COMPARATIVE HISTOLOGICAL, HISTOCHEMICAL AND PHYTOCHEMICAL STUDIES OF THE RAW DRUG JIVANTI FROM DIFFERENT RAW DRUG MARKETS OF KERALA

T. P. Girija *1 and A. B. Rema Shree 2

Department of Botany 1, MES Asmabi College, P. Vemballur, Thrissur, Kerala, India.
CMPR, Arya Vaidya sala 2, Kottakkal, Malappuram, Kerala, India.

Key words:
Jivanti, Holostemma ada- kodien, Leptadenia reticulata, Histological and histochemical studies, Phytochemical studies, TLC

Correspondence to Author:
Dr. T. P Girija
Assistant Professor
Post Graduate and Research,
Dept. of Botany, MES Asmabi College, P. Vemballur, Thrissur, Kerala – 680 671, India.
E-mail: girijamanu@yahoo.in

ABSTRACT: Jivanti is considered a stimulant and tonic in Ayurvedic literature. Its medicinal use dates back to about 4500 to 1600 BC, as mentioned in classical texts. Holostemma ada- kodien and Leptadenia reticulata are the two plants used in Ayurveda as source plants of the drug Jivanti. Roots of these plants are used in several Ayurvedic preparations. Though Ayurvedic Formulary of India mentions Leptadenia reticulata as the source plant of Jivanti, throughout Kerala and mostly in South India, Holostemma ada- kodien is used as source plants of Jivanti and there are reports regarding adulteration in market samples, which will adversely affect the quality of medicines prepared. Till now there is no significant study to compare the source plants available in markets as Jivanti. Present work is a comparative histological, histochemical and phytochemical study of the raw drug Jivanti from different raw drug markets of Kerala. This is a first time approach to develop quality control measures with the help of histological, histochemical and phytochemical tools.

INTRODUCTION: Jivanti, the drug is considered to have the property to bestow health and liveliness to the consumer. Caraka treats it as an important rasayana drug, capable of maintaining the youthful vigour and strength. The botanical identity of the drug is highly disputed. Kerala physicians identified Holostemma ada- kodien as Jivanti. The roots of these plants are being used as Jivanti in Kerala. Some authors from north have equated it with Flickingeria nodosa (Dalz.) Sciden f. an orchid. Leptadenia reticulata is considered to be a good cure for tuberculosis and eye diseases.

So it is treated as the real Jivanti by some authors and Ayurvedic formulary of India also accepts this plant as the true drug. The root is the official part, used for the preparations like Jivantyadi ghrtam, Manasamitravatakam, Balarishtam and Anutailam etc. Poisonous affections and tuberculosis are also relieved by the use of the drug. The adulteration/substitution occurs either due to the non availability of genuine drugs in required quantities or due to the ignorance of the correct identity of the genuine drug. From the present study found that majority of the Kerala market samples are Holostemma ada- kodien, the drug source of Jivanti. Morphological features of these plants were reported.

These morphological features are helpful for the identification of these plants. During the adulteration/substitution occurs, the identification of dried or fresh materials available in the markets...
is impossible. So these comparative studies of market samples are helpful for the correct identification of this raw drug. Reports to prove the pharmacological activities of the source plants of Jivanti are available.

Tuberous roots of *H. ada-kodien* possess potential anti-diabetic activity, dose dependent scavenging activity against DPPH radicals, Superoxide radicals, and Nitric oxide radicals and hepatoprotective effect against paracetamol (PCM) induced liver damage in rats. *Leptadenia reticulata* possesses the alterative, aphrodisiac, astringent, Galactogogue, diuretic and used as a tonic in debility due to seminal discharges, also useful in asthma. It is beneficial if used externally in various skin diseases, wounds and inflammation of the skin.

**MATERIALS AND METHODS:**

*Holostemma ada-kodien* and *Leptadenia reticulata* are the two plants used as a source of Jivanti. Both the plants belonging to same family Asclepiadaceae. Trips were conducted to collect the raw drugs from different raw drug markets of Kerala and the materials were subjected to anatomical and chemical comparison using the standard procedure. From this study raw drugs were collected from 12 markets of Kerala (Alappuzha, Calicut, Ernakulam, Idukki, Kollam, Kottayam, Kuttyadi, Malappuram, Palakkad, Thrissur, Vadakara and Wayanad. Roots were fixed in Formalin Acetic acid Alcohol (FAA) mixture for further study.

**Histological and histochemical studies:**

Histological studies of the useful parts of genuine plants/ substitutes/ market samples were carried out to study the type of cells and other details etc. Histochemical characterization of raw drugs were carried out according to standard procedures.

**Phytochemical studies:**

**Method of extraction:**

Extraction is the first step in the phytochemical evaluation of the plant material. The choice of extraction depends on the nature of the plant material and the compounds to be isolated. Powdered materials with suitable solvent are used for extraction process.

**Thin layer Chromatography (TLC) studies:**

Thin layer chromatographic studies conducted using precoated plates of silica gel 60 F254 (E. Merck) of uniform thickness of 0.2 mm.
showed same R_f values which is detailed in the Table 1 and Table 2. The samples from Kollam may be an adulterant which was not identified (Plate 2).

PLATE1: HISTOCHEMICAL COMPARISON OF RAW DRUG SAMPLES OF JIVANTI COLLECTED FROM DIFFERENT RAW DRUG MARKETS OF KERALA

TABLE 1: Rf VALUES OF DIFFERENT MARKET SAMPLES OF JIVANTI AT 254 nm

<table>
<thead>
<tr>
<th>Track</th>
<th>ALP</th>
<th>CLT</th>
<th>EKM</th>
<th>IDK</th>
<th>KTM</th>
<th>KDI</th>
<th>MLM</th>
<th>PKD</th>
<th>TSR</th>
<th>VDK</th>
<th>WYD</th>
<th>KLM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>-</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.08</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.16</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>-</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
<td>0.21</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.39</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.54</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
<td>0.63</td>
</tr>
<tr>
<td>11</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>-</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
</tr>
</tbody>
</table>

ALP – Alappuzha IDK – Idukki MLM – Malappuram VDK – Vadakara
CLT – Calicut KTM – Kottayam PKD – Palakkad WYD – Wayanad
EKM – Ernakulam KDI – Kuttyadi TSR – Thrissur KLM – Kollam

Colour of the bands:
Grey

International Journal of Pharmaceutical Sciences and Research
TABLE 2: $R_f$ VALUES OF DIFFERENT MARKET SAMPLES OF JIVANTI AT 366 nm

<table>
<thead>
<tr>
<th>Track</th>
<th>ALP</th>
<th>CLT</th>
<th>EKM</th>
<th>IDK</th>
<th>KTM</th>
<th>KDI</th>
<th>MLM</th>
<th>PKD</th>
<th>TSR</th>
<th>VDK</th>
<th>WYD</th>
<th>KLM</th>
<th>Colour of the bands</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>0.17</td>
<td>Blue</td>
</tr>
<tr>
<td>3</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>0.24</td>
<td>Blue</td>
</tr>
<tr>
<td>5</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>0.78</td>
<td>Blue</td>
</tr>
</tbody>
</table>

ALP – Alappuzha IDK – Idukki MLM – Malappuram VDK – Vadakara
CLT – Calicut KTM– Kottayam PKD – Palakkad WYD - Wynad
EKM – Ernakulam KDI – Kuttyadi TSR – Thrissur KLM - Kollam

CONCLUSION: To check the extend of variability of source plants of Jivanti from different raw drug markets of Kerala, histological, histochemical and phytochemical studies are used. From the present study it is clear that differences were observed in the depositions of lignin and starch according to the place of collection, but the chemical profiling showed that the compounds are similar but a little difference in their concentrations. From the Kerala market survey it was calculated that about 90% of the raw drug Jivanti were found to be Holostemma ada-kodien, the raw drug sources of Jivanti used in Kerala and 10% were found to be adulterant.

ACKNOWLEDGEMENTS: The authors are thankful to KSCSTE, Govt of Kerala for financial support and Arya Vaidya Sala, Kottakkal for extending the facilities.

REFERENCES:

1. Nadkarni AK: Indian material medica Bombay.1954.

How to cite this article: