

STANDARDIZATION OF SOME LOCAL DRUGS

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Five important local drugs, aconite, *Cinnamomum camphora*, colchicum, male fern and rhubarb have been studied. These were analysed and tested according to standard assay methods. All these drugs come up to standard laid down by I. P. Codex, 1953.

Introduction

Medicinal plants and herbs of great commercial and therapeutic value are known to occur in the north western part of West Pakistan and its tribal territories,^{1,7} but no systematic attempt has ever been made to standardize them. Due to lack of such authentic information local pharmacists are reluctant to use these valuable indigenous raw materials for the preparation of galenicals and other medicaments. They, therefore, import crude extracts of these drugs for the manufacture of tinctures and other pharmaceuticals. It has also been commonly observed that some medical practitioners hesitate to use them in their prescriptions because they are doubtful about their quality and they think that they would not get suitable results when administered to their patients. Recognizing the importance of standardization of indigenous pharmacopoeial and non-pharmacopoeial drugs the present work was undertaken and the results obtained have been reported in this paper. This analytical data and information will be useful for those engaged in the practice of medicine and pharmacy.

Materials and Methods

Five important drugs, aconite, *Cinnamomum camphora*, colchicum, male fern and rhubarb were selected for the present study. Samples of crude drugs or herbs were collected from wild sources

during the botanical surveys carried out at these laboratories. A few samples were also purchased from the local drug market of Peshawar. Some drugs were freshly analysed mainly because of the volatile nature of their constituents while others were dried in the sun or shade as required and the percentage of active principles was accordingly estimated. All drugs were analysed and tested according to the standard assay methods and the analytical data represent the average of at least three determinations in each case.

General and Experimental

Aconite or 'methatalia' (Urdu) consists of the dried root of *Aconitum chasmanthum* Stapf ex Holmes (N. O. Ranunculaceae) which is found as a beautiful perennial herb in the alpine and subalpine regions of western Himalayas, from Chitral to Guraiz Valley and Azad Kashmir, and also in Upper Hazara in high plateaus between 7,000-12,000 ft.³ It is found gregariously between Burwai and Gitidas; and is most common at Basal particularly on the sides of the Laluser Lake. It is the Banbalnag of Azad Kashmir, Mohri of Hazara, Dudhia and Pium of the Himalayas.

The air-dried fresh samples were analysed according to the assay method of the Indian Pharmaceutical Codex 1953 and the results are shown in Table 1.

It was also observed that alcoholic (90 percent) extract of the drug produces with equal volume of

TABLE. I—LOCAL ACONITE

| Month of collection | Locality of collection | Indaconitine % | Ash % | Acid-insoluble ash % | I.P.C. 1953 standards | |
|---------------------|-------------------------|----------------|-------|----------------------|-----------------------|----------------------|
| | | | | | Indaconitine % | Acid-insoluble ash % |
| October | Kamari (Azad Kashmir) | 3.80 | 4.83 | 0.20 | Not specified | Not more than 1% |
| October | Laluser (Kaghan Valley) | 3.63 | 4.50 | 0.15 | 4.3 | |

concentrated sulphuric acid a dark violet coloration, gives white precipitate with 5 per cent silver nitrate solution and yellow precipitate with a saturated solution of picric acid.

Cinnamomum camphora Nees and Eberm.—*Cinnamomum camphora*; Nees and Eberm (N.O. Lauraceae) or camphor tree is a large handsome evergreen plant and is indigenous to China, Famosa and Japan. It is planted in some gardens in the plains especially at Abbottabad. It grows well in good soil, and is quite hardy at 4,000 ft.^{5,6} It also grows in moist shady places in gardens at Lahore. This plant is a source of camphor which is an official drug of the British Pharmacopoeia.

TABLE 2.—ABBOTTABAD CAMPHOR TREE.

| | Average yield of volatile oil in | | Camphor in the air-dried sample % | Remarks |
|---------|----------------------------------|--------------------|-----------------------------------|---|
| | Fresh sample % | air-dried sample % | | |
| Bark | 0.02 | 0.07 | nil | Only oil could be obtained from fresh or dried bark. |
| Leaves | 2.20 | 4.20 | 1.70 | Camphor could be obtained only from air-dried leaves. |
| Sapwood | 0.53 | 1.70 | nil | Only oil could be obtained. |
| Twigs | 0.61 | 1.50 | 0.60 | Camphor could be obtained only from air-dried twigs. |

Samples of both fresh and air-dried bark, leaves, sapwood and twigs were steam-distilled for about three hours for the determination of volatile oil and camphor. In some cases only oil could be obtained while in others oil contaminated with camphor was obtained. Camphor was separated from the oil by a centrifuge and then analysed by following the general principles of the method of the British Pharmacopoeia 1953. The results are given in Table 2.

Colchicum luteum Baker.—*Colchicum luteum* Baker (N. O. Liliaceae) or 'Suranjan-e-talkh,' is an annual herbaceous plant found extensively growing in the subalpine areas in the rakhs and open fields in bordering forests of the Upper Hazara, Murree Hills, Malakand, Kurrum and Khyber agencies at altitudes of 2,000 to 9,000 ft. It is often the first flower (yellow) to bloom on lawns in Abbottabad and Murree from January to March. The plant is locally known as 'Qiamatgul' due to its poisonous nature. It is considered to be a substitute for *C. autumnale* Linn, an official drug of the British Pharmacopoeia.

The drug colchicum corm consists of the fresh corm of the above mentioned plant collected in early spring; or the same deprived of its coats, sliced transversely and dried at a temperature below 65°C. The drug colchicum seed are the dried ripe seeds of the same herb. Both were analysed according to the methods of I.P.C. 1953 and the results obtained are given in Table 3.

Dryopteris filix-mas (Linn) Schott.—*Dryopteris filix-mas* (Linn) Schott (Fam. Polypodiaceae) or male

TABLE 3.—LOCAL COLCHICUM.

| Locality of collection | Part analysed | Colchicine % | Total ash % | Acid-insoluble ash % | I.P.C. 1953 standards | | | B.P. 1953 standards for <i>C. autumnale</i> L. | |
|------------------------|------------------------------------|--------------|-------------|----------------------|-----------------------|-----------------------|-----------------------|--|-----------------------|
| | | | | | Colchicine | Total ash | Acid-insoluble ash | Colchicine | Acid-insoluble ash |
| Abbottabad | Corm, fresh and sliced under water | 0.27 | 2.10 | 0.12 | } Not less than 0.2 % | } Not specified | } Not more than 0.5 % | } Not less than 0.25 % | } Not more than 0.5 % |
| Abbottabad | Fresh air-dried corm | 0.27 | 2.14 | 0.13 | | | | | |
| Kamari | " | 0.27 | 2.30 | 0.13 | | | | | |
| Market sample. | Dried corm. | 0.20 | 2.41 | 0.20 | | | | | |
| Market sample. | " | 0.19 | 2.50 | 0.21 | | | | | |
| Abbottabad | Seeds | 0.40 | 3.38 | 0.12 | } Not less than 0.3 % | } Not more than 5.0 % | } Not more than 1.0 % | | |
| Abbottabad | Seeds | 0.44 | 3.40 | 0.12 | | | | | |

fern is commonly found in the moist depressions on the northern aspects and other such forests in cooler places in the northern part of West Pakistan like Azad Kashmir, Kaghan Valley and Murree Hills above 6,000 ft.¹ The drug consists of the rhizome, frond bases and apical buds, collected late in autumn, divested of dead portions and the roots are carefully dried, retaining the internal green colour.

Four fresh, air-dried samples of male fern were analysed according to the official assay method of B. P. 1953 and the analytical values are shown in Table 4.

Rheum emodi Wall.—*Rheum emodi* Wall (family Polygonaceae) or 'Rewandchini' is found in sub-alpine and alpine Himalayas and is common everywhere in Astore and Upper Guraiz Valley at altitudes of 11,000 to 12,000 ft.⁴ About 250 maunds can be collected in a season⁷ and is usually considered to be the source of the so called Himalayan or Indian rhubarb.

The drug consists of the dried rhizome and roots of this plant or other species of *Rheum*, collected from 6 to 7 years old plants just before the flowering season, with cortex intact or partially decorticated.

It was found that local rhubarb responds to all tests given in I.P.C. 1953, or B.P. 1953 and gives positive indication for the presence of anthraquinone compounds, emodin and chrysophanic acid. In ultraviolet light it fluoresces deep violet with certain amount also of velvety brown patches and does not contain rhaponticin.

Results and Discussion

Table 1 shows that indigenous aconite comes up to the standards laid down by the Indian Pharmaceutical Codex 1953 and also shows all the identification tests of the said Codex. It is, therefore, concluded that the drug can be put to all the uses enumerated therein in the prescribed doses to get the desired therapeutic results.

Table 2 shows that camphor tree of Abbottabad yields a good percentage of natural camphor and camphor oil which are valuable products for the manufacture of celluloid, disinfectants, medicaments and perfumes. It is, therefore, probable that an industry could be established somewhere near Abbottabad as the tree could be grown easily in moist ravines at about 2,000 to 4,000 ft. above sea level. But in order to achieve this end it is necessary to start a careful cultivation because at present only a few trees exist and they too are being destroyed by the people.

It is evident from Table 3 that corm of *Colchicum luteum* collected from natural source contain a suitable amount of colchicine and is more than the lower pharmacopoeial limit. So it is a good substitute for *C. autumnale* of the British Pharmacopoeia which does not grow at all in Pakistan but its preparations are quite specific for rheumatism and gout. The percentage of the active principle is, no doubt, comparatively low in the market samples. On enquiries it was disclosed by the dealers that fresh corm, just after their extraction from the ground, are put into boiling water for a minute or two and then dried in the sun. This

TABLE 4.—ANALYTICAL VALUES—RHIZOMES OF PAKISTANI MALE FERN.

| Date of collection | Locality | Ash % | Acid-insoluble ash % | Ether extract % | Filicin % | B.P. 1953 standards | |
|--------------------|------------------------------|-------|----------------------|-----------------|-----------|-----------------------|------------------------|
| | | | | | | Acid-insoluble ash | Filicin |
| October | Dungagali (Murree Hills). | 3.60 | 0.34 | 9.10 | 3.27 | Not more than 2.0% | Not less than 1.50% |
| September | Shogran (Kaghan Valley) | 3.42 | 0.15 | 9.51 | 3.30 | | |
| July | Naran (Kaghan Valley) | 2.97 | 0.17 | 8.97 | 3.39 | | |
| October | Shogran (Kaghan Valley) | 3.01 | 0.14 | 10.05 | 3.45 | | |

treatment does not allow them to shrink on drying and they retain their natural shape which is liked very much by the hakims. This defective process of drying is responsible for the low colchicine content of the drug samples purchased from the market. This method should be abandoned and the official method of slicing the fresh corm and then drying them in shade or at a temperature below 65°C. should be followed.

The analytical data obtained with indigenous male fern shows that it is of superior quality and may be used as an anthelmintic. It is reported that the active principle, filicin, is more stable than the crude drug itself which deteriorates within one year.⁸ It is, therefore, advisable to extract the resin and store that for use in pharmaceutical industry or export purposes. Local rhubarb also agrees with all the standards and identification tests of both the Indian Pharmaceutical Codex and British Pharmacopoeia. But the drug available from wild sources cannot even feed the local pharmaceutical industry. So in order to obtain a regular supply of the drug of standard quality, a careful cultivation of the medicinal species is necessary. If Himalayan rhubarb is cultivated with due care, there is reason to believe that a drug equal to the Turkish or Chinese rhubarb might be obtained.

Summary

All the five drugs discussed here are of standard quality. But in view of their short

supply from wild sources their cultivation should be started at suitable places both to meet the demand of the local industries and for export purposes.

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