Phytochemical Screening of *Iris decora* for secondary metabolites

1Ghulam Mustafa Rather, 2Ranjan singh, 3Arif Hussain Bhat & 4Irfan Rashid Thokar

1Research Scholar Department of Botany, Government M.V.M. Bhopal, MP (India)
2Professor Department of Botany Government M.V.M. Bhopal, MP (India)
3,4Research Scholar Department of Botany, Government M.V.M. Bhopal, MP (India)

**ABSTRACT**

*Iris* is the largest genus of family Iridaceae. *Iris* species are mainly used as ornamental plants, due to their colorful flowers, or in the perfume industry, due to their fragrance, but lot of *Iris* species were also used in many parts of the world as medicinal plants for healing of a wide spectrum of diseases. The phytochemical investigations of various species of *Iris* have resulted in the isolation of variety of secondary metabolites. Hundreds of compounds have been reported from the genus *Iris* which includes flavonoids, alkaloids, glycosides, steroids, saponins, tannins and terpenes. The present study reports the phytochemical screening of extracts of *Iris decora*. Different extracts of rhizomes of *Iris decora* were prepared and screened for phytochemical studies. The phytochemical analysis of the different extracts of this species revealed the presence of Flavonoids, Glycosides, Steroids, Saponins and Tannins.

1. Introduction

Plants that possess beneficial pharmacological effects on the human body are generally designated as medicinal plants. Medicinal plants naturally synthesize and accumulate some secondary metabolites, like alkaloids, steroids, terpenes, flavonoids, saponins, glycosides, tannins, resins, lactones, quinones etc. The medicinal plants have been used for the treatment of diseases, since the dawn of time. Researchers have found that people in different parts of the world tend to use the same or similar plants for the treating the same illnesses. The demand and utilization of medicinal plants has increased globally. There is now a co-sense regarding the importance of medicinal plants and traditional health systems in solving the health care problems. Among the medicinal plants, Iridaceae is a diverse family of monocots comprising over 260-300 species (WCSP, 2014). Among these about 14 species occur in Jammu and Kashmir India. (Akhter et al., 2012). *Iris* species are perennial plants, growing from creeping rhizomes or, in drier climates, from bulbs. They have long, erect flowering stems which may be simple or branched, solid or hollow, and flattened or have a circular cross-section. The rhizomatous species usually have 3–10 basal sword-shaped leaves growing in dense clumps. The bulbous species have cylindrical, basal leaves.

The presence of phytochemical compounds in the plants indicates its medicinal potential. Discovery of actual value of traditional plants as well as discovery of therapeutic agent solely depends upon the knowledge about the phytochemical composition of plant.

2. Material and methods

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Solvent</th>
<th>Wt. of plant material (gm)</th>
<th>Vol. of solvent (ml)</th>
<th>Wt. of extract (gm)</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>N-Hexane</td>
<td>300</td>
<td>500</td>
<td>42.85</td>
<td>14.2</td>
</tr>
<tr>
<td>02</td>
<td>Chloroform</td>
<td></td>
<td>200</td>
<td>21.05</td>
<td>7.01</td>
</tr>
</tbody>
</table>

Sample collection:

The rhizomes of *Iris decora* were collected from high altitudes 1652 m (Latitude 32° 44' N and Longitude 74° 54' E) of District Baramulla Jammu and Kashmir India, during May-June 2017. Taxonomical identification of the plant was carried at centre for biodiversity and taxonomy Department of Botany University of Kashmir. The herbarium of the plant was deposited at department of botany, university of Kashmir under voucher specimen No. 2459 on 20-05-2017.

The rhizome was thoroughly washed 2-3 times with running tap water, then these rhizomes were dried in shade for 3-4 weeks, every part was then cut into pieces, then the plant material (rhizomes) were grinded in grinder. The plant material was kept in a bottle and was labeled. The powered plant material was weighed using an electronic balance. The plant material was now ready for extraction by cold extraction with N-hexane and in soxhlet extractor with chloroform, methanol and distilled water. The extraction was done for 48 hours in each solvent. The crude extract thus obtained were then filtered through filter paper and then concentrated in vacuum evaporator. The amount of crude extracts obtained thus weighed is represented in the (table 1) and the yield was calculated as:

\[
\text{Percentage yield} = \frac{\text{Wt. of crude extract (gms.)}}{\text{Wt. of the powered sample used (gms.)}} \times 100
\]
Phytochemical screening:

It is a series of tests that determine the presence or absence of chemical substances present in Iris decora.

Test for flavonoids (Ammonia test):
5ml of dilute ammonia solution were added to a portion of crude extract followed by addition of concentrated sulphuric acid, formation of yellow coloration in the extract indicates the presence of flavonoids.

Test for glycosides (Borntrager's Test):
To the test tubes containing 2ml of extract, 2ml of dilute sulphuric acid was added; it was boiled for 5 minutes and filtered. To the filtrates, equal volumes of chloroform was added and mixed well, organic layers were separated and ammonia was added to this. Pinkish red color of the ammonia layer indicates the presence of glycosides.

Test for tannins (Ferric chloride test):
The crude extract was mixed with 1% ferric chloride solution and it gives blue, green or brownish green color which indicates the presence of condensed tannin.

Test for saponins (Foam test):
A small amount of extract was shaken with little quantity of water. The foam produced persists for 10 minutes. It confirms the presence of saponins.

Test for steroids (salkowski test):
Chloroform solution of extract was shaken with concentrated sulphuric acid and on standing yields red color, which indicates the presence of steroids.

Test for triterpenes (Salkowski test):
5ml of the extract was added to chloroform along with few drops of concentrated sulphuric acid. The mixture was shaken well and kept aside for some time. Appearance of red yellow color in the lower layer indicates the presence of triterpenes.

Test for diterpenes (copper acetate test):
The extract was mixed with solution of copper extract and gives green color, which indicates the presence of diterpenes.

Test for quinines: With 1ml of extract 1ml of concentrated sulphuric acid was added, red color was formed which indicates the presence of quinines.

3. Results and Discussion

The present study was carried out on phytochemical screening of rhizomes of Iris decora which revealed the presence of medicinal active constituents and the results are presented in Table 2. In the screening process flavonoids, glycosides, tannins, saponins, steroids, triterpenes and diterpenes shows different types of results in different chemical reagents. The medicinal value of plants lies in some chemical substances that have a definite physiological action on human body. Different phytochemicals have been found to possess a wide range of activities which helps in protection against different diseases. For example the importance of saponins and tannins in various antibiotics using in treating common pathogenic strains has recently reported by (Kubmarawa, et al., 2007; Mensah, et al., 2008).

According to previous studies phytochemicals such as steroids are found in I. suaveolens (Hacibekiroglu and Kolak, 2011) and I. germanica (Ibrahim et al. 2012). Triterpenoids are found in rhizomes of Iris tectorum (Fang et al., 2007). Triterpenoids are found in I. germanica L (Bonfils et al., 2001) and in I. marsica (Vandetti et al., 2017). Flavonoids are found in l. tenuifolia (Kojima et al., 1997), in l. songaria (Moein et al., 2008), in l. Pseudopumil (Rigano et al., 2009), in l. tenuifolia (Cui et al., 2011, Jansraet et al., 2014), in l. kashmiriana (Alam et al., 2017), in l. potaninii (purev et al., 2002). Glycosides are found in l. germanica L (Schutz et al., 2011), in l. marsica (Vandetti et al., 2017).

Table 2: Phytochemical analysis of extract of Iris decora in different solvent system:

<table>
<thead>
<tr>
<th>Secondary metabolites</th>
<th>Tests</th>
<th>N-Hexane</th>
<th>Chloroform</th>
<th>Methanol</th>
<th>Distilled water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>Dragonrofs test</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>Ammonia test</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Glycosides</td>
<td>Borntrager’s Test</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Steroids</td>
<td>salkowski test</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Saponins</td>
<td>Foam test</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td>Ferric chloride test</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Diterpenes</td>
<td>copper acetate test</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Triterpenes</td>
<td>Salkowski test</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

(−) absence and (+) indicates presence
Test for Alkaloids

(-) (-) (+) (+)

Test for Flavonoids

(-) (-) (+) (+)

Test for Glycosides:

I amDecom Test for Glycosides

Test for steroids:

(+), (+), (-), (-)

Test for Saponins:

(-) (-) (-) (+)

Test for tannins:

(-) (+) (+) (+)
4. Conclusion

Phytochemical screening of rhizome extract of *Iris decorati* indicates the presence of Alkaloids, Glycosides, Diterpenes, Triterpenes, Tannins, Flavonoids, Saponins and Quiones suggested that it is an important source of bioactive compounds that may supply novel medicines. Phytochemical analysis of this plant may be useful in developing new specialized drugs with more efficiency. Further optimization of these phytoconstituents through structural alteration may allow the development of pharmacologically active agents.

References


