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Study of some biochemical constituents of peels and pulps of Pomegranate (*Punica granatum*)

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ABSTRACT

The pomegranate (*Punica granatum*)fruits which include (Yemenian, Egyptian and Iraqi pomegranate (unripe and fully ripe) were collected from Babylon city market .The peels and pulps of these fruits were separated, dried, powdered and extracted to study some bio chemical constituents such as Fiber%,Fat%,ph, Na and K elements. The some active compounds were studied such as Gallic acid, Comuranin and tannic acid are analyzed by TLC. Owing to this study Yemenian pulp had the highest quantity of Na whereas Egyptian pulp of pomegranate had the lowest unripe Iraqi pulp of pomegranate had the highest amounts of k, whereas Egyptian peels and pulps were the lowest two. The active compounds study indicated that Iraqi unripe peel the highest quantity of comuranin and tannic acid compared to the others where as they had the lowest quantity of these acids in pulp part of pomegranate.

Key word: pomegranate peel, Gallic acid, Comuranin.

1. INTRODUCTION

Pomegranate (*Punica granatum*) is a small tree or shrub which is native for Asia. The peels and pulps of pomegranate do not consume by human because they are unpalatable, but they contain more antioxidants power than many sources such as green tea and red wine and they are a rich sources of bio active compounds such as poly phenols, anthocyandins, Flavinoids and minerals mainly potassium, calcium and sodium. Pomegranate and their constituents have safety been consumed for centuries without adverse effects.

Pomegranate seeds are also a rich source of biological compounds. There are many advantages of peels such as prevents wrinkles and other signs ageing, act as an effective scrub ,natural moisture ,natural sun screen ,acts against heart disease in floatation ,diabetes, dental plaque intestinal infection and dysentery (4,5)also it used in making jams and jelly. Pomegranate peel had the highest antioxidants activity among the pulp and seed fractions of 28 varieties of fruits abundant in china. Compared to the pulp the inedible pomegranate peel contains as much as three times of polyphenols such as tannins, catechins and gallocatechins. Poly phenols were lower in fully ripe fruits than unripe and the amounts of Na, K were highest in fully ripe fruits. Photo chemicals compounds naturally occurred in plants such Flavonoids Carotenoids and Coumarins. Coumarins occur in pomegranate fruits in follow to a family of benzophenones as shown in the structure below:

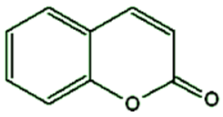

Figure.1.Coumarin

Coumarin: Coumarin ring is prevalently applied to construct several functional Molecules in the medicinal field. Gallic acid is the second compounds that found in pomegranate which characterized by HPLC. Gallic acid is used as a standard for determining the phenols constituents and used in pharmaceutical industry.

The structure of Gallic acid as show below: The other type of polyphenol occurred in pomegranate is tannic acid which is already present in woods like dak and walnut. Tannic acid is responsible for the activity against bacteria of medical importance.

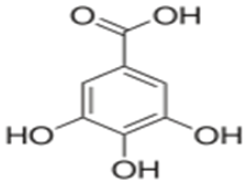

Figure.2.Gallic acid

2. MATERIALS AND METHODS

Pomegranate fruits of three different countries (Iraq, Yemen and Egyptian) were collected from the local market in the city of Babylon /Iraq. The peels and pulps of pomegranate were separated and dried in sun shade the dried pulps and peels were powdered in electric blender and stored in plastic bags for the next steps.

The sample of powders were extracted by using distilled water in Chemistry department of our college to estimate Na and K elements, so the sample were digested by using concentrated HNO_3 and $HClO_4$,the diluted digests were analyzed using Flame photometer some physical and chemicals constituents were estimated such as Moisture,

Fiber, Ash, Fat, and PH. The active fractions analyzed by TLC (High performance Chromatograph) on Cellulose Plate.

3. RESULTS AND DISCUSSION

Some physico Chemical Constituent's at pomegranate peels and pulps were shown in Table1.

Table.1.Physio Chemical Constituents at pomegranate peels and pulps

Type of sample	Moisture %	Fiber%	Ash%	Fat%	PH	Concentration Na/ppm	Concentration K/ppm
Yemeni peel	0.1	5.15	0.1	1.99	6.33	21	37
Yemeni pulp	0.6	4.8	0.12	1.89	6.14	27	32
Egyptian peel	0.18	3.11	0.57	2.0	3.18	23	28
Egyptian pulp	0.24	3.01	0.62	2.30	3.44	20	31
Ripe Iraqi peel	0.30	3.29	0.21	1.95	5.32	25	35
Ripe Iraqi pulp	0.6	3.34	0.11	1.86	5.14	22	33
Unripe Iraqi peel	0.7	2.84	0.31	2.13	5.12	26	35
Unripe Iraqi Pulp	0.9	2.18	0.57	2.16	3.88	24	38

Among all the extracts Table-1- Showed that unripe Iraqi pulp pomegranate had the highest moisture whereas Egyptian pulp had the lowest in the same table Yemenian peel had the lowest moisture % because it has a hard skin whereas the Iraqi peel pomegranate had the highest Yemenian peel had the highest fiber% whereas unripe Iraqi peel had the lowest in the same table Yemenian pulp had the highest fiber% whereas the Iraqi unripe pulp had the lowest fiber% Egyptian pulp had the highest fat% as shown in the same table where as Yemeni pulp was the lowest fat %. The highest PH was Yemenian peel whereas the lowest PH was Egyptian peel as shown in table 1. From the table we can show that Yemenian had the highest constituents at Na whereas Egyptian pulp was the lowest one. Iraqi pulp had the highest amount of K whereas Yemenian Pulp had lowest K amount among the extracts.

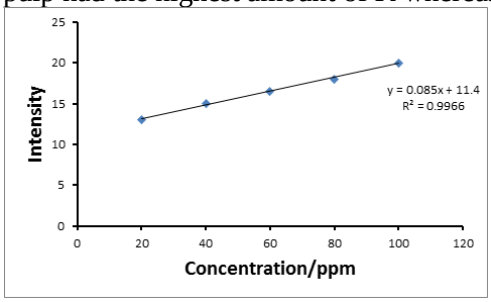

Fig.1.Calibration curve of Na ion

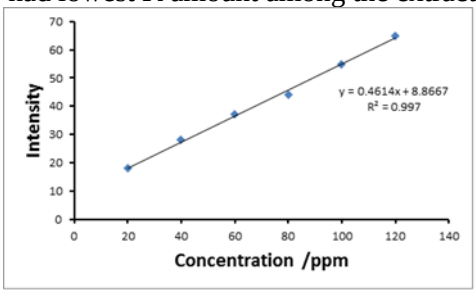

Fig.2.Calibration curve of K ion

Table.2.Some active Compounds in pomegranate peels

Type of sample	Active Compounds		
	Gallic acid ppm	Coumarin ppm	Tannic acid ppm
Egyptian peel	16.3	U.D.L	6.3
Yemeni peel	17.3	U.D.L	8.3
Ripe Iraqi peel	5.2	U.D.L	7.1
Unripe Iraqi peel	3.1	23.9	22.9

U.D.L It means that the quantity is under than the minimum detection levels .from Table -2- above we can show that yemenian peel pomegranate had the highest quantity of Gallic acid whereas unripe Iraqi peel had the lowest amount. From the same table coumarian or coumaric acid declared that unripe Iraqi peel pomegranate was the unique one which had 23.9 ppm whereas the others were lowest than the detective levels unripe Iraqi peel had the highest amount of tannic acid whereas Egyptian peel pomegranate had the lowest one, from the results we can show that Iraqi unripe peel pomegranate was rich in tannic acid and Gallic acid as compared with the study conducted in Tunisia which where 0.31ppm, and 0.030 ppm for tannic and gallic acid sequently.

Table.3.Some active compounds in pomegranate pulp

Type of sample	Active Compounds		
	Gallic acid ppm	Coumarin ppm	Tannic acid ppm
Yemeni pulp	3.1	34.1	17.1
Egyptian pulp	12.4	44.2	3.2
Ripe Iraqi pulp	23.4	11.73	13.6
Unripe Iraqi pulp	5.5	U.D.L	8.3

From table 3 above, we can see that ripe Iraqi pulp has the highest quantity of Gallic acid whereas Yeminian pulp had the lowest one. From the same table it indicated that Egyptian pomegranate pulp had the highest quantity of coumarian whereas unripe Iraqi pulp had U.D.L quantity Yeminian pulp pomegranate had the highest quantity of tannic acid whereas Egyptian pulp had the lowest quantity. Table 3 showed that fully ripe Iraqi pomegranate had higher quantity of Gallic acid, Coumarin and tannic acid compared with unripe Iraqi pomegranate, so our study agree with researcher.

4. CONCLUSION

The results from the present study suggests that pomegranate peels can be used as a natural antioxidant since it is nearly priceless, safe and induced powerful antioxidant, the study of recommends, particularly, to use pomegranate peels several fields for human health such as focusing on treatment and prevention of cancer, cardiovascular disease dental condition also arthritis and obesity.

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