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# Utilization of dried gooseberry in high nutritional value bakery products

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**Abstract:** Gooseberry (*Physalis peruviana,* L) has been cultivated in Egypt, India, South Africa, Australia, and England and because of its high antioxidants and fiber, was found to have substantial health benefits. The plant is relatively adaptable to a broad variety of soils and good crops are produced on poor sandy soil. The chemical composition, sensory evaluation color, texture, flavor, taste, and overall acceptability were determined. For various traits, the average scores of all the panelists were computed. Attributes of fresh and dried raisin and spices gooseberry fruits were evaluated. The dry matter, pH, total soluble solids, moisture, protein, oil, ash, dry matter, fiber ascorbic acid, antioxidant activity carbohydrate, water-soluble antioxidant phenolic, flavonoids, respectively.

Raisin gooseberry Four temperatures were investigated drying Processing time varied between 5-10 hours After processing, and raisin gooseberry with control, 40°C, 50°C, 60°C and 70°C ratios were found highly significant content and color data represented as *L*, a*, b**. Moreover, preparation of cookies from raisin gooseberry at levels 5, 10, 15, 20%, respectively, and the sensory properties were evaluated It could be concluded that the gooseberry (*Physalis peruviana,* L.) can be considered a good source of vitamin C, total phenolic content, flavonoids compounds, and antioxidant activity. The gooseberry was used to formulate some important bakery product like cookies were prepared from raisin gooseberry at level 5, 10, 15, and 20%. The organoleptic properties reported that the raisin gooseberry was added to wheat flour up to 15% to give the best cookies safety and high nutritional value.

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**Key words:** Gooseberry, Bakery Product, Juice, Spices, Raisin Gooseberry

## 1. Introduction

Nowadays, there is a tremendous a need decrease industrial pollution. Almost all countries are adjusting to this fact and attempting to modify their processes in order to recycle the residues collected (**Panwar and Broadway, 2015).** The majority of the fruit is grown for table purposes, but the distribution of harvested fruit is processed to a greater degree into various products such as fruit juice and the by-product acquired after juice extraction is called fruit pomace, a waste material with a high nutritional value (**Kodagoda and Marapana, 2017).** Fruit pomace is a waste that is a good source of high moisture content, dietary fibers, minerals, carbohydrates, and vitamin C, as well as 14-30% of crude dry weight fiber. In comparison to wheat and oat bran, fruit fiber often includes a larger amount of TDF (Total Dietary Fibers). It works in some food products as humectants and has sufficient water holding capacity (**Bhushan *et al.*, 2008).**

In Egypt, the cultivation, production and utilization of golden gooseberry are giving no attention. Fruit has a popular sweet taste with nature, high nutritive value and medical importance **Bakry (2003).**

Maybe the most essential medicinal plant in the conventional Indian system of medicine, Ayurveda, is Emblica officinalis, commonly referred to Indian gooseberry or Amla. There are good antioxidant activities in vitamin C, tannins and flavonoids found in amla Amla is successfully used in the treatment of diabetes mellitus because of its rich vitamin C content. It's one of the oldest fruits of India and is regarded as the “wonder fruit for health” **(Devi *et al.*, 2020).**

Medicinal plants have become a natural blessing for human life in order to promote a healthy life free of disease. Phyllanthus Emblica, commonly referred to as gooseberry, becomes widely distributed and has therapeutic effects against deleterious diseases in tropical and subtropical regions. The rich quantity of vitamin C, polyphenols like tannins, ellagic acid, gallic acid, flavonoids such as quercetin and rutin made Gooseberry a notable fruit. Emblica Officinalis (200-900 mg per 100 g of edible portion) is a natural antioxidant that is effective and has the richest natural source of Vitamin C. Emblica Officinalis is a natural and surprisingly effective anti-aging product. For the therapy of acidity and peptic ulcers, Emblica Officinalis is highly effective. Emblica Officinalis is rich in vitamin C, iron, calcium, essential amino acids and several other vitamins and minerals and anti-oxidants (**Kulkarni and Ghurghure, 2018).**

Indian gooseberry (*Emblica Officinalis* Gaertn) (*Euphorbiaceae*) does have a distinctive background of Ayurveda medicine and has a range of therapeutic effects and as a nutritional supplement, is increasingly used in Western countries. Its useful properties are believed to be a result of its antioxidant strength. In order to decide if there are any qualitative-quantitative variations, the research examined the chemistry and antioxidant properties of four commercial E. Officinalis fruit extracts. In the total phenol, total flavonoid, and total tannin assays, all extracts produced positive responses. The existence of predominantly (poly) phenolic analyses **(Poltanov *et al.,* 2009).**

In Egypt, India, South Africa, New Zealand, Australia and England, cape golden gooseberry (P. peruviana Linn., Solanaceae) has been cultivated and Its belongs to the family Euphorbiaceae and sub-family Phyllanthoidae **(Ramadan and Mörsel, 2003)**. Berries, because of their high antioxidants, vitamins, minerals and fiber, were shown to have important health benefits. After the Barbados cherry, the fruit is extremely nutritious and the best source of vitamin C in fruits. Edible fruit tissue from Gooseberry contains about three times more protein and 160 times more vitamin C than apple tissues **(Zhao, 2007).**

Due to their high astringency, the fresh gooseberry fruit is not common as a table fruit and their storability after harvesting is also reduced 5. Cold storage, sun-drying and hot air drying are the other ways of extending shelf life 6. There are many benefits to dehydration among these methods. Many drying methods are commercially available and quality requirements, raw material properties and economic conditions determine the choice of the optimal process (**Pareek, 2009).**

The aim of this research has been to assess the gooseberry as chemical, physical analysis, antioxidant and spice activity antioxidant, and raisin gooseberry. As well, raisin gooseberry was used to prepare cookies at levels 5, 10, 15 and 20%, respectively and finely sensory evaluated of cookies.

## 2. Materials and Methods

**Materials:**

This investigation was carried out at the Experimental Farm kom Hamada El-bohyraa, Egypt during two successive, winter seasons 2016\ 2017 to study the manufacture cape golden gooseberry (*Physalis peruviana,* L) two field experiments were conducted in Anova design with three replicates in this season.

Wheat flour (72% extract) was obtained from local market. The other stating materials used in preparation of cookies i.e., sugar, butter, fresh milk, sodium bicarbonate and baker's yeast were purchased from a local market.

Folin–Ciocalteau reagents, Gallic acid, Quercetin, DPPH· (2, 2-diphenyl-1- picrylhydrazyl) were purchased from Sigma Chemical Co. ( St. Louis, MO, USA).

**Methods:**

**Preparation of juice, spices and raisin gooseberry**

Gooseberry juice was prepared as follows: The dried gooseberries (10.0g dissolved in 50.0ml water) are ruptured for 5-10 seconds by very mild agitation in an electric blender. Then the resulting extract was centrifuged for 10 min at 1.400 g. The supernatants from the gooseberry juice centrifugation step were filtered and stored immediately at -20°C previous to analysis.

Gooseberry spices was prepared by drying the seeds at 40°C for 72 hours in an electric oven and The seeds were finely ground and stored in deep Frazier at -4°C for use.

Raisin gooseberry was prepared the seeds by drying in an oven ventilator at 40℃, 50 °C, 60°C and 70°C for time 17h, 15h, 13h, and 8 h and 1370 Rpm in laser tachometer general technologies corp. TA110. The seeds were finely ground and stored in deep Frazier at -4°C for use.

**Chemical and physical analysis of spices gooseberry:**

Moisture, protein content, total lipids, crude fiber and ash content were defined in accordance with **AOAC (2012).** Total carbohydrates were determined by difference according to **Pearson (1976).**

A pH meter (Corning pH/ion analyzer 350, Corning, NY) was used to determine the PH of the sample at 17 to 20°C. The percent of Total soluble solids (%TSS) was measured using Refractmeter apparatus according to **AOAC (2012).**

**Ascorbic acid determination of spices gooseberry:**

According to **Anonymous (1966),** ascorbic acid was derived from 2% oxalic acid and determined using 2, 6 dichlorophenolindophenol and it was determined according to **AOAC (2012)** using 2,6 dicholorophenol, indophenol dye.

**Total phenolic content**

According to **Qawasmeh et al. (2012),** the total phenolic (TP) banana peel extracts were determined spectrophotometrically by the Folin Ciocalteu reagent assay using gallic acid as standard. The absorbance was measured by a spectrophotometer (Unicum UV 300) at 750 nm. In the samples, the total phenolic content was expressed as a sample of mg gallic acid equivalents (GAE)/g dry weight. The triplicates of all samples were analyzed.

**Total flavonoids content**

According to **Eghdami and Sadeghi (2010)**, total flavonoids (TF) of green banana extracts were spectrophotometrically determined by the aluminum chloride method utilizing quercetin as a standard. Using a spectrophotometer (Unicum UV 300), the absorbance was measured against blank at 510 nm. Total flavonoids were expressed as mg quercetin equivalents (QE)/g of dry weight in the sample. The triplicates of all samples were analyzed.

**Antioxidant activity**

**DPPH· Free radical scavenging assay**

Determination of DPPH· free radical scavenging activity was calculated in green banana as per to **Ravichandran *et al.* (2012**). The mixture was vigorously shaken and allowed to stand at room temp. Butyl Hydroxy toluene (BHT, Sigma) has been used as positive control whereas the negative control is included the whole reaction reagent excluding the extracts. Then the absorbance was calculated against a blank at 515 nm.

The ability to scavenge the DPPH· radical has been measured using the following equation:

DPPH· scavenging effect (Inhibition %) = [ (Ac – As / Ac) × 100]

Where: Ac is the absorbance of the control reaction.

As is the absorbance in the existence of extracts of plants.

**Color analysis of dried and liquid spices gooseberry:**

Color of dried and liquid spices gooseberry was measuring the yellowness (*b* value), redness (*a* value) and brightness (*L* value) using a Hunter Lab. Colorimeter apparatus model D 25 according to **Francis (1998).**

**Sensory characteristics of dried and liquid spices and raisin gooseberry:**

Color, texture, taste, flavor, odor, and overall palatability of the dried and liquid spices gooseberry were assessed using 20 panelists. The panelists were asked to score the above attributes according to **Walts *et al.* (1989).**

**Chemical, physical analysis and antioxidant of raisin gooseberry**

Chemical, physical analysis, total phenolic acids, total flavonoids compounds, vitamin C and DPPH were determined according the obviously methods

**Preparation of different blends cookies from raisin gooseberry:**

In accordance with the **Kohajdová et al. (2014)** method, cookies were prepared. The cookie recipe was as follows: 150 g of fine wheat flour, 72 % extraction, 42.4 g of sugar, 39.75 g of shortening, 1.33 g of sodium chloride, 1.65 g of sodium bicarbonate and 18 mL of water. Fine wheat flour was substituted in the cookie recipe by raisin gooseberry preparations at a level of 5, 10, 15 and 20 %. In the consistent dough, the ingredients were mixed. Baking was performed in an electric oven for 8 min at 180 ° C. The cookies became cooled at room temp after cooking and placed in polypropylene bags for further analysis.

**Sensory evaluation of cookies from raisin gooseberry:**

Nine points hedonic scale method given by **Popov-Rajlič *et al.* (2013)** has been followed for performing the sensory assessment of cookies prepared with 5, 10 and 15% pumpkin seeds. It was performed using judges of faculty members from the Food Technology Research Institute, Agricultural Research Center. They were carefully chosen to assess the products for various sensory criteria, such as color, texture, taste, flavor and general acceptability. During the whole period of study, efforts were made to retain the same panel for sensory assessment. The judges were given plain water to rinse their mouth among the samples assessment.

**Statistical analysis:**

ANOVA has analyzed the data obtained in the current research. When a substantial variation (p b 0.05) was observed in a variable for all the analyses, the data mean test was used to assess the discrepancy among the samples. The findings were analyzed with the aid of SAS System for Windows SAS software **(2008).**

## 3. Results and Discussion

**Nutritional value of spices dried gooseberry:**

The physical and chemical characteristics of spices dried golden gooseberry were determined and the findings are reported in Table (1). The findings indicated that the physical properties as pH value and total soluble solids were 3.5 and 9.4 %. The percentage of TSS and pH values were close to that reported by **Abou-Gharbia and Abou-Tour (2001) and El Sheikha *et al*. (2008)** and were higher than that presented by **Abou-Farrag *et al*. (2013).**

Meanwhile, the proximate chemical compositions were determined and the findings have been shown in Table (1). From the results, it can be found that the crude protein (13.0%) was the same that reported by **Abou-Farrag *et al.* (2013)** (12.75%) for *P. pruinosa* fruits and **El Sheikha *et al.* (2008)** (13.18%) for *Physalis pubescens*. Crude ether extract of fresh cape gooseberry was 4.32%, this value agreed with the value reported by **Abou-Gharbia and Abou-Tour (2001) and Abou-Farrag et al. (2013)** who found that the crude ether extract was 5.70% and 4.96%. Total ash content of Cape gooseberry was

6.50% this means was higher than that presented by **Abou-Gharbia and Abou-Tour (2001)** (5.70%) and **Abou-Farrag et al. (2013)** (5.98%). On the other hand, crude fiber of cape gooseberry was 9.83% this value was lower than that reported by **Bakry (2003) and Abou-Farrag et al. (2013).**

Total phenolic acid was 8.07 mg GAE/100g sample and total flavonoids compounds was 39.74 mg QE/100g sample, as well as, ascorbic acid was10.45 mg/100g sample, in addition, Antioxidant activity as DPPH was 39.74 %, respectively. It is stated that Emblica officinalis has bioactive compounds such as tannins, terpenoids, saponins, flavonoids, ascorbic acids and several other compounds that have been confirmed to have various pharmacological activities such as antioxidant, antimicrobial, anti-inflammatory, antitussive, radio-protective, immunomodulatory, hepatoprotective, hypolipidemic and several other activities **(Hasan *et al.,* 2016).**

**Table (1). Nutritional value of spices dried from gooseberry.**

| **Nutritional value** | **Spices gooseberry %** |
|---|---|
| pH | 3.5±0.001 |
| Total soluble solids | 9.4±0.01 |
| Moisture | 2.03±0.001 |
| Protein | 13.0±0.12 |
| Fat | 4.32±0.05 |
| Total carbohydrates | 67.35±2.24 |
| Crude fiber | 9.83±0.15 |
| Ash | 6.50±0.08 |
| Total phenolic acids | 8.07±0.07 |
| Total flavonoids | 39.74±1.43 |
| Ascorbic acid mg/100gm | 10.45±0.17 |
| Antioxidant activity as DPPH% | 39.74±0.86 |

Means at the level of ≤ 0.05 with the same letter are not substantially different.

**Color measurement of spices and juice gooseberry:**

In the color measurement of food, the L*a*b* color space is the most widely used because of the uniform distribution of colors and because it is perceptually uniform, as per to Wu and Sun (2013).'' In Table (2**):** Hunter color of calculation of spices gooseberry in the user manual, digital colorimeter (Ultra Scan Vis stander box customer support side the mean value was recorded color scale lightness ( *L** ), redness ( *a** ) and yellowness ( *b** ) color difference relatively juice and spices goose berry were significant of lightness and yellowness.

The results obtained in the present study, the coordinate *a** and was found to be 10.33 and 10.68 and *b** were 30.47 and 26.10 in juice and spices. Meanwhile, *L** was 45.21 and 55.65 in juice and spices gooseberry. Changes in the L*, a*, and b* parameters are correlated with rises in carotenoid levels and pericarp chlorophyll loss, as explained in **Cárdenas-Pérez (2017).** Moreover, the color shift in fruits is attributable to the decrease in enzymes responsible for chlorophyll synthesis (green color compounds), whereas those that synthesize carotenoids and xanthophylls are activated; yellow and red colors are provided respectively by these substances. A reduction in brightness is caused by the double bonds breaking (oxidation) of these pigments, and following the development of the gray colors **(Novoa *et al.,* 2006).**

**Table (2): Hunter color measurement of spice gooseberry.**

| **Treatment** | ***L**** | ***a**** | ***b**** |
|---|---|---|---|
| Juice | 45.21±0.11 | 10.33±0.01 | 30.47±0.12 |
| Spices | 55.65±0.12 | 10.68±0.01 | 26.10±0.10 |

Means at the level of ≤ 0.05 with the same letter are not substantially different.

**Sensory characteristics of juice and spices gooseberry:**

In Table (3) the results from sensory characteristics of juice and spices in dried gooseberry showed that the color, flavor, taste, and overall palatability were the best (p≤ 0.05) in spice by 8.37, 8.25, 7.83, and 7.94, respectively. Followed by juice were 7.16, 6.66, 6.83 and7.51, respectively. While the texture was the lowest in the spices (7.29) and it was the highest in juice by 8.37. The color is broadly dispersed in fruits, vegetables, seeds, roots, among others, in nature, and is directly linked with other attributes of physical, chemical and sensory quality. There are a vast amount of pigments in foods, especially carotenoids, anthocyanins, and chlorophyll. There are many chemical and physical properties of natural pigments, which are mostly susceptible to oxidation, changes in pH, temperature, light and processing time **(Abdullah *et al.*, 2004).**

**Sensory characteristics of raisin dried gooseberry**

In table (4) the results reported that the sensory characteristic significant of raisin dried gooseberry the best value 60°C with 13 hour and 1366 Rpm |sec were found the lost value in control. Therefore, no significant detected in 50°c at 15 hour and give the best acceptability followed by raisin gooseberry in 60°C at 13 hours. Whilst, the drying raisin on 70°C for 10 hours was give darker color. This may be attributed to the accumulation of melanin brown/black pigments caused by polyphenol oxidase activity and non-enzymatic reactions when during drying, the raisins become darker. The golden raisins, to be clear, are immersed in hot water and handled with sulphur dioxide to avoid browning reactions **Williamson and Carughi, (2010).** Moreover, as certain caramelization and Maillard reactions can happen, the temperature rise can lead to a rise in hardness, resulting in a harder structure **(Segade *et al.*, 2013).**

**Table (3): Sensory characteristics of spices and juice gooseberry.**

| Treatment | Juice | Spices | L.S.D |
|---|---|---|---|
| **Color (10)** | 7.16$^{b}$ | 8.37$^{a}$ | 0.80 |
| **Texture (10)** | 8.37$^{a}$ | 7.29$^{b}$ | 0.80 |
| **Taste (10)** | 6.83$^{b}$ | 7.83$^{a}$ | 0.80 |
| **Flavor (10)** | 7.66$^{b}$ | 8.25$^{a}$ | 0.88 |
| **Over all palatability (10)** | 7.51$^{a}$ | 7.94$^{b}$ | 0.07 |

Means at the level of ≤ 0.05 with the same letter are not substantially different.

**Table (4): Dried Sensory characteristics of raisin dried gooseberry.**

| Treatment | Control | 40°C | 50°C | 60°C | 70°C |
|---|---|---|---|---|---|
| **Time (hour)** | 48 | 17 | 15 | 13 | 10 |
| **Rpm/sec** | 1374 | 1372 | 1370 | 1366 | 1360 |
| **Color (10)** | 4.70$^{b}$ | 6.80$^{a}$ | 8.40$^{a}$ | 8.30$^{a}$ | 7.30$^{a}$ |
| **Texture (10)** | 5.30$^{b}$ | 6.70$^{ab}$ | 8.50$^{a}$ | 8.00$^{a}$ | 6.60$^{ab}$ |
| **Taste (10)** | 6.30$^{b}$ | 6.49$^{b}$ | 8.10$^{a}$ | 8.80$^{a}$ | 6.10$^{b}$ |
| **Appearance (10)** | 7.20$^{a}$ | 6.80$^{a}$ | 8.80$^{a}$ | 9.30$^{a}$ | 7.00$^{b}$ |
| **Flavor (10)** | 6.80$^{a}$ | 6.50$^{b}$ | 8.60$^{a}$ | 8.50$^{a}$ | 7.40$^{ab}$ |
| **Over all acceptability (10)** | 6.9$^{a}$ | 6.80$^{a}$ | 8.50$^{a}$ | 8.50$^{a}$ | 7.30$^{ab}$ |
| **L.S.D** | 0.43 | 0.44 | N.S | 0.30 | 0.83 |

Means at the level of ≤ 0.05 with the same letter are not substantially different.

**Table (5): Chemical characteristics of raisin dried goose berry**

| Treatment | Control | 40°C | 50°C | 60°C | 70°C | L.S.D |
|---|---|---|---|---|---|---|
| Time (hour) | 48 | 17 | 15 | 13 | 10 | |
| Rpm/sec | 1374 | 1372 | 1370 | 1366 | 1360 | |
| **Moisture** | 1.14$^{ab}$ | 1.71$^{a}$ | 1.29$^{b}$ | 1.01$^{b}$ | 1.01$^{b}$ | 0.19 |
| **Protein** | 12.5 | 15.9 | 17.3 | 19.25 | 19.90 | 0.23 |
| **Fat** | 2.89$^{c}$ | 4.72$^{a}$ | 2.73$^{c}$ | 4.33$^{a}$ | 3.4$^{b}$ | 0.24 |
| **carbohydrates** | 70.63$^{a}$ | 64.94$^{c}$ | 65.55$^{b}$ | 63.64$^{c}$ | 66.76$^{b}$ | 0.31 |
| **Fiber** | 9.38$^{a}$ | 8.43$^{b}$ | 10.43$^{a}$ | 8.37$^{b}$ | 6.93$^{c}$ | 0.39 |
| **Ash** | 3.2$^{b}$ | 4.3$^{a}$ | 2.7$^{c}$ | 3.4$^{b}$ | 3.8$^{a}$ | 0.29 |

Means with the same letter are not substantially different at ≤ 0.05 level

**Chemical characteristics of raisin dried gooseberry**

The chemical characteristics of the gooseberry are given in Table (5). moisture, protein, fat carbohydrate, fiber and ash, with control, 40° c, 50°c, 60°c and 70°c were found to be 1.71, 19.90, 4.33, 70.63, 10.43, and 4.3%, respectively. **Sharoba and Ramadan (2011).** Reported that gooseberry contain ash, 2.7 % protein 12.5 and 2.89 % fat. Different studies have found carbohydrate values as 64.94 % and 70.63 % **(Osorio and Roldan, 2003).**

It has been shown that fruits, particularly gooseberries, provide significant advantages due to their high content of vitamins, minerals, and antioxidants (**Zhao, 2007).** Fruits with the highest content of nutrient-rich compounds are generally referred to as 'superfruits,' and supplementing the human diet with superfruits offers several health benefits (**Steven *et al.,* 2005).** Consequently, medicinal and food products based on these fruit types have become more and more common among consumers. They can be used with new flavors to enrich the diet, while providing a variety of natural ingredients that are of major importance. (**Steven *et al.,* 2005)**

**Physical characteristics of raisin dried gooseberry**

**Table (6)** Gooseberry is referred to as functional food compounds in it. For the golden gooseberry, there are several (phenolic) compounds **(Dinan et al. 1997)** and some of them have a good antioxidant property **(Chang et al. 2008).** Gooseberry is rich in phenolic compounds is following antioxidant capacity and total flavonoids **(Hakkinen *et al.* 1999). Valdenegro *et al.* (2013)**. Physical characteristics of raisin-dried gooseberry reported that the gooseberry was determined on a dry weight basis. The chemical composition of golden gooseberry was significant for the total soluble solids, total phenolic, ascorbic acid and antioxidant respectively, and is believed to help the fruit processing technology to be recognized. While, pH and total flavonoids compounds showed that no different significant was indicated.

The water-soluble extracts of E. officinalis have been able to reduce iron (III) and are also capable of donating electrons. This property indicates that the extracts will serve as terminators of the free radical chain, turning reactive free radical species into more stable nonradical products **(Dorman et al., 2004).** Transition metal chelation **(Kehrer, 2000)** is an effective antioxidant mechanism since these species have the ability to catalyze decomposition of hydroperoxide and Fenton-type reactions **(Dorman et al., 2003).** Plant extracts rich in polyphenolic components ought to be capable of complexing and stabilizing transition metals. Consequently, determining the iron (II)-chelating ability of the extracts was deemed important.

At chemical and physical levels, the raisins produced by the various methodologies showed no significant differences. However, compared to fresh grapes, it was found that the dried samples contained higher concentrations of total phenolic compounds, anthocyanins and tannins. The results of the sensory assessment revealed that dried grapes produced using various methodologies were comparable to commercial raisins (**Guiné *et al.,* 2015).**

**Table (6): Physical characteristics of raisin dried gooseberry**

| **Treatment** | **Control** | **40°C** | **50°C** | **60°C** | **70°C** | **L.S.D** |
|---|---|---|---|---|---|---|
| **Time (hour)** | 48 | 17 | 15 | 13 | 10 | |
| **Rpm/sec** | 1374 | 1372 | 1370 | 1366 | 1360 | |
| **PH** | 2.1 | 2.2 | 2.6 | 2.3 | 2.7 | n.s |
| **Total soluble solids** | 15.0 | 13.0 | 14.0 | 15.0$^{a}$ | 12.0 | * |
| **Total phenolic (mg/100gm)** | 2.41 | 2.43 | 3.95 | 3.92$^{a}$ | 2.81 | * |
| **Total flavonoids** | 0.013 | 0.110 | 0.016 | 0.012 | 0.110 | n.s |
| **Vit. C (mg/100gm)** | 4.7 | 10.0 | 11.15 | 11.7 | 12.0$^{a}$ | * |
| **Antioxidant activity DPPH%** | 32.02 | 30.83 | 47.43$^{a}$ | 31.62 | 30.43 | * |

Means with the same letter are not substantially different at ≤ 0.05 level

**Table (7): Sensory characteristics of raisin cookies gooseberry:**

| **Sensory properties** | **Control** | **5%** | **10%** | **15%** | **20%** |
|---|---|---|---|---|---|
| **Color (10)** | 7.25$^{c}$ | 7.50$^{ab}$ | 7.40$^{c}$ | 7.38$^{c}$ | 7.83$^{c}$ |
| **Texture (10)** | 7.60$^{b}$ | 7.33$^{c}$ | 7.58$^{ab}$ | 7.73$^{b}$ | 8.42$^{ab}$ |
| **Taste (10)** | 7.20$^{c}$ | 7.26$^{c}$ | 7.82$^{a}$ | 7.45$^{c}$ | 7.84$^{ab}$ |
| **Appearance (10)** | 7.66$^{a}$ | 8.77$^{a}$ | 7.75$^{a}$ | 7.87$^{ab}$ | 8.00$^{b}$ |
| **Odor (10)** | 7.84$^{ab}$ | 8.09$^{ab}$ | 7.83$^{ab}$ | 7.95$^{ab}$ | 7.88$^{c}$ |
| **Overall acceptability (10)** | 7.55$^{ab}$ | 7.69$^{b}$ | 7.75$^{c}$ | 8.76$^{a}$ | 7.84$^{ab}$ |
| **L.S.D** | **0.79** | **0.70** | **0.71** | **0.88** | **0.74** |

Means with the same letter are not substantially different at ≤ 0.05 level

The findings of the DPPH scavenging assay indicate that the extracts of E officinalis are able to scavenge free radicals at physiological pH and can therefore avoid free radical-mediated chain reactions from initiating and propagating by stabilizing reactive species before they can engage in deleterious reactions, such as hydrogen abstraction from susceptible polyunsaturated fatty acids **(Poltanov *et al.,* 2009).**

**Sensory evaluation of cookies from raisin gooseberry cookies:**

The results of the sensory evaluation of the cookies samples are shown in Table (7). All samples earned high scores for the total assessment in terms of sensory properties. The addition of raisin gooseberry had no influence ($P\geq0.05$) on the scores of color and appearance, flavor, body and texture, and properties of general acceptance. The cookies containing 15% raisin gooseberry was the most preferred by the panelists. There, the lowest significant the value color, texture, taste, appearance, odor and over all acceptability respectively on the sample control cookies according to **Einbond *et al.* (2004).**

**Conclusion:**

It can be inferred from the findings that a dried spice gooseberry highest liquid spices gooseberry in all characteristics. On the other hand, the raisin gooseberry on the 60° c on sensory evaluation physical characteristics, characteristic significant of raisin dried gooseberry the best value 60°c were founded the lost value in control. Therefore, it could be not significant at 50°C followed by 60°C.

All the sensory characteristics relatively higher significant color, texture, taste, appearance, odor, and overall acceptability with sample cookie 20% compared with the other samples cookies (5%, 10%, 15 % ). Thus, the lowest significant value color, texture, taste, appearance, odor, and overall acceptability respectively on the sample control cookies was 20%. Containing dried gooseberry coated was accepted by the panelists with some suggestions for further studies.

**References**


1. Abdullah, M. Z., Guan, L. C., Lim, K. C. and Karim, A. A. (2004). The applications of computer vision system and tomographic radar imaging for assessing physical properties of food. Journal of Food Engineering 61, 125 (2004).
2. Abou-Farrag, H.T., Abdel-Nabey, A.A., Abou-Gharbia, H.A. & Osman, H.O.A. (2013). Physicochemical and Technological Studies on Husk Tomato (*Physalis pruinose* L.) Alexandria science exchange journal, 34(2):204-221.
3. Abou-Gharbia, H.A. and Abou-Tour, E.M. (2001). Properties and processing of husk tomato (*Physalis pruinosa* L.). Minufiya J. Agric. Res., 26: 761-781.
4. AOAC. (2012). Official methods of analysis, 19th edition Association of Official Analytical Chemists. Washington DC.
5. Bakry, N.A. (2003 ). The chemical composition and processing of golden berry *(physalis peruviana. L*) grown in Egypt. M. Sc. Thesis, public health science ( food analysis ). High institute of public health. Alex. Univ., Egypt.
6. Bhushan S., Kalia K., Sharma M., Singh B., Ahuja P.S. (2008). Processing of apple pomace for bioactive molecules. Critical Reviews in Biotechnology. 2008; 28(4): 285-296.
7. Cárdenas-Pérez, S. (2017). ''Evaluation of the ripening stages of apple (golden delicious) by means of computer vision system,'' Biosystems Eng., vol. 159, pp. 46–58, Jul. 2017.
8. Chang JC, Lin CC, Wu SJ, Lin DL, Wang SS, Miaw CL, Ng LT (2008) Antioxidative and hepatoprotective effects of Physalis peruviana extract against acetaminophen-induced liver injury in rats. Pharm Biol 46:724–731.
9. Devi, S Gupta, E. and Maurya, NK. (2020). Development of a value added Amla product, Int. Arch. App. Sci. Technol; Vol 11 [2] June 2020: 90-93.
10. Dinan L, Sarker S, Sik V (1997). 28-Hydroxywithanolide E from Physalis Peruviana. Photochemistry 44:509–512.
11. Dorman HJD, Bachmayer O, Koşar M, Hiltunen R. (2004). Antioxidant properties of aqueous extracts from selected Lamiaceae species grown in Turkey. J Agric Food Chem 52: 762–770.
12. Dorman HJD, Koşar M, Kahlos K, Holm Y, Hiltunen R. (2003). Antioxidant properties and composition of aqueous extracts from Mentha species, hybrids, varieties, and cultivars. J Agric Food Chem 51: 4563–4569.
13. Eghdami, A., & Sadeghi, F. (2010). Determination of total phenolic and flavonoids contents in methanolic and aqueous extract of Achilleamillefolium. Journal of Organic Chemistry, 2, 81-84.
14. Einbon, L.S., REynertson, K.A., Luo, X., Basile, M.J & Kennelly, E.J (2004). Einbond, L.S., Reynertson, K.A Lou. X., Basile, J & Kennely, E.J. 2004 Anthocyanin an tioxidants. From edible. fruits food chemistry 103: 23-28.
15. El-Sheikha, A. F. Zaki, M. S, Bakr, A.A, El Habashy, M.M and D Montet (2010).

Biochemical and sensory quality of physailis (*Physalalis pubsscence* L.). Juice. Journal of food processing and preservation (34):M541-555.
16. El Sheikha, A., Zaki, M., Bakr, A., Magida, E, H. & Montet, M. (2008). Physicochemical Properties and Biochemical Composition of Physalis (*Physalis pubescens* L.) Fruits. Global Science Books, 124-130.
17. Francis, F. J. (1998). Color analysis in S. S. Nielson (ed), Food Analysis Maryland: Chapman and Hall.
18. Guiné RPF, Almeida IC, Correia AC, Gonçalves FJ. (2015). Evaluation of the physical, chemical and sensory properties of raisins produced from grapes of the cultivar Crimson. Journal of Food Measurement and Characterization, 9(3), 337-346.
19. Hakkinen SH, Karenlampi SO, Heinonen IM, Mykkanen HM, Riitta AT (1999). Content of the flavonols quercetin, myricetin, and kaempferol in 25 edible berries. J Agric Food Chem 47:2274–2279.
20. Hasan, R., Islam, N. and Islam, R. (2016). Phytochemistry, pharmacological activities and traditional uses of Emblica officinalis: A review, International Current Pharmaceutical Journal, January 2016, 5(2): 14-21.
21. Kehrer JP. (2000). The Haber-Weiss reaction and mechanisms of toxicity. Toxicol 149: 43–50.
22. Kohajdová Z., Karovičová J., Magala M., Kuchtová V., (2014). Effect of apple pomace powder addition on farinographic properties of wheat dough and biscuits quality. Chem. Pap., 2014, 68, 1059–1065.
23. Kodagoda K.H.G.K. and Marapana R.A.U.J. (2017). Utilization of fruit processing by-products for industrial applications: A review. International Journal of Food Science and Nutrition. 2017; 2(6): 24-30.
24. Kulkarni, KV. and Ghurghure, SM. (2018). Indian gooseberry (Emblica officinalis): Complete pharmacognosy review, 2(2): 2018; 5-11.
25. Novoa R, Bojaca M. and Galvis J. (2006). Fruit maturity and calyx drying influence post-harvest behavior of Cape gooseberry (*Physalis peruviana* L.) stored at 12 ºC. Revisita Agronomía Colombiana. 2006; 24 (1): 77-86.
26. Osorio D, Roldan J (2003). Volvamos al campo: manual de la uchuva. Grupo Latino LTDA, Bogotá.
27. Panwar M. and Broadway A. A. (2015). Development of value added biscuits by incorporation of fruit pomace and other ingredients: A survey. International Journal of Advanced Technology in Engineering and Science. 2015; 3(2): 2348–7550.
28. Pareek S. (2009). Processing technologies of aonla. In: Underutilized and Underexploited Horticultural Crops (K V Peter, ed.) pp. 283-308, New India Publishing Agency, New Delhi, 2009.
29. Pearson, D. (1976). The Chemical Analysis of Foods (7th Edition), Church-Hill Livingstone, London. 1976.
30. Poltanov, EA., Shikov, AN., Damien Dorman, H. J., Pozharitskaya, ON., Makarov, VlG., Tikhonov, VP. and Hiltunen, R. (2009). Chemical and Antioxidant Evaluation of Indian Gooseberry (Emblica officinalis Gaertn., syn. Phyllanthus emblica L.) Supplements, Phytotherapy Research, 23, 1309–1315 (2009)
31. Popov-Raljič J., Mastilovič J., Petronijevič J., Kevrešan Ž., Demin M. (2013). Sensory and color properties of dietary cookies with different fiber sources during 180 days of storage. Hem. Ind., 2013, 67, 123–134.
32. Qawasmeh, A., Obied, H. K., Raman, A., & Wheatley, W. (2012). Influence of fungal endophyte infection on phenolic content and antioxidant activity in grasses: Interaction between Loliumperenne and different strains of Neotyphodiumlolii. Journal of Agricultural and Food Chemistry, 60(13), 3381-3388.
33. Ravichandran, K.; Ahmed, A.R.; Knorr, D.; Smetanska, I. (2012). The effect of different processing methods on phenolic acid content and antioxidant activity of red beet. Food Res. Int. 2012, 48, 16–20. [CrossRef]
34. SAS System for Windows (Statistical Analysis System) (2008). Version 9.2. Cary, USA: SAS Institute Inc. S.
35. Segade, S., Giacosa, S., Torchio, F., de Palma, L., Novello, V., Gerbi, V. and Rolle, L. (2013). Impact of different advanced ripening stages on berry texture properties of 'Red Globe' and 'Crimson Seedless' table grape cultivars (Vitis vinifera L.). Scientia Horticulturae 160, 313 (2013).
36. Sharoba MA, Ramadan MF (2011). Rheological behavior and physicochemical characteristics of goldenberry (Physalis peruviana) juice as affected by enzymatic treatment. J Food Process Pres35:201–219.
37. Steven, G.; Pratt, M.D. and Matthews, K. (2005).Super Foods Rx: Fourteen Foods that Will Change Your Life; Harper Collins Publishers: New York, NY, USA, 2005.
38. Valdenegro ML, Almonacid S, Henríquez C, Lutz M, Fuentes L, Simpson R (2013). Effects of drying processes on organoleptic characteristics and the health quality of food ingredients

obtained from goldenberry fruits (Physalis peruviana). Open Access Sci Rep 2:642. doi:10.4172/scientificreports.642

39. Walts, B.M., Ylimaki, G.L. Jeffrey, L.E. and Elias, L.G. (1989). Sensory Methods for Food Evaluation, IDRG, Ottawa, pp: 6-9, 60-79.
40. Williamson, G., and Carughi, A. (2010). Polyphenol content and health benefits of raisins. *Nutrition Research*, 30, 511– 519.
41. Wu, D. and Sun, D.-W. (2013). ‘‘Colour measurements by computer vision for food quality control–A review,’’ Trends Food Sci. Technol., vol. 29, no. 1, pp. 5–20, 2013.
42. Zhao, Y. (2007). (Ed.) Berry Fruit: Value-Added Products for Health Promotion; CRC Press: Boca Raton, FL, USA, 2007.

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