A study to compare chemicals of natural tomato plant fruits and plastic house tomato fruits

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Absract

This study was conducted on tomato plants in Qasr -Akhyar area during the growing season 2022 to compare the physicochemical properties, chemical composition and effective chemical compounds of tomato fruits, where samples were collected of (natural tomato fruits that were grown by traditional methods and used for them Organic fertilizers and tomato fruits were planted in plastic houses and were used chemical fertilizers), the chemical analysis showed a difference in the properties and chemical between the two varieties, where the fruits of natural growth were more valuable in total acidity, percentage of dry matter, density, pH, mineral element nitrogen and the percentage of fiber, while the fruits of growth in plastic houses were more valuable in the total dissolved salts TDS, specific conductivity, moisture content, Ash content, acid equivalent ,solubility, percentage of organic matter, carbohydrates and lipids(Fats), protein, The metal elements (Cu, Zn, Mg Fe,) were estimated using the atomic emission technique, as well as other elements (Na, K, Ca, Li) using flame spectroscopy technique, and the results showed a superiority of the elements (Cu, Zn, Mg Fe, Na, K) in the tomato samples naturally, while the elements (Li, Ca) were in close proportions in both varieties.

The study included the detection of the active chemical compounds found in tomato fruits using water and organic solvents (methanol – ethanol- chloroform), the results of the qualitative chemical diagnosis showed that tomato fruits contain carbohydrates - phenols - flavonoids - proteins and amino acids - coniwans – - alkaloid glycosides - anthraconiwas - phytosterols - terpenoids - second terpenods - saponins - resines - coumarins - tannins - flubatanins in a varying proportion between extracts due to the difference between solvents and study samples.

The yield of chloroform extracts for natural tomato fruits was estimated at 15.8% and for plastic house fruits at 13.6%, while ethanol extracts were estimated at 27.9% for natural tomato fruits and for plastic house fruits at by 9.02% The methanol extracts were estimated yield for natural fruits by31.4% and the fruits of plastic houses by 55.8% and aqueous extracts were estimated at 54.98% for the fruits of natural and the fruits of plastic houses by 59.75%

The quantitative estimation of phenols outperformed the fruits of plastic houses by 0.088 mg/g on natural fruits by 0.017 mg/g and quantitative estimation of flavonoids The fruits of plastic houses outperformed by 0.53 mg/g on natural fruits 0.28mg/g, and quantitative estimation of alkaloids, the fruits of plastic houses outperformed

8.7mg/g on natural fruits. 7.2mg/g Quantification of glycosides6.34mg/g plastic house fruits outperformed 5.26mg/g natural fruits

الملخص :

اجريت هذه الدراسة علي نبات الطماطم في منطقة قصر الاخيار اثناء موسم النمو 2022 لمقارنة الخواص الفيزيوكيميائية والتركيب الكيميائي والمركبات الكيميائية الفعالة لثمار الطماطم حيت تم تجميع عينات من (ثمار طماطم طبيعية تم زرعها بطرق تقليدية واستخدم لها اسمدة عضوية و ثمار طماطم تم زرعها في البيوت البلاستكية واستخدم لها اسمده كيميائية)، اظهرت التحليل الكيميائية اختلاف في الخواص الفيز وكيميائية بين الصنفين حيت كانت ثمار النمو الطبيعي اكثر قيمة في الحموضة الكلية ونسبة المواد الجافة والكثافة و درجة الحموضة والعنصر المعدني الازوت(النيتروجين) و نسبة الالياف في حين كانت ثمار النمو في البيوت البلاستكية اكثر قيمة في مجموع الاملاح الدائبة والتوصيلية النوعية و نسبة الرطوبة والمحتوى الرمادي و المكافئ الحمضي و الكربوهيدرات و الدهون و البروتين ونسبة المادة العضوية .

وقدرت العناصر المعدنية(Mg Fe, Zn, Cu،) باستخدام تقنية الانبعاث الذرى وكذلك قدرت عناصر اخرى (Na ,K , Ca ,Li)باستخدام تقنية مطيافية اللهب و اظهرت النتائج وجود تفوق لعناصر (Cu ,Zn, Mg Fe, Na ,K)في عينات الطماطم طبيعي بينما عناصر (Li ,Ca) كانت بنسبه متقاربه في كلا الصنفين.

تضمنت الدراسة الكشف عن المركبات الكيميائية الفعالة الموجود في ثمار الطماطم باستخدام الماء والمذيبات العضوية (الميثانول-الايثانول –الكلوروفورم)،.اظهرت نتائج التشخيص الكيميائي النوعي احتواء ثمار الطماطم على الكربوهيدرات -الفينولات- الفلافونيدات-البروتينات و الاحماض الامينية –الكونيوانات-قلويدات – الجليكوسيدات –الانثراكونيونات -الفايتوسيترولات-التروبينات-التروبينات الثانية –الصابونيات-ا لراتينجات- الكومارينات –التانينات –الفلوباتانينات بنسبة متفاوتة بين المستخلصات و يرجع ذلك للاختلاف بين المذيبات وعينات الدراسة .

وقدرت نسبة مردود مستخلصات الكلوروفورم لثمار الطماطم الطبيعية ب15.8 % ولثمار البيوت البلاستكية ب13.6% اما مستخلصات الايثانول فقدر المردود فيها لثمار الطماطم الطبيعية ب27.9 %ولثمار البيوت البلاستكية ب9.02% اما مستخلصات الميثانول فقدر المردود للثمار الطبيعية ب31.4 % وثمار البيوت البلاستكية ب55.8 % والمستخلصات المائية فقدر المردود فيها ب 54.98 % لثمار الطبيعية وثمار البيوت البلاستكية ب59.75%

اما التقدير الكمي للفينولات فقد تفوقت ثمار البيوت البلاستكةب0.088mg/g على الثمار الطبيعية ب0.017mg/g والتقدير الكمي للفلافونيدات فقد تفوقت ثمار البيوت البلاستكية ب0.53mg/g على الثمار الطبيعية 0.28mg/gوالتقدير الكمي للقلويدات فقد تفوقت ثمار البيوت البلاستكية 8.7mg/gعلى الثمار الطبيعية 7.2mg/gالتقدير الكمي للجليكوسيدات فقد تفوقت ثمار البيوت البلاستكية 6.34mg/gعلى الثمار الطبيعية5.26mg/g

Introduction:

Tomatoes are considered one of the most consumed vegetables, as most of the mineral salts and vitamins are available, and tomatoes occupy the first place among vegetables because they contain many nutrients such as fiber, protein, fats, carbohydrates, antioxidants and other chemicals, and since the percentage of nutrients contained in these vegetables varies according to the environmental conditions in which these vegetables grow, and because of the many health benefits of tomatoes for the human body and for their frequent daily consumption, this research aims to study the properties Physiochemical of tomatoes and phytochemical screening and estimation of some active substances for tomato fruits

that have been grown in plastic houses (greenhouse) and compared with natural samples The determination of the natural properties of these vegetables is of great importance in determining the extent of their impact on vitality within the human body

Methods of work:

Samples of tomato plant fruits were collected from the Qasr Al-Akhyar area, which is located east of Tripoli along the coastal strip in Libya during November 2022, and they were classified into (Ta) natural tomato samples and (TB) plastic house tomato samples The samples were washed well and then cut into small pieces and dried naturally and placed in a well-ventilated place and left for a sufficient period to ensure complete drying, then washed the samples with distilled water and placed in the drying oven for 5 An hour was taken out and left to cool and then ground by means of an electric mill in order to turn it into a fine powder and then the powder was kept in a sterile glass container and a tight payment and kept in a cool place until use and away from sunlight

1-Physiochemical properties:

1-1-Moisture Content%: The moisture percentage of the samples was calculated according to the standard method (1990 FAO)[1]

1-2-pH:, then the pH value of all samples was recorded (Pearson 1976)

1-3-Total acidity :The Total acidity of the samples was calculated according to the standard method (AOAC1999):

1-4-Specific conductivity (Jones 2001)

1-5-total of dissolved salts .T.D.S: were calculated according to the method (White1969)

1-6-Acid equivalent: 100ml of sample solution was prepared and then titrated effortially against sodium hydroxide solution M0.2 using the pH device and the PH value was recorded against the added volume and according to the equivalence point V eq from the curve of the first derivative, the acid equivalent was calculated from the equation: Acid E qu/kg = NaOH (0.2)x V eq/1000g

1-7-Density: by using a density vial

1-8-Solubility: About 1 gram of the sample was weighed, then the 1%w/v solution was prepared using distilled water, then the solution was stirred for two hours using magnetic vibration, then the solution was filtrate and the weight of the filtrate was calculated and .then the percentage of insoluble substances in the sample was found

1-9-Determination of ash content and percentage of organic matter (FAO1990)[1]

1-10-Determination of the mineral element nitrogen: The mineral element nitrogen was determined for samples by Kaldahl method(Kjelahl et al-1883)

1-11-Fiber ratio: 2g of the sample was placed in a flask and added 200ml of sulfuric acid to it and boiled for 30 minutes After washing it with ether, it was transferred to a dish (dried and weighted) with boiling water After that, the water evaporates in a water bath and then the dish is dried at 100 C Weight and burning percentage was found Percentage of fiber = weight of crucible and sample before burning - weight of crucible and sample after burning/weight Dry matter X100

2-Determination of food compounds:

1-2-Determination of carbohydrates: according to the method of Dubois, et, al 1956, take 0.5g of the sample and add 5ml of TCA 20%, then mix was placed in glass tubes and then

separated by centrifuge for 10 minutes at a speed of 3000 revolutions / minute to obtain a floater Add to 1ml of phenol 5%, 5ml of concentrated sulfuric acid Shake the samples and leave them for 15 minutes and prepare standard solutions of glucose at a concentration of mg/ml (1000 ,0) The intensity of Optical absorption at 490nm wavelength

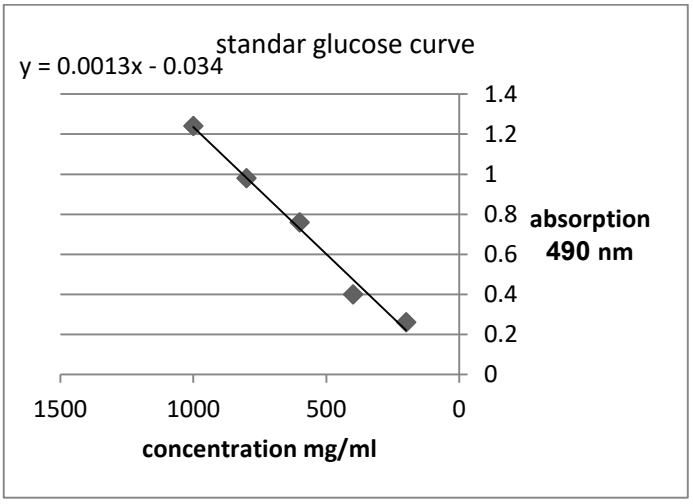


Fig. (1) Standard glucose curve

2-2-Determination of lipids(fats) according to the method of goldswothy, et, al 1972, take the remaining precipitate from the centrifugation process to estimate the previous carbohydrates and add 2ml(ether/chloroform1V/1V) Centrifuge separated for 10 minutes at a speed of 3000r/minute The floater was taken and 1ml of concentrated sulfuric acid was shaken The tubes are left for 10 minutes in a water bath at C 100 After the tubes have cooled, take 0.15ml of them and put them in other tubes and add1.5ml of the reagent (dissolve 76mg of Vanillin in 11ml of distilled water, 39ml of 85% phosphoric acid).
2.5g of oil (100 soy) was dissolved in 1ml of ether/chloroform solution V1/1V to obtain a concentration solution of 2500mg/ml A standard solution series was prepared at a concentration of (2500,0) mg/m and the tubes were kept in the dark for 30 minutes The optical absorption l intensity at the wavelength of 530nm The stander curve was drawn using the results of the standard solution reading

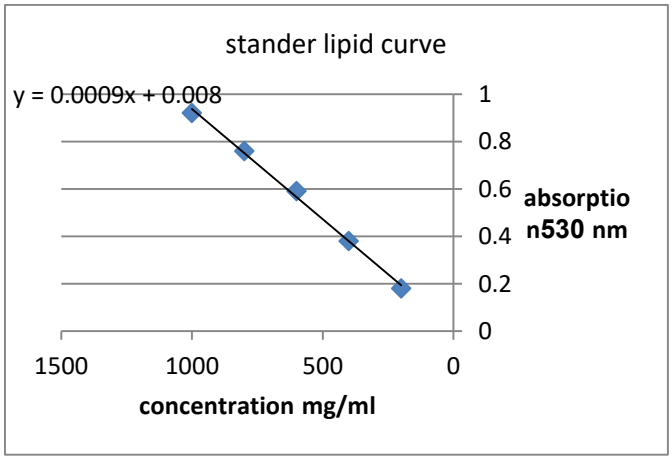
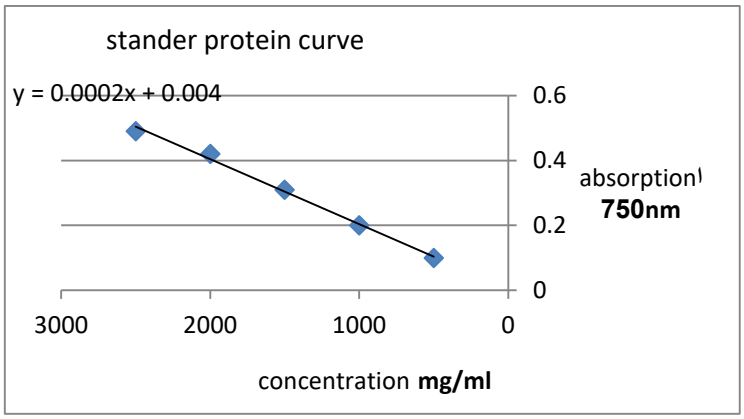


Fig. (2) Standard Lipid Curve .

2-3-Protein Determination :take the remaining precipitate from the centrifugation process to estimate the previous lipid and add 5 ml5 of NaOH(0.1N) solution, then prepare a standard protein solution by dissolving 3mg of albumin protein in ml3 of NaOH0.5N solution

to obtain a solution of 1000mg/ml Standard solution series was prepared at a concentration of (1000,800,600,400,200,0) mg/ml0.2ml of standard solution series and protein extract was placed in test tubes and 2ml of copper base sulfate reagent was added. Too 0.2 Folin-cicalteu reagent solution and keep the tubes in the dark for 30 minutes The optical absorption intensity at the wavelength of 750nm was read by the optical spectrometer and the stander curve was drawn using the results of the standard solution reading



Fig,(3) Standard Protein Curve

3-Determination of basic elements:

The percentage of basic elements was calculated according to the standard method FAO1999 where I weighed 1g of the dry sample in a porcelain crucible with known weight and then placed inside the combustion furnace at a temperature of 550C for five hours and then the ash was quantitatively transferred by distilled water to a 250ml flask containing 50ml nitric acid (1M) and then the solution was buried until the ash was completely dissolved by cooling the solution and completed to the mark and using the BWB device the concentration of the elements was read Na, Li ,Ca ,K and with the atomic emission device, the concentration of the elements Fe, Cu, Mg, Ze .,[2]

4-Chemical Screening of Active Compounds (phytochemical Screening)

4-1-Preparation of extracts

4-1-1-Preparation of aqueous extract: Take 4g of dry sample powder and add 120ml of distilled water and heat it in a water bath at a temperature of 70C for 10 minutes, then leave to cool, then filter and put in closed glass containers in the refrigerator until use[3,4]

4-1-2-Preparation of organic solvent extracts: Three solvents were selected (methanol - ethanol - chloroform), take 3g of dry sample powder and add 100ml of organic solvent to it and then put it on the device (JENWAY) 10025Stirrer for two days, then filter the solution and repeat The process is 3 times for each solvent, then the solution is filtered and the liquid extract is concentrated using a water bath at a degree (C 70-90) and placed in closed glass containers in the refrigerator until use[3,4]

4-2-Calculation of the yield of the extracts: prepare extracts in the same way as before, then distribute the extracts on glass dishes of known weight and placed in the electric dryer at a temperature of 40C to obtain dry matter and get rid of all the solvent and after complete drying, the dry matter, which is the raw extract, was collected and weighed with a sensitive balance and without Weight We calculate the yield using the following relation R=(Me/Mv)X100%:

R% yield of extracts, Me, Mass of dry plant matter extracted after evaporation of solvent Mv, Mass of dry plant matter used in extraction

4-3-Preliminary phytochemical tests (phytochemical screening) A set of qualitative examinations were conducted to identify the active chemical ingredients in the organic extracts of tomato fruit powder to test the presence or absence of phytochemical components as follows

4-3-1-Carbohydrate detection: It is detected using the following reagents after adding 5 ml of distilled water to the extract and filtering and then using filtrates for carbohydrate .presence tests

1-Molch test: The test is carried out by adding two drops of alcohol alpha-naphthol solution to the filtrate in a test tube that forms a purple ring at the confluence of the two liquids, indicating the presence of carbohydrates. [5]

2-Benedict test :Add Benedict's reagent to the filtrate and heated form a red-orange precipitate indicating the presence of reducing sugars. [6]

3-Fahling test .The extract is dissolved in dilute hydrochloric acid, then neutralized by adding a base, then added to it Fahling reagents A, B, and then heated to form a red precipitate indicating the presence of carbohydrates. [7,9]

4-3-2-Glucosides detection: The extract is dissolved in dilute hydrochloric acid and then .used to test glucosides

1-Burnrager modified: treated filtrate solution of ferric chloride and immersed in boiling water for 5 minutes and then cool the mixture and extract the solution with benzene and after separating the benzene layer treated with ammonia solution, the formation of pink color indicates the presence of anthrol glyxides. [7,9]

2-Labkal test: The extract is treated with sodium nitro proside in pridine and sodium hydroxide forming pink to red color indicating the presence cardiac gluxides. [8]

3-Keller Kilani test: The extract is mixed with 2 ml of ice acetic acid and drops of ferric chloride solution with a concentration of 2%, then the previous mixture is added to 2 ml of concentrated sulfuric acid The appearance of a brown ring at the confluence of the two liquids indicates the presence of cardiac glycosides[8]

4-3-3-Alkaloid detection: The extract is dissolved in dilute hydrochloric acid and then :filtered and the filter is used in the following tests

1-Meyer test: (0.68g of mercuric chloride (HgCl2 + KI) is dissolved with g2.5 of potassium iodide in 50ml distilled water) The reagent is added to the filtrate, so that a yellow precipitate indicates the presence of alkaloids. [22]

2-Test Wanger: (0.2g potassium iodide (I2+KI) dissolved with 10ml distilled water) Add the reagent to the filtrate so that a reddish-brown precipitate is formed indicating the presence of alkaloids

3-Test of DDR Agendorf (dissolved 2g of potassium iodide (Bi(NO3)+KI) with 0.2g of bismuth nitrate in 10ml distilled water) formation of a red precipitate indicating the presence of alkaloids. [7]

4-Hajar test (saturated solution of picric acid) the presence of alkaloids confirmed by the formation of a yellow precipitate [1]

4-3-4-Detection of phenols :

1-Ferric chloride test General test for phenols, the filtrate is treated with 3-4 drops of ferric chloride solution that form a bluish-black color indicating the presence of phenols. [11]
2-Potassium cyanide ferrous reagent to detect multiple phenols, taken from the extract 5ml, 1ml of ferric chloride solution 2% in ethanol and 1ml of ferrous potassium cyanide solution 1% red color indicates the presence of phenols. [10]

4-3-5-Detection of flavonoids

1-Basic test: The filtrate is treated with a few drops of a solution concentrating 2% sodium hydroxide, forming a dense yellow color and becoming colorless when diluted acid is added, indicating the presence of flavonoids. [8,19]
2-Lead acetate test a few drops of lead acetate solution to be added to the filtrate, so that a yellow precipitate indicated the presence of flavonoids. [16]
3-Shinoda test (selected glycosidic flavonoids): pieces of magnesium metal are added to the extract, followed by the gradual addition of a few drops of concentrated hydrochloric acid, the appearance of pink color minutes later indicates the presence of flavonoids[17]
4- test free flavonoids, taken from the extract 5ml, add 2.5ml of isoamylic alcohol, shake and balance when observing yellow colors, this indicates the presence of free flavonoids[13,14]

4-3-6-Detection of proteins and amino acids: The extract is first dissolved in 10 ml of distilled .water and then filtered, it has been used to detect proteins and amino acids
1-Mellon test: Drops of the Mellon test are added to 2 ml of filtrate, forming a white precipitate indicating the presence of proteins. [17]
2-Puret test: drops of 2% copper sulfate solution are added to 2 ml of filtrate in a test tube, followed by the addition of 1 ml of ethanol (95%), and pieces of solid potassium hydroxide, the appearance of pink color in the ethanol layer indicates the presence of proteins. [18]
3-Xantho protein test: The filtrate is treated with a few drops of concentrated nitric acid, the .formation of a yellow color indicates the presence of proteins
4-Ninhydrin test: The filtrate is treated with a solution of ninhydrin concentration (0.25%), then boiled for a few minutes, the appearance of blue or violet color indicates the presence of amino acids[16]

4-3-7- Detection of phytosterols

1-Salkovsky test: The extract is treated with chloroform and then filtered, then the filtrate is treated with a few drops of concentrated sulfuric acid, then shaken and then left until it settles, the appearance of a golden yellow color indicates the presence of phytosterols
2-Test for modified Berman Borchar: The extract is treated with chloroform, then filtered and then treated with a few drops of acetic anhydride, then boiled and then left to cool after adding drops of sulfuric acid, forming a brown ring at the confluence of the two liquids indicates the presence of phytosterols. [16]

4-3-8-General detection of terpenes: The extract is dissolved first in chloroform, then evaporated until dry, then add 2 ml of concentrated sulfuric acid, then heat the mixture for two minutes, the appearance of silver color indicates the presence of terpenoids. [17]

4-3-9-Detection of second terpenes: Copper acetate test: The filtrate is dissolved in water and then treated with 3-4 drops of copper acetate solution The appearance of emerald green color indicates the presence of second terpenes. [16]

4-3-10-Detection of quinines: 1 ml of sulfuric acid is added to 1 ml of plant extract, so that a red color indicates the presence of quinines. [18]

4-3-11-Detection of anthracinoids: A few drops of hydrochloric solution concentration and 2% to 0.5 ml of extract are added, the appearance of red color indicates the presence of antraquinones[18]

4-3-12-Detection of flobatanins: add a few drops of ammonia solution with a concentration of 10% To 1ml of extract the appearance of a pink precipitate indicates the presence of flobatanins. [18]

4-3-13-Detection of tannins:

1-Test as gelatin solutions is done by adding 1 ml of gelatin solutions containing sodium .chloride The formation of a white precipitate indicates the presence of tannins. [16]

2-Ferric chloride test, by adding 1 ml of ferric chloride solution 1% to 1ml of the extract to form a bluish-green precipitate indicating the presence of Katishik tannins [20]. But when a bluish-black precipitate is formed, it indicates the presence of Galician tannins. [21]

4-3-14-Detection of saponins：

1-Foam test: The extract is diluted by adding 20 ml of distilled water and then shaken in a graduated tester for 15 minutes, forming a 1 cm layer of foam indicating the presence of saponins[22]

2-Another foam test: in which 0.5 grams of the extract is dissolved in 2 ml of distilled water. If the foam produced lasts for ten minutes, it indicates the presence of saponins. [22]

4-3-15-Coumarin detection: By adding ML2 of sodium hydroxide solution10% to 1ml of the plant extract, the appearance of a bright greenish-yellow color indicates the presence of coumarins[12]

4-3-16-Detection of resins: add 1ml of distilled water acidated with hydrochloric acid 4% to 1ml of the extract, the presence of resins is indicated by the appearance of a clear turbidity in the solution[9]

5-Determination of some active substances in tomato fruits

5-1-Determination of glycosides: by adding 100ml of ethyl alcohol 80% to 10g of plant powder left for 24 hours and then filtered the solution to obtain the ethanolytic extract and concentrated the solution by heating in a water bath (70-90)C and then add 50ml of eter and 5ml of lead acetate solution 0.3M with shaking and repeating the addition of ether three times and extracted the top layer and dried at a temperature of 30C to obtain glycosides

5-2-Determination of alkaloids: By adding 250ml of ethyl alcohol 80% to 50g of plant powde concentratedthe solution and dissolve product or remaining in 100ml of hydrochloric acid 5% and then added 100ml of ethyl acetate separated the aqueous layer and added to it ammonia solution to make it basic PH=9 and then added to the extract 100ml of methylene chloride and for three times then take the bottom layer each time and then evaporate to obtain alkaloids

5-3-Determination of phenols: followed the method (Kaurandkapoor 2002) to determine phenols by mixing 0.2 ml of methanolic extract (3 g of dry matter with 30ml methanol 80%) with 1ml Follin reagent and 0.8ml sodium carbonate 20% and then leave it for 40 minutes away from light and then read the intensity of optical absorption at a wavelength of 760nm

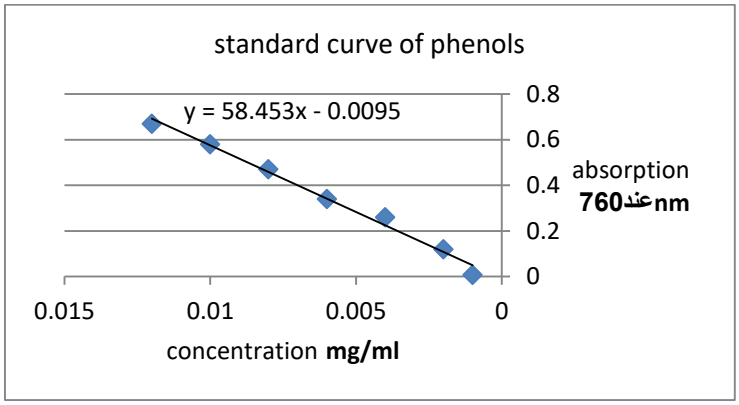
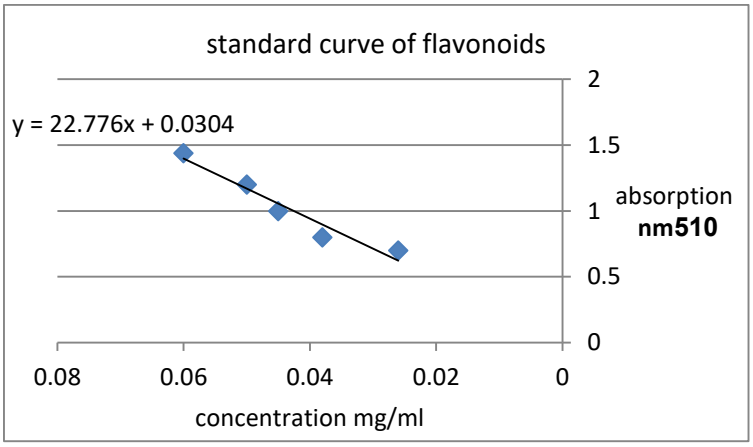


Fig. (4) Standard curve of phenols

5-4- Determination of flavonoids: The quantitative estimation of flavonoids was done by the method of aluminum trichloride and quercetin acid as a standard flavonoid and then the estimation by optical spectroscopy device and then reading the intensity of optical absorption at a wavelength of 510nm



Standard Curve of Flavonoids

Results & Discussion

1-Physiochemical properties

The results of Table (1) indicate a convergence in the pH of tomato fruits between tomato fruits Ta and tomato fruits Tb, and the total acidity of the fruits (titration acidity) had similar values between tomato fruits Ta and tomato fruits Tb with a slight superiority in the acidity of tomato fruits Ta. The results showed a slight superiority of the acid equivalent of tomato fruits Tb compared to tomato fruits Ta, the acidity of tomatoes is produced from the presence of organic acids such as citric and malic acid and inorganic dissolved in the soil (2018., Amraoui) The change in acidity values is due to several factors, the most important of which is the difference in the environment and stages of growth, during growth the conversion of organic acids into sugars, which leads to a decrease in titrated acidity and an increase in pH (2006). Bareiro) contributes to food safety and does not hinder food spoilage

by reducing the spread of microorganisms (2000., Giordano) and is a major factor in the selection of tomatoes (1998., Hong)

The results of Table (1) indicate a convergence in the values of specific conductivity and TDS between tomato fruits Ta and Tb fruits, The specific conductivity and the group of soluble salts TDS are an indicator of the nutritional quality of fruits (2018., Amraoui) A study (Anza.al.et 2005) on the effects of diversity and growing season on the sensory and nutritional quality of tomatoes grown with water showed that environmental and soil conditions and the percentage of salts Mineral soluble in soil has a specific conductivity effect and TDS on which explains the results obtained in our study that there is no difference between them,

the results of Table (1) showed that the fruits of tomato Tb in the percentage of moisture content with the fruits of tomato Ta and the moisture content is often related to the quality of the product (2018., Aboagye) and the moisture content can also have an impact on the rate of respiration and metabolic processes, which leads to deterioration of fruit quality (1987). al.et. Kadea) As a result of the catabolism of carbohydrates and fats in the fruits and can explain the increase in the percentage of moisture of the fruits Tb, as the environment with high humidity gains the fruits a high amount of moisture,

the results of Table (1) showed a superiority of the percentage of dry matter of fruits Ta compared to Tb fruitsThe dry matter content is one of the most important quality standards for fresh tomato fruits (2018). Aboagye)due to the increase in the percentage of dry matter in the fruits Tb to the lack of substances resulting from the process of photosynthesis and accumulated in the fruits, as a result of the low rate of respiration, which works to break down and demolish the nutrients stored in the fruits and thus remain the materials produced by the plant stored in the fruits as happens at the level of these fruits conversion to sugars and proteins and the activity of enzymes that contribute to the ripening of fruits as the decrease in dry matter in the fruits Ta can be explained by the exploitation of the plant of materials Resulting from the process of photosynthesis and accumulated in the fruits by the plant by respiration can also be explained by the difference in the proportion of dry matter between samples according to the climate in which the fruits are , and the results recorded in Table (1)asighficant superiority of ash content for tomato fruits Tb compared to tomato fruits Ta

the results of Table (1) indicate the slight superiority of the percentage of organic matter for tomato fruits Tb compared to tomato fruits Ta explain the decrease in the percentage of ash and organic matter in tomato fruits Ta due to the lack of migration of elements from the vegetative part to the fruits and we attribute the increase in the percentage of ash in the fruits Tb to the increase in fruit ripening and thus an increase in cell regulation, permeability and control of the activities of enzymatic systems

The results of Table (1) indicate the superiority of the fruits Ta with nitrogen content, can also explain the changes of nitrogen according to the different agricultural processes of water, fertilizers, plowing and soil, in addition to the method of irrigation and pesticides used, as well as explain the difference between the two samples to activate the migration of organic substances that contain, especially proteins that include nitrogen, which confirms their decrease when the fruits of Tb show the results of Table (1) The density of the fruits of Ta exceeds compared of the fruits of Tb The results of Table (1) indicate a convergence in

the solubility values between the fruits of tomato Ta And the fruits of tomatoes Tb.,The results of Table (1) show the percentage of fiber to The fiber percentage of the fruits of Ta is higher compared to the value of Tb

Table (1) Chemical Properties of Tomato Fruits

The properties	natural tomato fruits(Ta)	plastic house tomato fruits(Tb)
Moisture content	%5.77	%1173
Percentage of dry matter	%94.23	%88.12
PH	3.76	3.64
Total acidity	0.063	0.049
Acid equivalent	53.5	64.67
Specific conductivity	µs/cm1058	µ S/cm 1206
TDS	ppm1052	ppm 1203
Ash content	%6.49	%10.15
Percentage of organic matter	%30.47	%34.71
Mineral element nitrogen	24.62	16.26
density	1.0085	1.0033
solubility	%98.17	%99.27
Percentage of fiber	%1.3	%0.86

The results of Table (2) showed a superiority in the content of carbohydrates, lipids and protein of Tb fruits, the carbohydrate content of fruits is due to organic fertilizers, as organic fertilizers have a role in increasing the nutritional content of tomatoes. The superiority of Tb fruits in protein content compared to Ta fruits can also be explained by the stability of temperature in the optimal range of protein synthesis, and the difference in protein content is due to other environmental pressures Other explains the low fat content of fruits Ta to the high respiratory rate, which results in the stimulation of enzymes responsible for the breakdown of fat and its exploitation by the plant in the stages of growth, as for the fruits of Tb, it was found that the accumulation of fat in the content of the fruit as a result of the decrease in the respiratory rate

Table (2)food compounds Nutrients

Matter mg/g	natural tomato fruits(Ta)	plastic house tomato fruits(Tb)
carbohydrates	4.37	7.41
Lipids(fats)	1.67	3.07
proteins	0.57	1.61

The results shown in Table (3) indicated the superiority of tomato fruits Ta in the percentage of elements (Na, K, Ca), while the percentage of (Li) element was equal in both types

Table (3) Mineral Elements

Element%	natural tomato fruits(Ta)	plastic house tomato fruits(Tb)
Na	1.2	0.2
Li	0.4	0.4
K	5.7	0.8
Ca	3.1	2.5

The results shown in Table (4) show the superiority of tomato fruits Ta in the concentrations of elements (Fe, Mg, Cu, Zn) compared to Tb tomato fruits

Table (4) Basic Elements

	Element%	natural tomato fruits(Ta)	plastic house tomato fruits(Tb)
	Fe	0.435	0.343
	Mg	0.155	0.114
	Cu	0.063	0.032
	Zn	0.13	0.08

The results of Table(5) for qualitative chemical detection showed that tomato fruits contain carbohydrates, phenols, flavonoids, proteins, amino acids, alkaloids, glycosides, tropines and phytocitruls in all extracts, while coniwans have not been proven in ethanol extract, while anthracones, second trobines, sapons and coumarins have not been proven in chloroform extract and resins have been proven in amethanol extracts. And ethanol only and phlobatanins proved to be present in natural fruits in ethanol extract only, note that the presence of active substances in tomato fruits in a varying proportion between extracts due to the difference between solvents and study samples

Table(5)phytochemical screening

solvents								matters using/tests	Active matter
aqueous		chloroform		ethanol		methanol			
Tb	Ta	Tb	Ta	Tb	Ta	Tb	Ta		
++ +++ -	++ +++ -	+ - -	+ - -	+ + ++	++ +++ +	++ +++ ++	++ +++ -	Molch test Benedict test Fahling	carbohydrates
+ +++ +	+ + +	+ + ++	+ + +	++ + +	+ + +	+ + +	- - -	Burnrager modified Keller kilani test Labkal test	glycosides
++ + + +	+ + + +	+ + + +	- + + +	- + + +	- + + +	- + + ++	- - + ++	Meyer test test DDR Agendorf test Wanger Hajar test	alkaloids
+++ ++	++ ++	++ -	+ +	++ ++	+ +	++ +	++ +	Ferric chloride test Potassium cyanide ferrous	phenols
++ ++ + ++	++ + ++ +++	+ - + +	+ - + +	+ + + +	++ + ++ ++	++ + ++ +++	++ ++ ++ ++	test free flavonoids Shinoda test Basic test Laed acetate test	Flavonoids
+ ++ ++ ++	+ + ++ -	- - + -	- - + -	+ + + +	+ + + +	+ + ++ -	+ ++ ++ -	Mellon test Puret test Xantho protein test Ninhydrin test	Proteins and amino acids
+ +	+ +	+++ ++	++ +	+ +	+ +	++ ++	+ +	Salkovsky test Berman Borchar modified test	Phytosterols
+	+	+	+	+	+	+	+	concentrated Sulfuric acid	terpenoids

+	+	-	-	+	+	+	+	Copper acetate	Second terpenods
+	++	+	+	-	-	+	++	concentrated Sulfuric acid	Coniwans
+	+	-	-	+	+	+	-	hydrochloric acid 2%	Anthra coniwans
-	-	-	-	-	+	-	-	Ammonia solution 10%	Flubatanins
- +	- +	+ +	+ +	- +	+ +	+ +	+ +	%1test gelatin Ferric chloride test	Tannins
++	++	-	-	+	+	++	+	Foam test	Saponins
+++	++	-	-	+	++	+	++	Sodium hydroxide 10%	Coumarins
-	-	-	-	+	-	++	+	hydrochloric acid %4	Resins

(+++)present in a very high concentration (++)present in moderately high concentration(+)present in a small concentration (-)not found

The results in Table (6) showed a superiority in the content of phenolic compounds and the content of flavonoids, alkaloids and glycosides of Tb fruits compared to Ta fruits, tomatoes are one of the most important vegetables rich in antioxidants and phytochemicals beneficial to health (Strack., 1997; Suganthi., 2017) are phenolic compounds (Taveira et al., 2012), and we can also explain the increase in the content of phenolic compounds, flavonoids, alkaloids and glycosides obtained in fruits Tb by increasing the percentage of moisture accompanied by the proliferation of fungi and parasitic ones, which stimulates the production of phenolic and flavonoid compounds as well as the production of lycopene in fruits (2018., Nikolaose et, al) in addition to the role of fertilizers in improving the yield of antioxidants in fruits (2006). Hamouz,et,al)and is likely to return a decrease in For the content of phenolic and flavonoids in fruitsTa (to the effect of growing conditions on the formation of phenolic compounds (2003., Howard.)

Table (6) Content of secondary compounds in tomato fruits

Active matter mg/g	natural tomato fruits(Ta)	plastic house tomato fruits(Tb)
glycosides	5.26	6.34
alkaloids	7.2	8.7
phenols	0.017	0.088
flavonoids	0.28	0.53

The results of Table (7) show the percentage of yield R of the extract of tomato fruit powder, where the fruits Ta excelled in ethanol and chloroform extract by giving them the highest yield compared to the fruits of Tb and the fruits of Tb in methanol and aqueous extract and explains the difference in the percentage of tomato fruit yield by the conditions in which the plant is (heat, humidity, exposure to parasites and insects), which is a primary catalyst for the production of secondary metabolites, and can also explain the difference by region according to different agricultural operations (2009). Agbede)so that it worksOrganic fertilizers to increase the yield of tomato fruits. (Kitabala et al., 2016

Table(7) of yield yields of extracts

the extracts%	natural tomato fruits(T)	plastic house tomato fruits(Tb)
methanol	%31.4	%55.8
ethanol	%27.9	%9.02
chloroform	%15.8	%13.3
aqueous	%54.98	%59.75

We conclude from this study that there are slight differences in the physiochemical properties between the two varieties, but they contain the same active chemicals, and note the superiority of natural fruits in the percentage of mineral and basic elements and the superiority of plastic house fruits in the percentage of nutrients and the proportion of some active substances

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