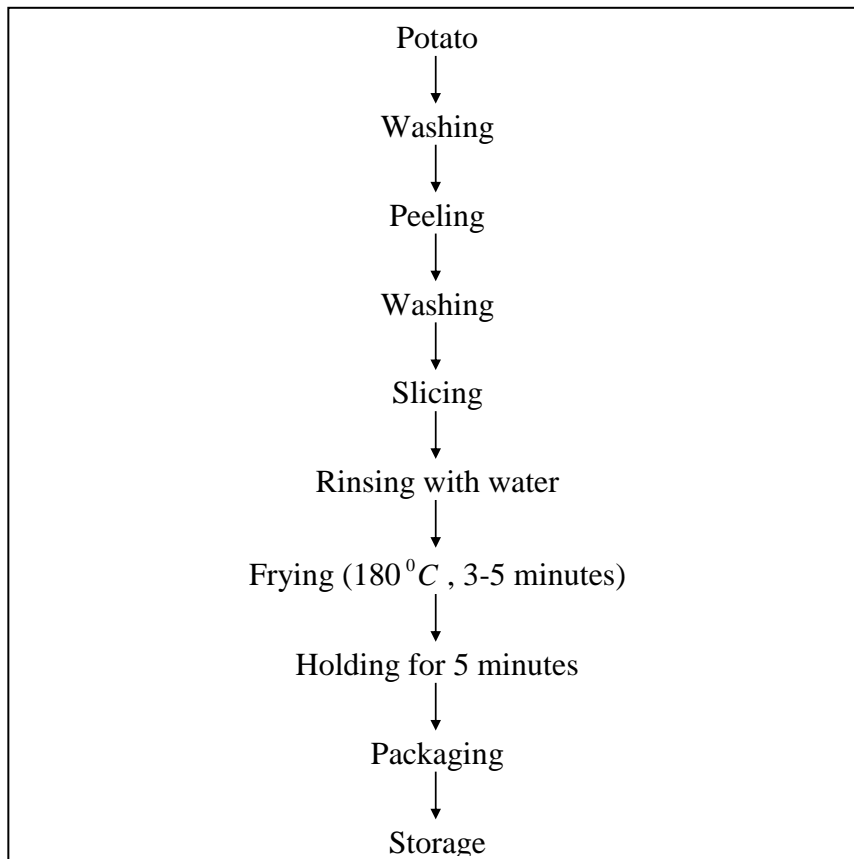


Figure 1. Potato chips production stages

Analyses

In potato varieties and finished product: tuber size, tuber shape, average tuber weight, eye depth (Lisinska and Leszcynski, 1989), crust and internal tissue color (Anon, 1993), specific gravity, pH-total acidity-L-ascorbic acid-total dry matter-ash (Cemeroğlu, 1992), starch (Anon, 1993), total sugar-reducing sugar-sucrose (Cemeroğlu, 1992), shell ratio-chips yield (Talbur and Smith, 1986), fat amount (TSE, 1991), color measurement (Hunter and Harold, 1987), free fat acid (Nas et. al., 1998) were analyzed.

RESULTS AND DISCUSSION

In this research some physical, chemical and technological properties of some potato varieties grown in Hatay ecological conditions were determined at harvest time. The physical and chemical properties of fresh ovules were examined first, then processed into chips and finger potatoes to determine the physical, chemical and technological properties of these products.

The mean length of the tubers of the different varieties ranged from 58.67 to 99.21 mm, from 41.89 to 51.66 mm, and the average weight ranged from 80.4 to 175.8 g.

Alaska, Szazbouzcp, Agria, White Lady and Daline varieties were small and other varieties were large nodule varieties when the width, height and weights of the tubers were taken into consideration.

When the ocular depth is taken into consideration, it is determined that the depth of the eye is between 1,075-2,463 mm. It has been determined that the depth of the eyes of the potato tubers is in the range of Justine, Szazbouzcp, Agria and Buchan varieties and moderate in the other varieties.

Tubular shape is round, oval, cylindrical or among them. It is generally observed that there is more round structure among the varieties.

It was observed that they are yellow and light yellow according to the crust color. In some varieties (Daline, Goliath, Lilla, Sebastian, Szazbouzcp), it was observed that the shell color was pinkish.

Harmony and Marabel varieties were found to have cream in the inner texture and yellow in the others.

Specific gravity values ranged from 1.024 to 1.087 (Goliat-Anais) in fresh nodules. The lowest specific gravity values were determined in the Goliat, Harmony, Justine, Marabel and Agria varieties respectively, and the highest specific gravity values in the varieties of Anais, Buchan, Szazbouzcp, Surde and Safrane respectively.

The dry matter content of fresh noodles ranged from 21.08 to 31.55% (Goliat-Szazbouzcp). The highest dry matter contents in fresh noodles were determined in Szazbouzcp, Anais, Surde, Buchan and Van Gogh varieties and the lowest dry matter contents in Goliat, Marabel, Mortana, Justine and Agria varieties respectively.

Starch content varied from 9.45% to 12.59% (Justine-Van Gogh) in fresh noodles. The highest starch contents in fresh noodles were; Van Gogh, Surde, Szazbouzcp, Alaska and Eladie varieties, while the lowest starch contents were found to have Justine, Anais, Lilla, Sebastian, Mortana and Buchan varieties.

The total sugar content of fresh noodles ranged from 0.222-0.691% (Goliat-Mortana). The lowest total sugar content was determined in the varieties of Goliat, Sebastian, Agria, Daline and Safrane, respectively, while the highest total sugar content was determined in Mortana, Lilla, Szazbouzcp, Justine, Marabel and Eladie varieties respectively.

The amount of invert sugar ranged from 0.080 to 0.548% (Alaska-Mortana) in fresh noodles. The highest invert sugar amounts were determined in Alaska, Goliat, Sebastian, Harmony and Agria varieties respectively in Mortana, Lilla, Van Gogh, Szazbouzcp and Safrane varieties respectively.

The rate of sucrose ranged from 0.076-0.242% (Safrane-Alaska) in fresh noodles. The highest amounts of sucrose were determined in the varieties of Alaska, Harmony, Justine and Eladie respectively and the lowest amounts of sucrose were in Safrane, Van Gogh, Daline, Agria and Anais varieties respectively.

The amounts of L-ascorbic acid ranged from 22.70 to 38.15 mg / 100 g (Mortana-Buchan) in fresh noodles. The highest amounts of L-ascorbic acid were found in Mortana, Harmony, Lilla, Alaska, Sebastian and Eladie varieties and the highest amounts of L-ascorbic acid were respectively Buchan, Justine, Agria and Goliat varieties.

The pH values ranged from 5.94 to 6.18 (Daline-Szazbouzcp) in fresh noodles. The lowest pH values were respectively Daline, Surde. The highest pH values in the Agria, Eladie, Goliat and Sebacitan varieties were determined in Szazbouzcp, Justine, White Lady, Marabel, Buchan and Alaska varieties respectively.

Total acidity values ranged from 0.378-0.755 g / 100g (White Lady-Mortana) in fresh noodles. It has been determined that the highest acidity values of the varieties of Mortana, Sebastian, Alaska, Eladie, Daline and Goliat have the lowest acidity values of White Lady, Harmony, Szazbouzcp, Agria, Lilla and Anais varieties respectively.

The amount of ash varied between 0.371-0.929% (Mortana-Szazbouzcp) in fresh noodles. The highest ash amounts were determined in Szazbouzcp, Sebastian, Eladie, Goliat, Agria, White Lady and Anais varieties respectively in Mortana, Surde, Buchan, Van Gogh, Harmony and Daline varieties respectively.

Chips yield varied between 33.74-42.47% (Justine-Safrane). The highest yields of crisps were determined in the varieties of Safine, Daline, Szazbouzcp, Alaska, Van Gogh and Surde, respectively, and the lowest yields of chips were determined in Justine, Sebastian, Eladie, Buchan, Agria, Harmony and Marabel varieties respectively.

The moisture content of the chips varied between 1.28-4.14% (Justine-White Lady). The highest moisture contents were chips produced from White Lady, Surge, Harmony, Lilla, Safrane and Alaska varieties and chips produced from Justine, Marabel, Van Gogh, Eladie, Mortana and Sebastian varieties respectively.

Fat amounts of crisps varied between 21.07-39.53% (Mortana-Surde). The lowest fat amounts were determined to have chips produced from the varieties Mortana, Goliat, Buchan, Agria, Szazbouzcp and Daline and the highest fat amounts were chips from Surde, Alaska, Eladie, Lilla, Sebastian and White Lady varieties respectively.

The amount of ash in chips varied from 2.095% to 3.761% (Daline-Marabel). The lowest ash amounts were found to be chips produced from Daline, Surde, Van Gogh, Mortana, Buchan and Sebastian varieties and chips produced by Marabel, Lilla, Anais, Alaska, Justine and Szazbouzcp varieties respectively.

The free fatty acid values of oil extruded from chips ranged from 0.361-0.583% (Eladie-Sebasitan). It was determined that the highest fatty acid values were extracted from the oils extracted from Eladie, Alaska, Justine, Buchan, Anais and Harmony varieties, respectively, in Sebastian, Agria, Surrey, White lady, Daline and Safrane varieties.

The mean a/b values of the crisps obtained from fresh tubers varied between (-0.1115) -(0.2537) (Van Gogh-Sebastian) depending on the variety. The varieties of Van Gogh, Anais, White Lady, Justine, Mortana, Agria and Harmony have low a/b values while Sebastian, Goliat, Alaska, Surde, Eladie, Daline and Buchan have high a/b values.

The moisture content of the finger potatoes varied between 40.61-62.67% (White Lady-Eladie). The lowest amounts of moisture were determined to be the fingers produced from the varieties of White Lady, Sebastian, Justine, Van Gogh and Buchan respectively and the highest moisture contents were determined to be the fingertips produced from Eladie, Anais, Mortana, Daline and Agria varieties respectively.

The fat content of finger potatoes varied between 17.37-33.45% (Mortana-Eladie). The highest fat content was determined to be fingerprints produced from Eladie, Sebastian, Buchan, Surde, Goliat and Anais varieties, while the lowest fat content was determined to be fingerprints from Mortana, Daline, Alaska, White Lady, Szazbouzcp and Agria varieties respectively.

The ash contents of finger potatoes varied between 1.106-1.770% (Marabel-Eladie). The lowest ash content was determined to be fingerprints produced from Marabel, Anais, Szazbouzcp, Mortana, Justine, Safrane and Daline varieties and the highest moisture contents were determined to be fingerprints from Eladie, Surde, Sebastian, Van Gogh, Goliat, Alaska and Agria varieties respectively.

The free fatty acid values of the finger potatoes ranged from 0.285-0.478% (Alaska-Lilla). The highest fatty acid values belong to the finger potatoes produced from the varieties of Lilla, Surde, White Lady, Marabel, Safrane, Goliat and Daline and the lowest acidity values belong to the finger potatoes produced from Alaska, Eladie, Anais, Harmony, Justine, Buchan and Sebastian varieties respectively. It has been identified.

CONCLUSION

It has been determined that Agria, Anais, Alaska, Daline, Harmony, Justine, Safrane, Mortana, Van Gogh and White Lady are suitable for cuisine processing. Sebastian, Szazbouzcp, Goliat and Buchan have been found to be suitable for processing fries.

It has also been suggested that varieties of Eladie, Anais, Mortana and Daline may be more suitable for starch production due to the high starch content of boiled potatoes, as well as Van Gogh, Surde, Szazbouzcp, Alaska, Agria and Eladie varieties.

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