IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Quantitative Estimation And Comparison Of The Total Phenol Content (TPC) Of Different Peel Extracts Of Punica granatum L.During Two Different Seasons Of Saurashtra And Ahmedabad Region Of Gujarat

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Abstract: Pomegranate is one of the oldest known edible fruit which is predominant member of Punicaceae family. It is a large deciduous shrub or small tree native to Asia. The present study focus on the quantitative estimation and comparison of the total phenol content (TPC) of different peel extracts of *Punica granatum* L. peel during two different seasons of Saurashtra and Ahmedabad region of Gujarat state. Quantitative eastimation of *Punica granatum* L.peel was performed using two solvents (1) Methanol and (2) acetone. This study was conducted during two different seasons of Saurashtra and Ahmedabad region of Gujarat (1) Ambe bahar (Fruit harvest in June- August) and (2) Hasta bahar (Fruit harvest in February-April). The present study indicated that methanolic extract of Pomegranate peels have more total phenol content(TPC) as comapare to the acetonic extract in both seasons Ambe bahar and Hasta bahar of Saurashtra and Ahmedabad regions of Gujarat. Here, we also reported that Saurashtra region contains more total phenol content than Ahmedabad region. The variations in the quantity of total phenol content (TPC) of pomegranate peels are due to the various environmental factors and geographical distribution of plant in Gujarat. Comparison of Total phenol content for Acetone and Methanol extract of *Punica granatum* L. Peels during two different seasons of Saurashtra and Ahmedabad regions were firstly reported in Gujarat during this study.

Key words **– Pomegranate, Quantitative analysis, Total phenol content (TPC), Seasons, Saurashtra, Ahmedabad**

1. INTRODUCTION

Pomegranate is one of the oldest known edible fruit which is predominant member of Punicaceae family [1]. It is a large deciduous shrub or small tree native to Asia. Different parts of pomegranate like leaves, seeds, peels, flowers, fruit have some medicinal properties like anti-microbial, anti-inflammatory, healing activity, anti-cancer activity etc. [2]. *Punica granatum* L. is useful in the treatment and prevention of cancer. Cardiovascular disease, diabetes, dental conditions, bacterial infection, ultraviolet-radiation induced skin damage, male infertility, alzheimer's disease, arthritis, infant brain ischemia and obesity [3]. Phytochemicals are bioactive chemicals such as primary and secondary metabolites. Plants manufacture the secondary metabolites naturally but they have little need for them. The quantity of these phytochemicals may vary from one part to other parts of plant [5].

Fig 1: Pomegranate tree (1) Saurashtra and (2) Ahmedabad region

Classification of *Punica granatum* L. [4]

Domain : Eukarya
Kingdom : Plantae
Phylum : Magnaliophyta
Class : Magnoliopsida
Order : Myrtales
Family : Punicaceae
Genus : Punica
Species : granatum

Pomegranate peels contains ellagic acid, gallic acid, chlorogenic acid, cinnamic acid, caffeic acid, ferulic acid, coumaric acid, punicalagin, punicalin, quercetin and catechin [6]. Environmental factors such as temperature, humidity, light intensity, soil structure, water influence the growth of the plant and production of secondary metabolites [7]. Climate change causes noticeable effects on the life cycles of plant and distribution of phytochemicals during different seasons and different regions of that area [8]. The present study focus on the quantitative estimation and comparison of the total phenol content (TPC) of different peel extracts of *Punica granatum* L. peel during two different seasons of Saurashtra and Ahmedabad region of Gujarat state.

2. Material and method

Materials:
Peels of *Punica granatum* L. were collected from two different regions of Gujarat (1) Visavadar (Junagadh district) Saurashtra region and (2) Godrej garden city, Ahmedabad region. The peels of *Punica granatum* L. were collected two times during two different seasons of Saurashtra and Ahmedabad region. Here, season 1 was Ambe bahar (Fruit harvest in June-august) and season 2 was Hasta bahar (Fruit harvest in February-april). The peels of plant collected during these seasons, washed and dried at room temperature and then crushed. Dried powder stored in the air tight bottle for extract preparation.

Extract Preparation:
10gm of Pomegranate peels were extracted using 100ml of organic solvent (Methanol and acetone) for 24 hours and then filtered using Whatmann filter paper No. 1. The extracted solution, (filtrate) was kept overnight to obtain dry extract while the residue after filtration was discarded. The methanol and acetone extracts of each part was stored in a cool and dry place after transferring them into vials.

METHOD:

Quantitative analysis

Estimation of Total phenol content [9]
Quantitative analysis of Total Phenol contents (TPC) of *Punica granatum* L. peels were done by folin-ciocalteau's method with some modifications. For the preparation of calibration curve, gallic acid used as standard. Gallic acid was prepared in two different solvent such as methanol and acetone with different concentrations. Aliquots of 0.5 ml of each concentration of gallic acid were mixed with 2 ml of (1:10) Folin-ciocalteau's reagent and 2 ml of 7.5% sodium carbonate solution. Then tubes were shaken vigorously and mixed well. The mixture was allowed to incubate for 30 minutes at room temperature before the absorbance was measured at 760 nm. Same as for plant extracts, 0.5 ml of all extracts (1mg/ml) were treated and absorbance was measured.

RESULTS AND DISCUSSION:

Here, **Season 1** was Ambe bahar (Fruit harvest in June- August).
Season 2 was Hasta bahar (Fruit harvest in February-April).

Total Phenol Content:

Total phenol content of *Punica granatum* L. peels were estimated by Folin- ciocalteau's method for both season of Saurashtra region and Ahmedabad region of Gujarat. TPC was calculated for methanol extract from standard calibration curve of Gallic acid($y=0.2088x+0.0751$, $R^2=0.9976$) and for acetone extract from standard calibration curve of Gallic acid($y=0.1842x+0.064$, $R^2=0.9901$) in terms of mg/ml Gallic acid equivalent of sample (Fig.2).

In Saurashta region, for methanol extract of *Punica granatum* L. peels, the values of TPC were found between 0.178mg to 0.350 mg in first season (Ambe bahar) but in the season 2(Hasta bahar) TPC were found between 0.164 mg to 0.298 mg/ml of Gallic acid equivalent(GAE)(Fig.3) whereas for acetone extract of *Punica granatum* L. peels, the values of TPC were found between 0.153 mg to 0.272 mg in season 1(Ambe bahar) but during second season (Hasta bahar) TPC were found between 0.123 mg to 0.205 mg/ml Gallic acid equivalents (GAE)(Fig 4).Among these two season of *Punica granatum* L. peels, it was concluded that season 1(Ambe bahar) recorded the best result in quantity of phenol content than season 2(Hasta bahar) for the both acetone and methanol extract.

But in Ahmedabad region, for methanol extract of *Punica granatum* L. peels, the values of TPC were found between 0.168mg to 0.273 mg in first season (Ambe bahar) but in the season 2(Hasta bahar) TPC were found between 0.139 mg to 0.229 mg/ml of Gallic acid equivalent(GAE)(Fig.5) whereas for acetone extract of *Punica granatum* L. peels, the values of TPC were found between 0.094 mg to 0.167 mg in season 1(Ambe bahar) but during second season (Hasta bahar) TPC were found between 0.084 mg to 0.133 mg/ml Gallic acid equivalents (GAE)(Fig 6).Among these two seasons of *Punica granatum* L. peels, it was concluded that season 1(Ambe bahar) recorded

the best result in quantity of phenol content than season 2(Hasta bahar) for the both acetone and methanol extract in Saurashtra and ahmedabad region of Gujarat.

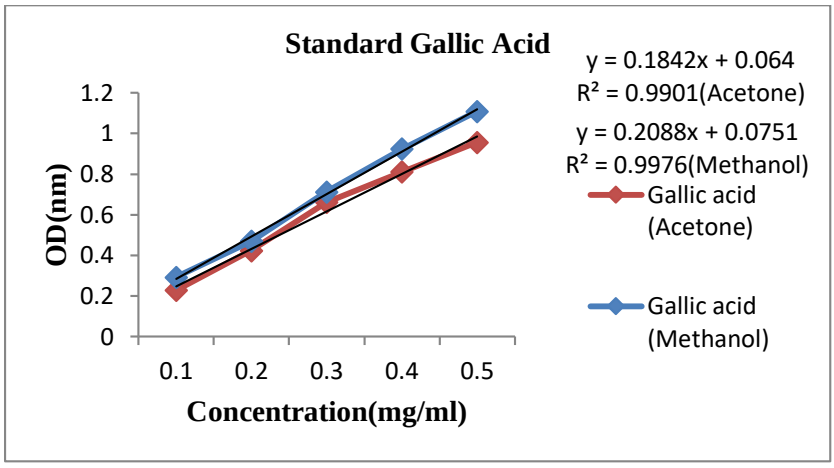

Figure 2: standard graph of Gallic acid (Acetone and Methanol)

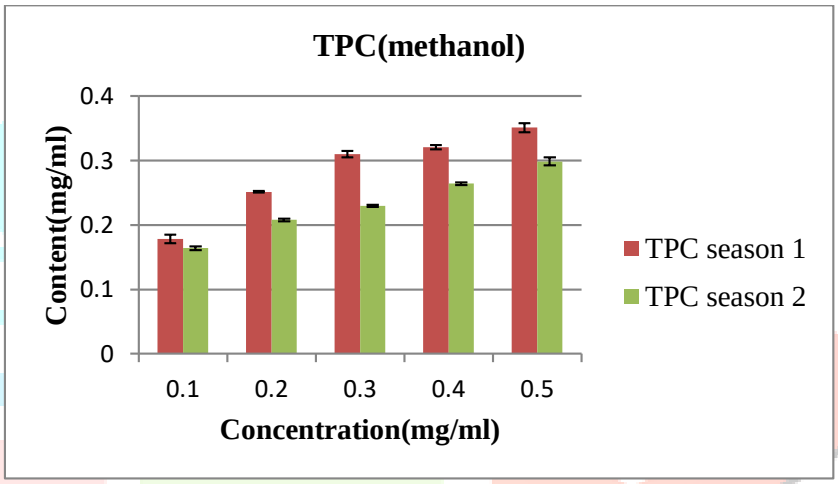

Fig-3: Total phenol content of ME of *Punica granatum* L.peels from Saurashtra region of Gujarat

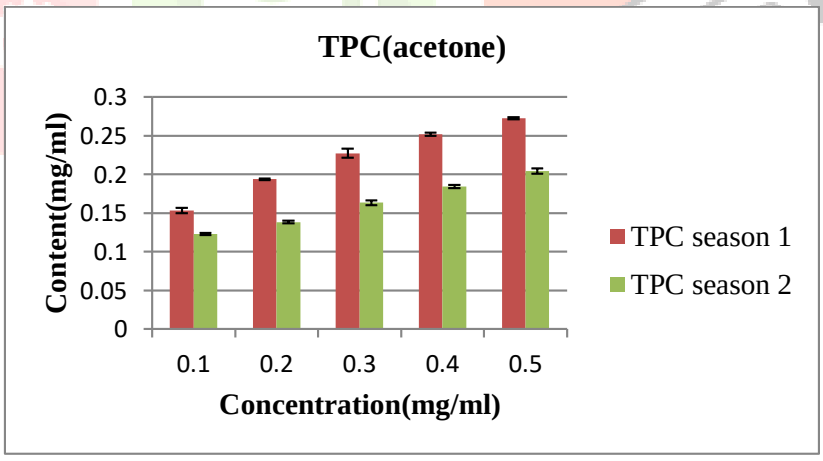

Fig-4: Total phenol content of AE of *Punica granatum* L.peels from Saurashtra region of Gujarat

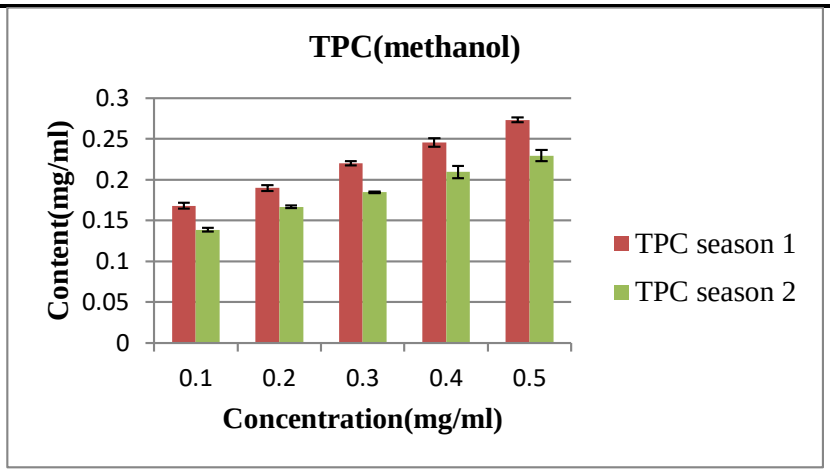

Fig-5: Total phenol content of ME of *Punica granatum* L.peels from Ahmedabad region of Gujarat

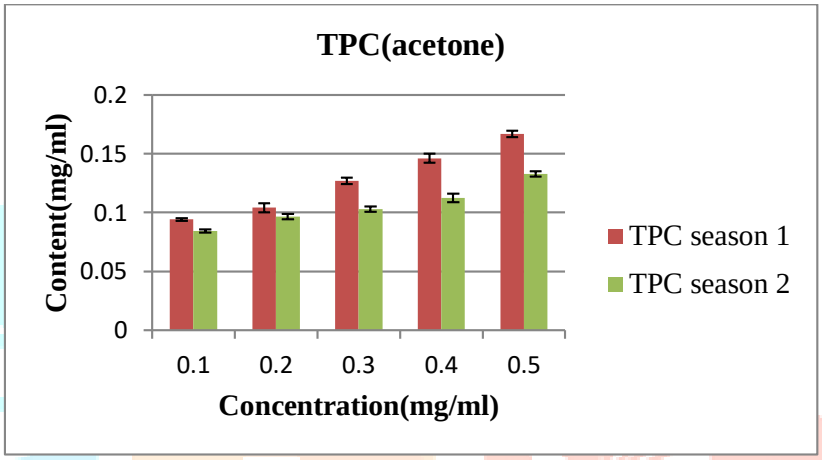

Fig-6: Total phenol content of AE of *Punica granatum* L.peels from Ahmedabad region of Gujarat

Comparison of Total Phenol content of Pomegranate Peels:

This result revealed that in methanolic extract of *Punica granatum* Peels, Total phenol content was higher than acetone extract. The result showed that for the acetone extract and methanolic extract, Season 1(Ambe bahar) had higher Total phenol content while season 2(Hasta bahar) had lower Total phenol content in Saurashtra and Ahmedabad regions of Gujarat.(Fig.7).From this result we can say that Saurashtra region contains more total phenol content than the Ahmedabad region. Many environmental factors such as soil structure, climate change, rain, humidity, weather, temperature may responsible for the variations in the quantity of total phenol content of *Punica granatum* Peels.

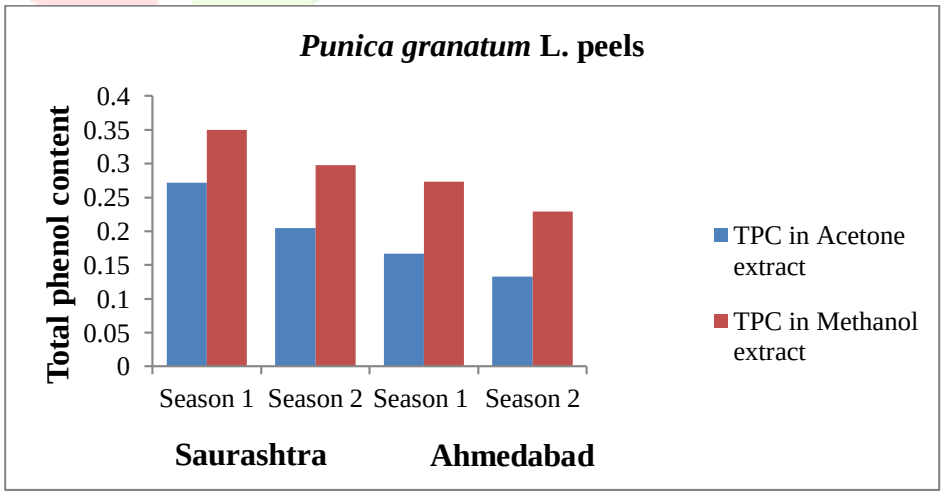

Fig.7: Comparison of Total phenol content for Acetone and Methanol extract of *Punica granatum* L. Peels during two different seasons of Saurashtra and Ahmedabad region

Conclusions

The medicinal property of various plant is depends upon their chemical compounds. These chemical compounds of plants may vary in different seasons of that environment and also in different regions. The present study indicated that methanolic extract of Pomegranate peels have more total phenol content(TPC) as comapare to the acetonic extract in both seasons Ambe bahar and Hasta bahar of Saurashtra and Ahmedabad regions of Gujarat. Here, we also reported that Saurashtra region contains more total phenol content than Ahmedabad region. The variations in the quantity of total phenol content (TPC) of pomegranate peels are due to the various environmental factors and

geographical distribution of plant in Gujarat. **Comparison of Total phenol content for Acetone and Methanol extract of *Punica granatum* L. Peels during two different seasons of Saurashtra and Ahmedabad regions were firstly reported in Gujarat during this study.** So the quantification of Pomegranate peels require intensive study for isolation of dominant and desire compounds, protection against from some common diseases and herbal drug formulations.

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