Pharmaceutical Standardisation

Phyto-chemical evaluation of dried aqueous extract of Jivanti [Leptadenia reticulata (Retz.) Wt. et Arn]

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Abstract

Jivanti (Leptadenia reticulata (Retz.) Wt. et Arn) is a well known climber used for its innumerable therapeutic properties like antioxidant, antibacterial, vasodilator, galactogogue, jivaniya, etc., Its use in veterinary practice is tremendous due to its lactogenic effect. The Ghana (dried aqueous extract) of the whole plant was prepared and evaluated phyto-chemically by subjecting it to various tests like physico-chemical, qualitative analysis; TLC and HPTLC. Qualitative tests revealed the presence of flavonoids and TLC also inferred positive Rf value (0.30), indicating the presence of quercetin in the Ghana.

Key words: Dried extract, Ghana, Jivanti, Leptadenia reticulata, quercetin

Introduction

Plants are preliminary source of chemicals used to treat the various disease conditions of living creature. Chemicals derived from plants fulfill every aspect of our daily requirements, as a source of food as well as medicinal agents.

Leptadenia reticulata (Retz.) Wt. et Arn. is an important plant of Asclepiadaceae family, commonly known as Jivanti in Sanskrit and Dodi in Hindi and Gujarati, is a climber distributed in tropical and sub-tropical parts of Asia and usually grown as hedges in Gujarat. The botanical source of jivanti is in the state of controversy and Charaka mentioned it as a classical whole some vegetable (Shrestha Shaka) to be consumed for maintaining the good health. It is also used as Jivaniya, Snehopaga, Vayasthanapiya, Rasayana, and Chakshushya in Ayurveda. Various herbs are used under the name of Jivanti in the different parts of the country, namely - Dregia volubilis Linn, Holostemma annulare Roxb. of Asclepiadaceae family, Dendrobium normale Fale (Orchidaceae), etc., However, L. reticulata is accepted as a genuine Jivanti.

It is rich in sterols especially stigmastanol and tubers contain fructosan. Physico-chemical parameters, Thin Layer Chromatography (TLC) and High Performance Thin Layer Chromatography (HPTLC) of the methanolic extract of the leaf and stem has been reported but Ghana (dried aqueous extract) of the plant has not been found evaluated yet and hence it was thought to evaluate the Ghana of the whole plant of L. reticulata in the present study.

Materials and Methods

Materials

The matured Jivanti (L. reticulata) was collected from Khatia forest of Jamnagar in the month of March and their authenticity was confirmed by referring various floras and with the help of Pharmacognost of Gujarat Ayurved University. Underground parts of the plant were washed out by running tap water to remove adherent soil, dust, etc., Morphological and microscopical characters of root, stem, leaf, fruit, etc., of the plant were studied separately to confirm the genuinity.

Shade dried plants were subjected to coarse powdering for the preparation of Ghana by following standard methods and converted into tablets of 500 mg weight in the Pharmacy of Gujarat Ayurved University, Jamnagar. The compressed tablets were stored in well closed glass bottles for further study.

Methods

Weight variation, disintegration time, and hardness of the prepared tablets were recorded as per the standard methods preliminarily and then they were subjected to chemical evaluation. Parameters like loss on drying, ash value, water soluble ash, acid insoluble ash, water soluble extractive,
methanol soluble extractive, hexane soluble extractive, pH value and qualitative tests for tannin, terpenoid/sterols, alkaloid, saponin, flavonoid, glycoside, carbohydrate were carried out by following standard methods.\[6\]

In TLC study, methanolic extract of \textit{L. reticulata Ghana} was run on a pre-coated silica gel 60 F 254 plate by using Toluene: Methanol (9:1) as a solvent system and anisaldehyde sulfuric acid as a spray reagent and Quercetin as standard. The solvent was allowed to run up to 8 cm distance and plate was observed as such under long and short ultraviolet (UV) rays and the florescent spots resolved were noted down. Then the plate was sprayed and heated at 110°C in oven. The Rf of the developed colored spots resolved were noted down.

The methanolic extract was also tested by HPTLC with the help of CAMAG Linomat-5 instrument to detect the presence of quercetin in \textit{Jivanti Ghana} by following standard method.\[7\]

**Results**

**Analysis on routine physico-chemical parameters**
Prior to physico-chemical tests, the prepared tablet of \textit{Ghana} were tested for the parameters, results show its disintegration time as 37 minutes and hardness as 6.5 kg/cm². The physico-chemical analysis revealed not less than 11.00% W/W as moisture content and not more than 32.50% W/W as ash value. The water soluble ash was not more than 19.50% W/W and acid insoluble ash was not more than 1.50% W/W. There was wide variation in all the extractive values. Water soluble extractive was not less than 56.00% W/W, whereas methanol and hexane soluble extractive were not less than 28.00% and 2.00% W/W, respectively [Table 1].

**Analysis on routine qualitative parameters**
Qualitative tests revealed the presence of tannin, terpenoid/sterols, alkaloids, saponin, flavonoids, carbohydrate, and glycoside [Table 2].

**Analysis on thin layer chromatography separation of the methanol extract**
TLC analysis of the extract showed four resolved spots (Rf – 0.30, 0.44, 0.60, and 0.73) and Rf value (0.30) and the color of the quercetin were matching with one of the resolved spot of the extract, indicating the presence of quercetin in \textit{Ghana} [Table 3 and Figure 1].

**Table 1: Analytical data of physico-chemical parameters of \textit{Jivanti Ghana} tablet**

| Parameter                        | Results (%) |
|----------------------------------|-------------|
| Determination of loss on drying  | 11.00 W/W   |
| Ash value (% of total ash)       | 32.50 W/W   |
| Water soluble ash                | 19.50 W/W   |
| Acid insoluble ash               | 1.50 W/W    |
| Water soluble extractive value   | 56.00 W/W   |
| Methanol soluble extractive value| 28.00 W/W   |
| Hexane soluble extractive value  | 2.00 W/W    |
| pH value (5% aqueous solution)    | 5.88        |

**Table 2: Analytical data of qualitative tests of \textit{Jivanti Ghana} tablet**

| Components   | Tests                                      | Results  |
|--------------|--------------------------------------------|----------|
| Tannin       | With dilute solution ferric chloride       | Positive |
|              | With 5% lead acetate and KOH              | Positive |
| Terpenoid/sterols | Libermann–Buchhard test              |          |
| Alkaloid     | Salkowski reaction                        | Positive |
|              | Dragendroff reagent                       | Positive |
|              | Mayer’s reagent                           | Positive |
|              | Wagner’s reagent                          | Positive |
| Saponin      | With lead acetate                         | Positive |
|              | Froth test                                | Positive |
| Flavonoid    | With neutral lead acetate                 | Positive |
|              | With sulphuric acid                       | Positive |
| Glycoside    | Molish test                               | Positive |
| Carbohydrate | Fehling A and B solution test              | Positive |

**Analysis on HPTLC identity test**
In the HPTLC study, same Rf value (0.86) was noticed in all three tracks at 700 nm in track I and track II and at 260 nm in track III [Table 4 and Figure 2].

**Discussion**
As the drug is in tablet form, it should first be dissolved in the stomach in right time for its proper absorption. Since the drug, having moderate disintegration time and very high water and...
alcohol soluble extractive value, is indicative of proper dissolution and absorption in the acid media of stomach and intestine. Any drug must first pass into solution before it can be absorbed and so the alcohol soluble extractive of Ghana has physiological importance. Hence, it may be inferred that chemical constituents of Jivanti will be physiologically more available in the form of Ghana. Furthermore, other parameters like pH (5.88) and ash value (32.50% W/W) of the Ghana also support its better efficacy. Qualitative assessment in Jivanti Ghana by different tests reveals the presence of tannin, terpinod/sterols, alkaloids, saponins, flavonoids, carbohydrates, and glycosides-like constituents. Presence of carbohydrate denotes Jivanti having Madhura Rasa, may confirms classical reference. The resolution of four spots on TLC indicates the presence of four different chemical constituents one of them being quercetin resolved at 0.30 Rf. In the HPTLC study, same Rf value (0.86) was noticed in all three tracks at 700 nm in track I and track II and at 260 nm in track III. Positive Rf value indicate the possibility of the presence of quercetin-like flavonoid in Jivanti Ghana and variation in covered area due to presence of iso-quercetin, a nearer flavonoid glycoside-like quercetin [Figure 3].

### Table 4: HPTLC details of test solution of Jivanti Ghana and quercetin at 254 and 366 nm

| Track | Sample          | No. of spots at 254 nm | Rf value | No. of spot at 366 nm | Rf value |
|-------|-----------------|------------------------|----------|-----------------------|----------|
| I     | *L. reticulata* MeOH | 8                      | 0.02, 0.07 | 8                     | 0.02, 0.07 |
|       |                  |                        | 0.10, 0.16 | 0.10, 0.16            |
|       |                  |                        | 0.20, 0.68 | 0.20, 0.68            |
|       |                  |                        | 0.86, 0.97 | 0.86, 0.97            |
| II    | *L. reticulata* MeOH | 9                      | 0.01, 0.07, 0.10, 0.11, 0.15, 0.19, 0.64, 0.86, 0.97 | 3         | 0.01, 0.08, 0.10 |
|       |                  |                        | 0.74, 0.86 | 0.15, 0.74            |
|       |                  |                        | 0.97       | 0.97                  |
| III   | Quercetin        | 5                      | 0.02, 0.16 | 4                     | 0.02, 0.09 |
|       |                  |                        | 0.74, 0.86 | 0.15, 0.74            |
|       |                  |                        | 0.97       | 0.97                  |

### Conclusion

The absorption and bioavailability of Jivanti (*L. reticulata*) may be better in the form of Ghana. Presence of carbohydrate may confirm classical reference regarding Rasa of Jivanti. Positive R, value at 0.86 confirm the possibility of the presence of quercetin/iso-quercetin in the Ghana.

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हिंदी सारांश

जीवन्ती घन का विश्लेषणात्मक अध्ययन

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