Chromatographic studies on a herb decoction
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Abstract: Argwadhadhi Kwatham is a compound preparation of 3 single drugs viz cassia fistula L. Azadirachta indica A., Tinospora cordifolia L. Literature survey shows that all3 ingredients are very effective for skin diseases. Kashyams prepared individually with these 3 drugs was found to be more effective for skin diseases. This paper deals with a comparative study of the chemical constituents present in aragwadhadhi kwatham and the individual kwathams, all the four kwatham were chemically analysed T.L.C. studies were mainly used for the comparative studies.

INTRODUCTION

India’s ancient system of plant based medicine, Ayurveda is gaining recognition throughout the world as more and more Ayurvedic drugs are being clinically tested and accepted for manufacture. In Ayurveda drugs in their gross state have been used against specific diseases through knowledge passed down from one generation to another1. In recent years there has been an awakening in the world for use of natural medicament in place of synthetic drugs and antibiotics. World health organization also stressed on the use of indigeneous medicine for the ailments2. This in turn has led to a consistent growth and demand of many of these plant bde4d drugs and several plant products. As the knowledge of chemistry advanced the plants were subjected to chemical analysis and their chemical and their chemical constituents were isolated and identified. An important aspect of Ayurvedic treatment is its easy availability3 and abundance of its ingredients. But urbanization, deforestation, etc led to the shortage of genuine single drugs and the medicine prepared, in many cases, omitting costly rare drugs and using substitutes/adulterants, had not been able to maintain their proper efficacy4. Combined with this, man new medicines were marketed, based on new permutations and combinations of single drugs.

Aragwadhadhi Kwatham is a compound preparation of 3 single drugs, viz cassia fistula L. Azadirachta indica and tinospora cordifolia Literature survey shows at all the 3 ingredients are very effective for chronic skin diseases. At the same time, aragwadhadhi kwatham, a combination of 3 drugs was found to be more effective for skin diseases. In this context a study was taken up to compare the chemical constituents of the individual kashayam with the combined kwatham.

Materials and Methods

Single drugs used for the study were obtained from Model Demonstration Garden of our Institute.
Kashayam was also prepared with equal quantities of the 3 drugs by the usual method. Each of the prepared kashayam was extracted with ethyl acetate. T.L.C technique was mainly used for the study. Silica gel G plates activated at 1100C was used for the comparative study. The ethyl
acetate extract of combined kashayam (Aragwadhadhi Kwatham) was spotted along with that of the individual drugs.

Results

Kashayam of the ark of cassia fistula is popularly used for skin disease. Main components of bark of cassia fistula are tannin, anthraquinones, proasthocyanidin etc. A main chemical constituent fisticacadin was isolated from he bark of cassia fistula. Main alkaloid is chaksine. Cassia fistula is reported to possess antipyretic and analgesic properties. In the case of Azadirachta indica (Vep) almost all parts of the tree has found use in indigenous medicine Bark is a bitter tonic, astringent and antiperiodic. Also useful in malarial fever. It is very useful in skin diseases. Tinospora Cordifolia is mentioned in ayurvedic literature as a constituent of several preparation, used in general debility dyspepsia, fever and urinary diseases. The dry stem with bark intact constitute the drug. The bitter principles present in the drug showed antiperiodic, antispasmodic, anti inflammatory, and anti-pyretic properties. This is also reported to possess one-fifty of the analgesic property of sodium salicilate. Stem contains glucoside, alkaloids including beriberine, and 3 bitter principles, columbin, charmasthen and palmarin, Tinosporin, tinosporic acid and tinosporol. Aqueous and alcoholic extracts caused reduction in fasting blood sugar and has been suggested due to its favourable effect on endogenous insulin secretion, glucose uptake and inhibition of peripheral glucose release.

Ethyl acetate extracts of kashayams of Vep, Konna, Amrith and Aragwadhadhi Kwatham were spotted. In the solvent system benzene: ethanol 5:1, Tinospora cordifolia, Azadirachta indica and Aragwadhadhi kwatham gave spots in iodine vapours. Cassia fistula did not give any spot. Tinospora gave only one spot in iodine which was also present in Aragwadhadhi kwatham (Rf 0.29) which indicates that the particular constituent of tinospora has not undergone any chemical change during the process of preparation. Azadirachta indica gave 3 spots in this system, in (iodine). But only one spot in the Aragwadhadhi kwatham corresponded with spot of azadirachta indica, Rf 0.06. Two other spots of azadirachta indica Rf 0.70 and 0.81 were absent in the Aragwadhadhi kwatham. (fig 1). This means tree constituents of the drug are detectable in this solvent system. In Aragwadhaiki kwatham prepared with three ingredients, only one spot is present, showing that the other two constituents of Azadirachta indica present in individual kwatham is absent when the three drugs are combined. Since the kwathams were prepared under some conditions, constituents present in the individual kwatham is absent when the three drugs are combined, since the kwathams were prepared under some conditions, constituents present in the individual kwatham should be present in the Aragwadhadhi kwatham, unless the components have undergone some chemical reactions to form new compounds. Investigations are going on in this direction to identify any new compound formed. In this case as the two compounds are entirely missing in the Aragwadhadhi kwatham in this solvent system, the new compound formed should be entirely different from its nature.

In the system benzene, acetone, methanol 7.2:1, both Tinospora cordifolia and Azadirachta indica gave one spot in iodine. Tinospora gave a spot of Rf: 0.29 and Azadirachta indica gave a spot of Rf 0.44. Cassia fistula did not give any spot in this system. This shows that components present in the individual drugs are present
without any change in the Aragwadhadhi Kwatham.

In the system Chloroform: diethyl amine 9:1 Tinospora cordifolia gave two spots in iodine. Both cassia fistula and Azadiractha indica did not give any spot. The two spots of Tinospora cordifolia were present in the Arugwadhadhi kwatham Rf 0.6, Rf 0.75. Also Aragwadhadhi kwatham did not give any other spots. This result shows that the two components of Tinospora cordifolia are present without any change in aragwadhadhi kwatham, also that any new product formed is no of nature of these two compounds.

In the solvent system chloroform pet ether-diethyl amine 7:2:1. only Azadirchta indica gave single spot in iodine (Rf 0.78) only this spot was present in Arugwadhadhi kwatham. Cassia fistula and tinospora cordifolia did no give any spot. Also Arugwadhadhi kwatham, a mixture of three single drugs gave only one spot corresponding to spot of Azadirachta indica. This also means that same components in Azadirachta indica is present on Aragwadhadhi kwatham and no new compound is manifested.

Two other system were developed for cassia fistula (I) benzene – ethyl acetate – ethanol 25:15:5 and (II) benzene – methanol – acetone – 30: 10: 10. in both systems one spot was obtained for cassia fistula in U.V (Rf 0.88- I and Rf 0.88 – I and Rf 0.73 II). The spots of obtained for cassia fistula in both the solvent were present in the Arugwadhadhi kwatham also. No other spot was present in the finished product. In other words it can by assumed that the component present in cassia fistula is present without an change in Aragwadhadhi kwatham.

Discussion and Conclusion

In the present study Thin Layer chromatographic technique was mainly used. Rf of a compound in any system depends on the nature of compound and nature of solvent system used. separation of mixture of compounds in TLC is mainly based on its polarity. Hence for comparative studies, different types of solvent systems of varying polarity were tried. Investigations are going on for isolations and identification of compounds in present in the single drug are unchanged when the individual drugs are combined to form Arugwadhadhi kwatham. But in the case of Azadirachta indica, there was a change in the nature of compounds. In the solvent systems benzene – ethanol 50:10 and benzene chloroform: ammonia 20: 75:3. Azadirachta indica gave 3 spots and only one spot was present in Arugwadhadhi kwatham, prepared using the three drugs together. Since in two different systems two spots are missing in Aragwadhadhi kwatham there is a possibility that a new compound has formed by combining with another compound of other drugs. In the case of other two drugs, the compounds deterred in single drug were found unchanged in the Aragwadhadhi kwatham. However our preliminary studies shows clearly the possibility of formation of new compounds. Clinical stud reports have shown that Aragwadhadhi kwatham is more efficient than kashayams of individual drugs. As the possibility of formation of new compounds cannot be ruled out form our preliminary studies itself, the more therapeutic efficacy of the Aragwadhadhi kwatham can be attributed to the formation of new compounds.
| System                                      | Azadirachta indica | Cassia fistula | Tinospora cordifolia | Aragwadhadhi Kwatham |
|---------------------------------------------|--------------------|----------------|----------------------|----------------------|
| Benzene: acetone: Methanol 7:2:1            | 1 0.44             | Nil            | 1 0.29*              | 1 0.29*              |
| Chloroform: diethylamine 9:1                | Nil                | Nil            | 2 0.6* 0.75*         | 2 0.6* 0.75*         |
| Chloroform: pet ether: diethyl amine 7:2:1  | 1 0.78*            | Nil            | Nil                  | 1 0.78*              |
| Benzene: chloroform: 20:75:5                | 3 0.33* 0.70* 0.85*| 1 0.3*         | Nil                  | 2 .03* .033*         |
| Benzene: ethanol 5:1                        | 3 0.6* 0.70* 0.81* | Nil            | 1 0.20               | 2 0.20* 0.60*        |
| Benzene: ethyl acetates: Ethanol 25:15:5    | Nil                | Nil            | 1 0.88*              | Nil                  |
| Benzene: Methanol: Acetone 3:1:1           | Nil                | Nil            | 1 0.73**             | Nil                  |

* iodine vapours  
** UV.
Fig. 1
Solvent System: Benzene: ethanol 5:1
Rf = 1. 0.20
     2. 0.60
     3. 0.70
     4. 0.81
Fig. 2
Solvent System: Benzene: Chloroform: ammonia
Rf = 1. 0.3
2. 0.33
3. 0.7
4. 0.85

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