



Extraction of Pigment from Pomegranate (*Punica granatum*) Flower Used for Various Applications

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Abstract

Pomegranate is a flower known from ancient times. The flower and the plant have various medical applications. The fruit, leaves and flowers are known for its medicinal used. Keeping this as a base the flower extract was taken. It is used as a functional food and nutraceutical source. The whole plant has many beneficial effects to human health. It is nutrient dense food rich in beneficial phyto chemicals. Pomegranate fruit extract are used in cooking, baking, juice blends, meal garnishes, smoothies and alcoholic beverages such as cocktails and wine. The extraction of colour is done in aqueous medium in soxhlet apparatus. The flower extract is used in various applications of food industry and in the field of microbiology and in textile industry. Hence the extracted dye has various benefits and its health benefits.

Keywords

Punica granatum, Pigment, staining, colour, dying, indicator.

INTRODUCTION:

Pomegranate (*Punica granatum*) is a tropical plant. It is a common plant found in various parts of the globe. It is a fruit bearing deciduous shrub in the family Lythraceae that grows between 5-10m tall. Northern hemisphere from September to February. Southern hemisphere from March-May. The name derived from medieval latin pomum" Apple" and granatum" seeded". The pomegranate product includes its use as an antioxidant, an anti-inflammatory, an antiviral, an antibacterial and an antifungal. (Braga et al. 2005)

Pomegranate is rich in health benefits such as cancer (prostate, colon, breast, skin), cardiovascular health, diabetes, arthritis, antimicrobial applications, skin care and various other diseases like chronic obstructive pulmonary disease, Alzheimer disease, neonatal neuroprotection, male infertility,

menopause and immune function. (SuzanneD. Johanningsmeier et al.2010) (plate 1).

In field of medicine it is said that any red pigmented fruits, flower and vegetables are known to increase and purify the red blood cells of the body. Hence when consumed or included in the food improves our health. It also provides immunity against diseases. Pomegranate has reported the use in the field of medicine to treat conditions such as diabetes and to combat malarial parasite. (Xu et al. 2009, Dell'Agli et al. 2009). Pomegranate has good antioxidant properties higher than the foods such as red wine and green tea. (Halvorsen et al. 2002, Gil et al. 2000). Pomegranate has antimicrobial, antioxidant and anti-inflammatory properties and can reduce blood pressure (Aviram.M et al. 2001). It contains advantageous properties on liver and kidney function has been reported (Ibrahium M. 2010). Pomegranate extract can ameliorate the oxidative and

histopathological damage induced by renal ischemia-reperfusion injury (Sancaktutar A.etal. 2014). The phytochemicals reported in pomegranate are majorly polyphenols. These polyphenols are extractable from almost all parts of the plant. That has a major source of dietary polyphenol. Among the various flavonoid polyphenol packed in pomegranate fruit, anthocyanin is in abundance. These are water soluble pigment and impart red colour to the fruit arils. This anthocyanin is responsible for the antioxidant property, having potential health benefits. The other phytochemicals reported in pomegranate are catechin and procyanidins, organic acids, phenolic acids, sterols, terpenoids, fatty acids, triglycerides and alkaloids. These bioactive compounds have been proved to have prophylactic and curative potential for dreaded diseases like heart stroke, atherosclerosis, all types of cancer, inflammation, hyperlipidemia, diabetes, hypoxia, ischemia, ageing, alzheimer disease, and in addition are the antibacterial, antifungal, antiviral, antihelmintic, vermifugal and tenicidal agents (Jyotsana Sharma *etal.*, 2010)

MATERIALS ND METHODS:

COLLECTION OF FLOWERS:

Fresh flowers of pomegranates from places near Western Ghats (Avinashi). Water is used as solvent for the extraction of colour. As also used in food application only aqueous extraction is done. Only the petals of the fertilized flower are collect. On the fruit maturation the petals wilt and go on waste. Hence, the petal is collected and in sterile container and kept air tight. (Plate 2)

EXTRACTION:

3.7-4.7g of flowers petal was taken. It was washed and added with 100ml sterile water. The petal was boiled to 30minutes at 95-100°C. On boiling the petal colour changes from red to pale pink to white. When the petals turn white the mixture is filtered. The extract obtained was up to 80ml. The extract was red in colour. Then the extract was concentrated to 20ml. It produces deep pink to deep red colour. The extract was stored in the refrigerator. (Geetha B and V Judia, 2013)

STAINING THE CELLS:

The concentrated extract was used as staining agent. It was used in staining the bacterial and fungal cells. The normal staining procedure was done for bacterial and fungal staining. But in the bacterial staining, only the simple staining techniques were followed. It is the use of only one stain to stain the bacterial cells. But in the case of fungal staining normal LPCB technique was followed by only

substituting the lacto phenol cotton blue dye with the flower extract.

FOOD APPLICATION:

The concentrated extract was used to colour the sugar syrup and noted the colouring ability. A good concentrated extract a few drops were added to the sugar syrup. It was thoroughly mixed and left undisturbed to cool. The colour retaining ability of the extract was noted after the sugar syrup hardened. (Plate 3)

TEXTILE DYING:

A small piece of cotton cloth was dyed using the extract for about 30 mins. It was drained and added water containing NaCl to fix the colour for 10 mins. (Plate 4) (Gbadegbe Richard Selase et al, 2014)

PH INDICATOR:

The extract was added to alkaline and acidic solution to check for any colour change. A series of three test tubes were taken. All the three were added with the flower extract. One of the tube was maintained as control. The other tube was added with two drops of concentrated hydrochloric acid. The third tube was added with a few drops of sodium chloride solution. The results were observed to determine the action of the extract to the ability to change colour in acidic and alkaline environment. (Plate 5)

RESULTS:

The obtained extract from pomegranate flower is red in colour. This extract is made use in various applications to improve the use of natural colour in various applications. This colour extract can be used as a substitute even for food industry and also in the field of textile. (Plate 6)

STAINING THE MICROBIAL CELLS:

The extract was not having ability to stain bacterial cells. It stains only for few mins. The fungal cells are the best stained with extract. It has the ability to stain the fungal cells due to certain colouring agent presenting in the flower extract. (Plate 7)

COLOURING THE FOOD MATERIAL:

The extract coloured the sugar syrup and the colour is maintained for days after solidification of syrup. It shows that the extract has the ability to retain the colour in the food. This is mainly done to replace the chemical and artificial food colourants with the natural and organic colour. Hence most of the candies and sweets can be coloured with the natural colour that provides good health to the consumers. It is mainly done to substitute the artificial colour that imparts dangerous effects to the body. As the pomegranate flower has various health benefits it can be used in food to impart betterment in health and to provide goodness to the body. Hence it is a

better substitute for artificial food colourants (Plate 8).

TEXTILE DYING:

The cloth took up colour to some extent, white cloth changed to sandal-pale pink colour. The cotton cloth that is dyed with the pomegranate extract has antibacterial and antifungal properties. Hence it provides protection to the wearer from infection caused by the contamination in the cotton or during the manufacturing of the cloth. (Plate 9).

PH INDICATOR:

The extract is tested for the property to act as a pH indicator. This can be incorporated in the medium for microbial growth or can be used as pH indicator for biochemical tests that indicate the production of acid by the organism. The extract reacts to acid by producing deep red colour with a minimal amount of acid interaction. But it is less responsive to alkaline pH (Plate 10).



Plate 1: Pomegranate Plant



Plate 2: Flower Collection



Plate 3: Food Colouring



Plate 4: Dying of Fabric

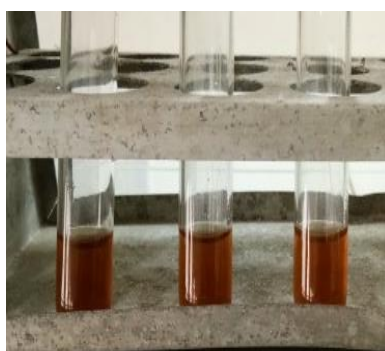


Plate 5: Test for Ph Indicator



Plate 6: Pomegranate Flower Extract

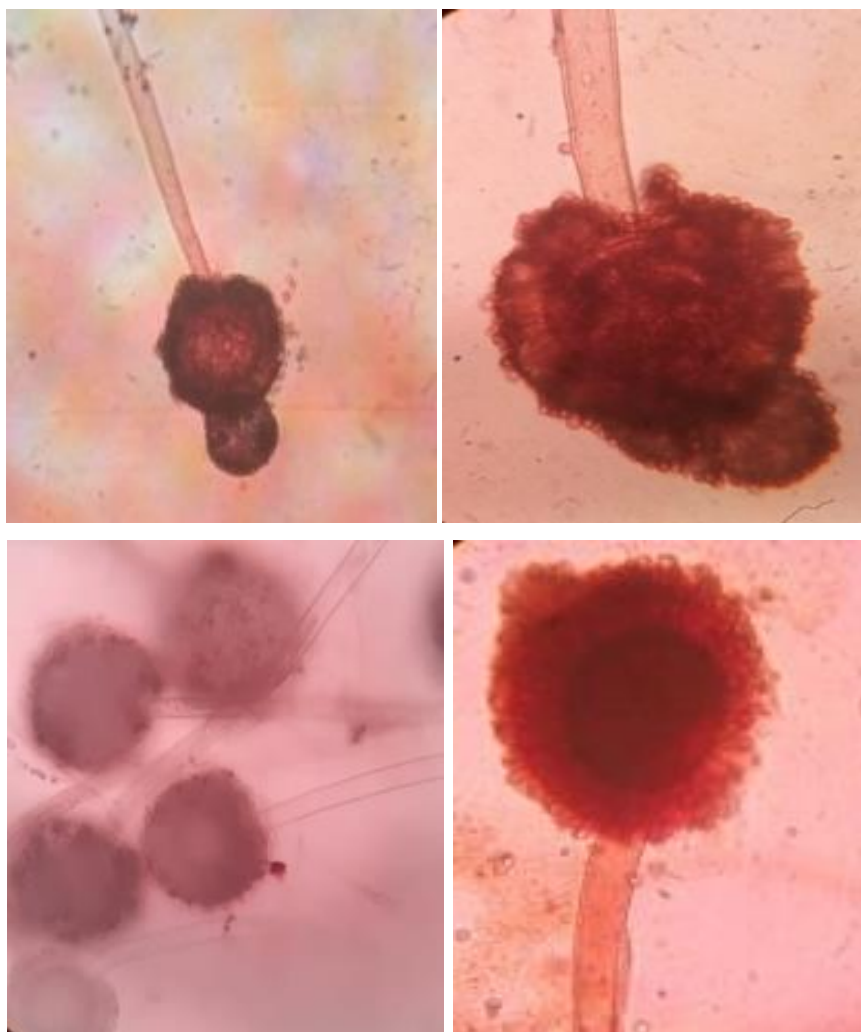


Plate 7: Stained Fungal Cells



Plate 8: Coloured Food Stuff



Plate 9: Fabric Dyed with the Extract



Plate 10: Used as Acid Indicator

DISCUSSION:

From the current I conclude that the aqueous extract from the pomegranate flower can be used for various applications. It can be used in food, textile and in the field of microbiology for staining and used as pH indicator in culture media. In the case of food, the extract used is safe for health and easy to obtain. It does not cause harm to any life form. In the case of textile industry, the extract is used for dyeing the cloths. This is a natural colour and does not cause any harm to the skin of the wearer. This dye does not cause any water or environmental damage. This extract is obtained from the petals of the pomegranate flower that is wilted when the fruit develops. Hence, this extraction is done to eliminate the waste and to bring wealth from the resource that is wasted. The pomegranate flower is a rich source and nutritious in nature. Hence, wasting it is a loss for the human population.

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