The majority of these beneficial effects are at least in part due to the presence of phytochemicals in plants (the ancient Greek word *phyton* means plant). Phytochemicals are certain non-nutritive plant chemicals which have some disease preventive properties. However, the term phytochemical is often used to describe a diverse range of biologically active compounds found in plants. Phytochemicals provide plants with colour, flavour and natural protection against pests. Numerous epidemiological studies have indicated that a diet rich in fruit and vegetables offers considerable health benefits to humans. Among these benefits are:

1. Reduction of the risk of developing many forms of cancer (lung, prostate, pancreas, bladder and breast).
2. Reduction of the risk of cardiovascular diseases.

The majority of these beneficial effects are at least in part due to the presence of phytochemicals in vegetables and fruits. In this context phytochemicals may be defined as "non-nutrient" chemicals found in plants that have biological activity against chronic diseases.

Orange (*Citrus sinensis*), a hesperidium belonging to the Rutaceae family, is the most widely grown and commercialized citrus specie. Orange is composed by an external layer (peel) formed by flavedo (epicarp or exocarp) and albedo (mesocarp), and an inner material called endocarp (pulp) that contains vesicles with juice. Sweet orange oil is a by-product of the juice industry produced by pressing the peel. It is used as a flavoring of food and drink and for its fragrance in perfumes and aromatherapy. Sweet orange oil consists of about 90% d-limonene, a solvent used in various household chemicals. Phytochemicals are already a part of our diet through food and drink and for its fragrance in perfumes and aromatherapy. Sweet orange oil consists of about 90% d-limonene, a solvent used in various household chemicals.

**INTRODUCTION**

Phytochemicals can be defined as any compound found in plants (the ancient Greek word *phyton* means plant). Phytochemicals are certain non-nutritive plant chemicals which have some disease preventive properties. However, the term phytochemical is often used to describe a diverse range of biologically active compounds found in plants. Phytochemicals provide plants with colour, flavour and natural protection against pests. Numerous epidemiological studies have indicated that a diet rich in fruit and vegetables offers considerable health benefits to humans. Among these benefits are:

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The majority of these beneficial effects are at least in part due to the presence of phytochemicals in vegetables and fruits. In this context phytochemicals may be defined as "non-nutrient" chemicals found in plants that have biological activity against chronic diseases.

**ABSTRACT**

*Citrus Sinensis* pulp was screened for its phytochemical composition. The aqueous as well as the ethanolic extracts of the pulp revealed the presence of carbohydrates, alkaloids, tannins, fixed oils and lipids, sugars, proteins, steroids, and amino acids whereas the terpenoids are present only in the ethanolic pulp extracts.

**Keywords**: *Citrus Sinensis*, Phytochemicals, Aqueous extract, Ethanolic extract.

**MATERIALS AND METHODS**

Collection of sample: Fresh Sweet orange were collected from Amravati (Central region of India) in the month of April 2012. The handpicked Sweet orange were washed well using tap water and twice using distilled water. Then the pulp of Sweet Orange was separated by cutting them into small pieces and it was dried in shade for a period of 20-25 days, at an ambient temperature of 30°C. The dried samples were grinded properly using a mortar and pestle and later using a grinder, to obtain the powdered form.

Preparation of extracts: Aqueous extract: 25 gm of both sample was suspended in 200 ml of distilled water. Extraction was done at 70°C for 30 minutes, followed by filtering of the extracts using Whatman filter paper No.1. Extracts were then evaporated at 45°C for 72 hours to form a paste, and further transferred into sterile bottles and refrigerated until use.

Ethanolic extract: 95% ethanol was added to 25 gm of sample. Extraction was allowed to stand for 72 hours at 27°C, after which they were filtered using Whatman filter paper No.1. Extracts were then evaporated at 45°C for 72 hours to form a paste, and further transferred into sterile bottles and refrigerated until use.

**Phytochemical Analysis (Qualitative Analysis):**

- **Test for reducing sugars:** A little amount of Fehling’s reagent was added to 2 ml of both extract. A little amount of concentrated sulphuric acid was added to it and allowed to form a layer. The mixture was shaken well, and allowed to stand for few more minutes, which was then diluted by adding 5 ml of distilled water. Purple precipitate ring showed the presence of carbohydrates.
- **Test for reducing sugars:** A little amount of Fehling’s reagent was added to the both extract, and the mixture was boiled for 2 minutes. A brick red colour indicated the presence of glycosides.
- **Test for proteins:** 0.5 ml of each extract was treated with equal volume of 1% sodium hydroxide, to which a few drops of copper sulphate solution was gently added. The solution turning to purple colour, indicated the presence of proteins.
- **Test for tannins:** Gelatin test: 3 gm of both extract was dissolved in 6 ml of distilled solution was added to it. A bluish green colour indicated the presence of tannins.
- **Test for steroids:** 0.5 ml of the each extract was dissolved in 3 ml of chloroform and was filtered. To the filtrate, concentrated sulphuric acid was added by the sides of the test tube, which formed a lower layer. A reddish brown
**Table 1: Phytochemical analysis of Citrus Sinensis pulp**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Phytochemicals</th>
<th>Tests performed</th>
<th>Aqueous Extract</th>
<th>Ethanal Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carbohydrates</td>
<td>Molisch’s Test</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Sugar</td>
<td>Dragendorff’s Test</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Protein</td>
<td>Ninhydrin Test</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Tannins</td>
<td>Gelatin Test</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Steroids</td>
<td>Ring test</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>Amino acids</td>
<td>Ninhydrin Test</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Terpenoids</td>
<td>Salkowski test</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Anthraquinones</td>
<td>Borntrager’s test</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Alkaloids</td>
<td>Dragendorff’s test</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Chalcones</td>
<td>Spot test</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Saponins</td>
<td>Froth test</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Fixed oils and lipids</td>
<td>Spot test</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

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REFERENCES

