STANDARDISATION OF CIVANAR AMIRTAM

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ABSTRACT: Civanar amirtam is a siddha herbo- mineral formulation prescribed for rheumatism, bronchial asthma, tuberculosis and leprosy. Of the nine ingredients which constitute the preparation, four are inorganic and the others are plant drugs. Attempts have been made to chemically analyse and to identify the presence of each ingredient in the medicine to lay down standards. The identification of various chemical constituents present in the plant drugs using TLC technique by comparison with authentic chemicals, along with the physico-chemical parameters and quantification of inorganic ions established the presence of each ingredient. The parameters presented can be considered viable for prescribing dependable standards to this preparation.

INTRODUCTION

The Siddha pharmacopoeia committee has listed ‘Civanar amirtam’ under the category karuppu. It derives its name from the black colour of the finished product. Civanar amirtam is prescribed for rheumatic diseases, bronchial asthma, delirium, ascites and tuberculosis. It is also used for diseases due to deranged bile, leprosy, colic, pile and in insect stings. Earlier workers have reported the drug to possess a significant anti-inflammatory diuretic and antimicrobial activities. The nine ingredients which constitute the preparation are shown in table 1. The present paper describes the detailed chemical analysis of Civanar amirtam to lay down to standards.

MATERIAL AND METHODS

The raw drugs were procured from the authorized drug dealers madras, Botanically/chemically identified, and subjected to preparation as per siddha text. Qualitative and quantitative analysis was done following the procedure detailed in pharmacopoeial standards for ayurvedic formulation. Qualitative inorganic analysis was carried out after igniting the sample except mercury which was analysed using the medicine. The organic secondary metabolites were tested with the CHCL₃ and ETOH extracts of the drug. The exhaustive extracts of the medicine in n-hexane benzene, CHCL₃ were subjected to thin layer chromatography (tlc) over silica gel in the following solvent systems:

1. n-Hexane : Benzene (2:1)
2. Benzene : Ethyl acetate (12:1)
3. Benzene : Ethyl acetate (10:1)

Total alkaloid was estimated as per the method given in India Pharmaceutical Codex.
### Table -1

**Ingredients of Civanar amirtam**

| S.No. | Tamil name | Botanical/Chemical name | Anatomical part       | Qty. g |
|-------|------------|-------------------------|-----------------------|--------|
| 1.    | Iracam     | Mercury                 | -                     | 10     |
| 2.    | Kantakam   | Sulphur                 | -                     | 10     |
| 3.    | Iruvi      | *Drypters filix* –mas Schott | rhizome               | 10     |
| 4.    | Karunabi   | *Aconitum Sp.*          | rhizome               | 10     |
| 5.    | Cukku      | *Zingiber officinal Rosc.* | Dried rhizome        | 10     |
| 6.    | Manocilai  | *Arsenic disulphide*    | -                     | 10     |
| 7.    | Poritta    | *Sodium biborate* (dehydrated) | -                     | 10     |
| 8.    | Venkaram   |                         | fruiting inflorescence | 10     |
| 9.    | Tippili    | *Piper longum L.*       | fruits                | 80     |
|       | Milaku     | *P.nigrum L.*           |                       |        |

### Result and Discussion

The product was a black fine powder, with pungent taste and smell of pepper. The qualitative inorganic analysis showed the presence of chloride, sulphate, carbonate, phosphate, oxalate, borate, sulphur, sodium, iron, calcium, mercury, arsenic and magnesium. The organic components analysed were steroid, triterpenoid, alkaloid, quinine, flavonoid, furan, coumarin, tannin, saponin, phenol and sugar.

The physico-chemical data are summarized in table2. Of the nine ingredients which constitute the medicine, four are of inorganic origin and the rest are botanicals. To identify the presence of inorganic ions, solubility of the medicine in water and the elements present were determined. Thus the estimated water soluble (15.03%) along with the various ions viz. mercury 6.1 and borax 5.79% confirmed that presence of the inorganic ions, *manocilai* (arsenic disulphide), the arsenical drug was identified by quantitatively estimating arsenic 3.2% and sulphur contents 14.11%. LC of the extracts also showed the presence of free sulphur by comparison with an authentic sample (fig.c).

The remaining five herbal drugs have essential oils and other secondary metabolites, therefore, the estimated volatile matter content (0.332%), exhaustive extraction values and alcohol soluble (12.08%) can be also considered as parameters (Table 2).
Aconitum sp., Piper nigrum and P. longum have alkaloids, hence that total alkaloid was estimated as 4.108%. The alkaloid piperine (3.7%) is present in both P. longum and P. nigrum. The identification of piper longumine and piper longuminine from the TLC of the solvent extracts was conclusive evidence for the presence of P. Longum in the medicine by co-TLC with authentic samples (fig B&C).

Although the piperine content would characterize the presence of P. nigrum, other parameters have been considered to differentiate P. nigrum in the presence of P. longum. TLC examination of the volatile matter (fig 4) resulted in the characterization of piperonal, caryophyllene (P. nigrum) and zerumbone and citral (Z. officinale), the respective major volatile oil constituents by comparison with authentic samples, which confirmed the identity of P. nigrum and Z. officinale in the medicine.

The solvent extracts of the medicine developed in 10:1 benzene : EtOAc resolved into spots which were almost identical to those present in the five herbal ingredients by co-TLC of the EtOAx extracts of P. longum, Z. officinale, P. nigrum, Aconitum Sp. and Dryopterus fillix –mix (fig ). Further TLC of the CHCL₃ extract of the medicine on comparison with the EtOAc extract of Aconitum sp. Afforded two dragendorff’s positive spots (Fig C, tract 7) which confirmed the identity of Aconitum sp.

The literature survey reveals that these chemicals are reported to have various therapeutic effect 9-12. Thus the activity of the medicine may be due to the presence of these compounds. Though modern techniques like HPTLC, spectrophotometry etc. would help to evolve more parameters, the data presented above can be considered for prescribing standards to this medicine.

**Conclusion**

Chemical analysis of Civanar amirtam has been carried out. Identification of various chemical constituents present in the plant drugs using TLC technique by comparison with authentic chemicals and estimation of inorganic ions along with the physicochemical data established the presence of each ingredient. The data presented can be considered to lay down standard.

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### Table -2

**Analytical data of *Civanar amirtam***

| Parameters                              | Value (% w/w)   |
|-----------------------------------------|-----------------|
| Loss on drying at 110°C                 | 9.30            |
| Loss on ignition                        | 83.86           |
| Acid insoluble ash                      | 0.61            |
| Water insoluble ash                     | 4.33            |
| Alkalinity of water soluble ash         | 0.40 cc of 0.1N HCL/g |
| **Exhaustive extraction**               |                 |
| Hexane                                  | 10.19           |
| Benzene                                 | 10.77           |
| Chloroform                              | 11.98           |
| **Solubility**                          |                 |
| Alcohol (90%)                           | 12.08           |
| Water                                   | 15.03           |
| Volatile matter                         | 0.332           |
| Total alkaloids                         | 4.108           |
| Piperine                                | 3.7             |
| **Assay**                               |                 |
| Mercury                                 | 6.1             |
| Borax                                   | 5.79            |
| Arsenic                                 | 3.2             |
| Total sulphur                           | 14.11           |
| Free sulphur                            | 4.71            |
A

2:1 HEXANE : BENZENE

1. VOLATILE MATTER
2. CARYOPHYLLENE - PIPER NIGRUM
3. CITRAL - ZINGIBER OFFICINALE
4. PIPERONAL - P. NIGRUM
5. ZERUMBONE - Z. OFFICINALE

B

BENZENE : ETHYL ACETATE
12 : 1

(DRAGENDORFF'S REAGENT)

1. CHLOROFORM EXTRACT
2. ACONITUM SP. - EIOAc EXTRACT
3. PIPER LONGUM - EIOAc EXTRACT
4. PIPER LONGUMININE - P. LONGUM
5. PIPER LONGUMININE - P. LONGUM
6. PIPERINE - P. NIGRUM
FIG. C

10:1 BENZENE : ETHYL ACETATE

1. HEXANE EXTRACT
2. BENZENE EXTRACT
3. CHLOROFORM EXTRACT
4. PIPER LONGUM - EtOAc EXTRACT
5. ZINGIBER OFFICINALE - EtOAc EXTRACT
6. P. NAGUM - EtOAc EXTRACT
7. ACONITUM SP. - EtOAc EXTRACT
8. DRYOPTERIS FILIX - MAS - EtOAc
9. SULPHUR
10. PIPER LONGUMININE
11. PIPER LONGUMINE
12. PIPERINE
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