International Standard Serial Number (ISSN): 2249-6807

International Journal of Institutional Pharmacy and Life Sciences 7(1): January-February 2017

INTERNATIONAL JOURNAL OF INSTITUTIONAL PHARMACY AND LIFE SCIENCES

Life Sciences **Research Article……!!!**

Received: 11-11-2016; Revised: 30-12-2016; Accepted: 01-02-2017

ANTIMICROBIAL ACTIVITY OF POMEGRANATE PEEL AQUEOUS EXTRACT

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Keywords:

Pomegranate peel, antibacterial activity, aqueous extract

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ABSTRACT

The present study was undertaken to investigate the antimicrobial activity of pomegranate peel aqueous extract against the microorganisms *streptococcus sp , staphylococcus sp ,Candida sp, and Bacillus sp*. The study revealed that the extracts possessed antibacterial activity against all the microorganisms in the manner *Candida sp>staphylococcus sp > streptococcus sp > Bacillus sp.* The study suggests that pomegranate peel extract can be used in pharmaceuticals.

INTRODUCTION

The pomegranate is an ancient fruit that has not changed much throughout the history of man. It was found in the Indus valley so early that there is a word in Sanskrit for pomegranate .The pomegranate is also significant in Jewish, Christian and Muslim traditions (Navindraseeram *et al*, 2006). The pomegranate fruit has valuable compounds in different parts of the fruit. These can be divided into several anatomical origins: peel, seeds, and arils. Pomegranate rind consists of the dried pericarp of the fruit of *punica granatum*. The therapeutic potential of pomegranate peel has been widely recognized by different cultures. In Egyptian culture, several common ailments such as inflammation, diarrhea, intestinal worms, cough and infertility have been treated by exploiting pomegranate peel extract (popx).Pomegranate is currently finding important applications in the field of dental health. A variety of cultures and traditions in both the developing and developed worlds recommend pomegranate peel to treat common health problems. Traditionally, aqueous Pomegranate peel extract is obtained by boiling for 10–40 min. The extract has been used to treat diarrhea, dysentery, and dental plaque, in addition to being used as a douche and enema agent (Lansky *et al.*, 2004). Hence, an attempt has also been made to enumerate antibacterial activity of pomegranate peel aqueous extract against oral microbes.

MATERIALS AND METHODS

Collection of Plant Material

The fruits of *Punica granatum* were collected from the Virudhunagar local market and the specimens were identified. Care was taken to select healthy fruits. It was identified as reddish or yellowish red color rind belonging to *punicaceae* family.

Preparation pomegranate peel powder

Pomegranate fruits were washed and cut manually to separate the seeds and peel. The rind (peels) thus obtained, cut into small pieces using a sharp knife and dried in an air circulatory tray drier at 60±5ºC for 6 hrs. The pomegranate fruits were handy peeled and the required fruit rind were cut and removed from the fruits. The fruits rind (pomegranate peel) was dried in an oven at 40c for 24h, then mechanically powdered and the find powder was sieved through 24-mesh , then it was packed in high density polyethylene bags and stored at ambient temperature (25±5ºC) until use (Devatkal, 2010).

Extraction of from peels of pomegranate

10 g of the dried powder was taken in 100 ml of water in conical flask, plugged with cotton wool and then kept in an orbital shaker at 120 rpm for 24 h. After 24 h the extract was filtered through whatman no 1 filter paper for removal of peel particles. The dry extract was stored at 4°C.

Determination of extraction yield (Balasundram *et al, 2006)*

The residues obtained after filtration were weighed to obtain the extraction yield.

Extraction yield (%) = (weight of the residue)/(total weight of the peel powder)×100

Microorganisms

The microbes used in the study were collected from the Department of Biotechnology, V.V.Vanniaperumal College for Women, Virudhunagar, Tamilnadu

Well Plate Method

Mueller Hinton agar plates were prepared from standard Hi Media. Petriplates were spreaded with oral pathogens and wells were plucked on agar using cork borer.100µl of pomegranate extract was poured in the well and incubated at 24C for 24 hours in incubator. The antimicrobial activity was observed by the zone of inhibition around the wells and was measured.

RESULTS AND DISCUSSION

Fig 1. Dried Pomegranate Peel

Fig 2. Pomegranate Peel powder

The water is used as the solvent for extraction of pomegranate peel. The yield of extract was 27%. The aqueous peel extract was used for the further studies. Antimicrobial activities were measured with respect to pathogenic microorganism's reveals that the pomegranate peel extract

show antimicrobial activity the microbes in the order *Candida sp>staphylococcus sp > streptococcus sp > Bacillus sp* (Table1) .The pomegranate peel extracts effective against all the microbes.

Table 1: Antibacterial activity of pomegranate peel

Name of the microorganisms	Zone of inhibition (mm)
staphylococcus	12
Candida	16
streptococcus	11
Bacillus	9

Sachin Annasaheb Nitave *et al*, 2014 found that the extracts of waste material (peel) of *Punica granatum* may be utilize as a potential source of antibacterial (*E.coli, Staphylococcus)* and antifungal *(Aspergillus, Candida albicans)* agents. These results were also reliable with the studies conducted by Tianinal Nuamsetti (2012) who reported that the pomegranate peel extracts exhibit antibacterial activity against *bacillus subtilis, staphylococcus, Escherichia coli and salmonella lyphimurium.*

CONCLUSION

Pomegranate peel extract was found to be most effective all the microbes used in this study. Overall results revealed that the pomegranate peel may be considered an effective approach in the discovery of new antimicrobial agents. Further studies are required to determine the nature of compound(s) responsible for the antimicrobial effects.

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