The genus *Pyrus*: An update

Kiran, Vandana Garg, Anju Dhiman, Rohit Dutt and Sweety Ranga

**Abstract**

Genus *Pyrus* is classified into three main categories according to their origin and production. These are Japanese pear (*Pyrus pyrifolia*), Chinese pear (*Pyrus bretschneideri*; *Pyrus ussuriensis*) and European pear (*Pyrus communis*). This review complies the information about Genus *Pyrus* that includes ethnomedicinal, morphology, phytoconstituents and pharmacological reports. Most popular species of genus *Pyrus* are *P. pyrifolia* and *P. communis*. *P. communis* is native to Central and Eastern Europe and Southwest Asia while *P. pyrifolia* is native to East Asia. *Pyrus* is rich source of alkaloids, tannins, carbohydrates, amino acids, steroids, cardiac and coumarin glycosides, flavonoids and phenolic compounds. Amongst various species of genus *Pyrus*, *P. communis* and *P. pyrifolia* proven to have medicinal value, and have been conventionally used as antioxidant and antimicrobials. In the ultimate fraction, the prospect possibility of *Pyrus* species has been accentuate with a outlook to generate their miscellaneous organic behavior and mode of actions.

**Keywords**: *Pyrus*, *Pyrus pyrifolia*, *P. communis*, antioxidant, antimicrobial

**Introduction**

The review on *Pyrus* has been compiled using references from major sources such as Chemical Abstract, Pub Med, Science Direct, Research Gate, Medicinal and Aromatic Plants Abstracts. The accessible knowledge on *Pyrus* has been alienated into five sections, these are, ethnomedicinal properties, morphology, phytoconstituents, pharmacological and clinical studies. Traditional uses, and Alternative and complimentary medicinal uses are the subdivision of ethnomedicine division. Under title ‘Alternative and complimentary therapeutic uses’ medicine prescribed by medical practitioners for *Pyrus* species or their preparations for the treatment of various ailments are highlights.

**The Genus *Pyrus***

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division</td>
<td>Magnoliophyta</td>
</tr>
<tr>
<td>Class</td>
<td>Mangnoliopside</td>
</tr>
<tr>
<td>Order</td>
<td>Rosales</td>
</tr>
<tr>
<td>Family</td>
<td>Rosaceae</td>
</tr>
<tr>
<td>Subfamily</td>
<td>Amygdaloideae</td>
</tr>
<tr>
<td>Genus</td>
<td><em>Pyrus L</em></td>
</tr>
<tr>
<td>Species</td>
<td><em>pyrifolia</em>, <em>bretschneideri</em>, <em>communis</em></td>
</tr>
</tbody>
</table>

The genus *Pyrus* belonging to Rosaceae family and comprise about five species which are commonly distributed in Europe, Northern Africa, Asia Minor, Iran and Central Asia, Tian-Shan and Hindu Kush mountains eastward to Japan [1]. In India pear is cultivated in Uttarakhand, Himachal Pradesh, Uttar Pradesh, Punjab, Jammu-Kashmir and many other regions [2]. Most popular species of the genus are *P. pyrifolia*, *P. bretschneideri* and *P. communis* [3].

**Ethnopharmacology**

**Traditional uses**

*P. pyrifolia* has a handful traditional medicinal use. *P. pyrifolia* has been used for years to alleviating alcohol hangover, constipation, diuresis, cough, and flu [4]. *P. communis* bears many actions like astringent, sedative activity and febrifuge [5]. Flowers of common pear are used as analgesic and spasmylytic [6].

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**Alternative and complimentary medicinal uses**

Fruits of *P. pyrifolia* possess anti gastric ulcer [7], anti-inflammatory and antioxidative effects [8]. Fruits of *P. communis* exhibited anti-diabetic, hypolipidemic [9], antioxidant [10] and antimicrobial activities [11].

**Morphology**

*P. pyrifolia*

**Leaves:** Leaves are ovate, broad cuneate rotund, large and fine serrate-setose [12-13].

**Flower:** Flower bears corymbose inflorescences, they are white in color and 5cm wide, with terminally mixed buds, appearing before or with the leaves [16].

**Fruit:** Fruit are medium to very large in size have russet or white in color and 5cm wide, with terminally mixed buds, Short to long Peduncle, Calyx is deciduous, 5 or rarely 4 Petals appearing before or with the leaves [16].

**Seed:** Blackish in colour, 8.4 × 4.8 mm, with a thin layer of endosperm [20].

**Phytoconstituents**

Phytoconstituents of *P. communis* and *P. pyrifolia* are reported in Table 1

<table>
<thead>
<tr>
<th>Part</th>
<th>Constituents Present in <em>P. communis</em></th>
<th>Constituents Present in <em>P. pyrifolia</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bark</td>
<td>Friedelin, epifriedelanol and beta-sitosterol [22]</td>
<td>Steroids, Saponins, Fats, Flavonoids, Tannins, Carbohydrates [27]</td>
</tr>
<tr>
<td>Root bark</td>
<td>Phloridzin [21]</td>
<td>Phloridzin [23]</td>
</tr>
<tr>
<td>Flowers</td>
<td>Chlorogenic acid, Fatty acid [24]</td>
<td>Chlorogenic acid, Fatty acid [24]</td>
</tr>
</tbody>
</table>

**Pharmacological Studies**

It has been reported that *P. communis* (ethanolic and ethyl acetate extract) at a dose of 200mg/kg and glibenclamide (5mg/kg) showed the anti-diabetic and hypolipidemic activities [9]. Methanolic extract of the *P. communis* fruit is reported to exhibit the antioxidative activity [10]. Fresh juice and aqueous extract of pear showed antimicrobial activity against *Staphylococcus* and *Escherichia coli* [11]. Pear contains Arbutin which has potential to lower the level of melanin in the body and act as natural whitening agent [6]. Pear is rich source of vitamin C. Vitamin C stimulates the production of collagen fibers in the skin and heals the wounds. Arbutin reduce the risk of wound infection. The wound healing activity of ethyl acetate and ethanol extracts of fruits of *P. communis* (EAEP 200 mg/kg) was investigated by various wound healing models in normal rats such as excision, incision and dead space wound model [30].

**Clinical Studies**

Pear is a rich source of dietary flavonoid and stilbene. Regular utilization of pear effect the level of plasma lipids and total antioxidant capacity of plasma. Subjects were given the fruits and juice daily, after 26 days of consumption total antioxidant capacity and lipid profile were measured. Fruit consumption increased total plasma antioxidant capacity (TAC), total cholesterol, high-density lipoprotein cholesterol, and low-density lipoprotein cholesterol [32]. Flavonoid and stilbene rich fruits consumption reduces the risk of cardiovascular diseases [25]. Effect of fruit on energy consumption and body weight was evaluated by adding to the diet in women. Women with body mass index larger than 25 kg/m² were erratically selected and 3 pears are add to their usual diet for 10 weeks. After10 weeks their body mass index were less than 25 kg/m² were randomly selected and 3 pears are add to their usual diet for 10 weeks. Regular utilization of pears is also reported to weight reduction [33].

**Conclusion**

Pear is good source of vitamin C, dietary fibers, fructose and sorbitol. Pears improve gut health and prevent constipation when consumed with combination of dietary fiber. Amongst the three species of Pyrus two species are investigated. Pharmacological studies states that *P. pyrifolia* exhibit antioxidant, antimicrobial and analgesic properties; *P. communis* exhibit antioxidant, antimicrobial, anti-inflammatory, skin whitening and analgesic properties. Therefore it is to concluded that plants of this genus hold great potential to treat the chronic diseases, the thorough investigations may be carried out by the researchers to explore their various activities.
References


