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Low cost, simple analytical method to determine the purity and strength of costly *Ayurvedic* ingredient *Hirabol* (*commiphora myrrh*) from various samples.

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ABSTRACT:

Ayurveda is the holistic science of life. In ancient scriptures of *Ayurveda*, medicinal properties of *Hirabol* has been described. In recent years, entire world is looking forward for the use of medicinal plant products in healthcare system.[1] Analysis and standardization of drug is todays need.[2] The herbal industry needs to follow strict guidelines and regulations as laid down by the government. The use of *Hirabol* is mentioned in various ayurvedic literatures. Since ancient time it has been used as a household remedy. The analysis of *Hirabol* or Myrrh is not specified in any of the authentic books because of the lack of proper method. Modern methods involve high cost apparatus and hence are beyond reach of common *Vaidya*. By using simple solvent extraction methods and available tests, here is an attempt made to analyze the purity and strength of Myrrh using various samples available in Indian Market.

Keywords: Ayurveda, *Hirabol*, *Myrrh*, *Resin*, *Myrrhol*, *Volatile Oil*, *Commiphora*, *Myrrhol*

INTRODUCTION:

The Ayurvedic system of medicine is a vast ocean of knowledge, which has been blessing the nectar of life to humanity since immemorial times. Since ancient time it has been used as a household remedy. Reference of *Hirabol* is mentioned in various *Nighantus* and ancient ayurvedic literatures. A huge description on Hirabol is mentioned in *ayurvedic nighantus* especially Raj *Nighantu*. *Hirabol* is acclaimed as a drug of choice in various vataj and kaphaj disorders.[3] Myrrh has been used as an ingredient for perfumes, incense and cosmetics for thousands of years. According to ancient Greek legend, Greek soldiers carried myrrh with them to treat battle wounds. The botanical identity of a majority of the plants mentioned in the pharmacopoeia of various indigenous systems of medicine has been established since the introduction of the modern system of plant classification in India. There are however a number of crude drugs where

the plant source has not yet been scientifically identified. In other cases it has been seen that, more than one plant species, sometimes with widely different morphological and taxonomic characters are considered the source of a particular drug. The true source of the crude drug in such cases can be located only after detailed chemical and pharmacological studies.[4]

As commercialization of the herbal medicine has happened, assurance of safety, quality and efficacy of medicinal plants and herbal products has become an important issue. The herbal raw material is prone to a lot of variation due to several factors, the important ones being the identity of the plants. So, an attempt made to analyse the purity and strength of Myrrh using various samples available in Indian Market.

COMMIPHORA MYRRH:

As per Raj Nighantu, Myrrh is oleo gum resin obtained from plant of *Commiphora* myrrh. [5,6,7]

Synonym: Commiphora molmol, Gum Myrrh

Biological source: It is the oleo-gum-resin obtained by incision from the stem of Commiphora molmol Engler and from other Commiphora species.

Family: Burseraceae. The genus of Commiphora consists of about 185 species.

Habitat: Found in India, W. Pakistan, Arabia, Tropical and Southern Africa. It is usually found in low brush lands and in shallow soil, most often over limestone.[8]

Botanical Classification:

- *Kingdom* *Plantae*
- *Division* *Magnoliophyta*
- *Class* *Magnoliopsida*
- *Family* *Burseraceae*
- *Genus* *Commiphora*
- *Species* *myrrh*

Other Names :

- ***English name*** ***myrrh***
- ***Hindi name*** ***bol*** *baaoL*
- ***Sanskrit namegandh*** ***ras*** *gaMQarsa*
- ***Gujarati name*** ***heerabol*** *ihrabaaola*

It has a small tree that attains a height of 10 feet. Its stem extricates an extract which is called as Myrrh or Bol or Hirabol. It is of reddish brown or yellowish in texture. Pure Hirabol is crystalline and is bitter in taste. The main tree trunk is gray in color and is thick in appearance. The branches are attached to main trunk at almost at an angle of 90 degree. The leaves are toothed and are divided into a pair having oval leaflets and a bigger terminal leaflet. Flower is of red or yellow in color. Fruit is oval in shape and is tapering at the apex.

Myrrh which is commonly known as Hirabol or Bol in Indian market is wildly used in Ayurvedic preparations.

The research scholars so far tried to establish the perfect analytical method but due to less data available and high percentile seasonal and geographical variation. According to Indian *Materia Medica,* By *A.K. Nadkarni,* the Hirabol constituents are *Myrrhol*, Oxygenated ethereal essential Oil 5 to 10 %, resin-myrrh 27 to 50 %,Gum 30-60 %, Bitter principle Glycoside, Salts such as Calcium Phosphate and carbonate etc. The other book. Herb of *Ayurveda* by Ashok Seth claims *Hirabol* to have *Myrrhol* 2%, *Myrrhin*, Gum 60 %, Resin 3-5 %, and Calcium carbonate.. But no definite method is given to *analyse* the exact contents of *Hirabol*.

Various attempts were made to develop easy gravimetric methods to determine the Purity and Strength of *Hirabol* samples. As this is the naturally occurring Oleo Gum Resin, the chances of adulteration with similar looking but a low cost and zero potent gums or resins are very high. The present study is to establish the easy and accurate method to determine purity and strength of Myrrh or *Hirabol*.

Aim: To determine the purity and strength of Myrrh/*Hirabol*.

Objectives:

1. To study literature on *Hirabol* from various literatures.
2. To study analysis
3. Collection of raw material from local market.
4. Identification of raw material.
5. Authentication of raw material.
6. To study literature w. s. r. to purity and strength.
7. Analytical study of *Hirabol*.

MATERIALS AND METHODS

Materials : Various samples of Myrrh. (Here I got 4 samples from different suppliers and different variety), Mortar Pestle, 20mesh size S.S. sieve, Electronic weighing balance (0.001 gm accuracy), Solvent Ether, Ethanol, Potassium Hydroxide, Lead Acetate, Glycerin, Volumetric Flasks, Measuring cylinders, Beakers, Volatile oil apparatus, *Soxchlet* apparatus, Stirrer, Flasks, Filter papers etc.

Part 1 : Sample preparation :

Myrrh by nature, due to high resin and gum content, is very hard and bulbous form. So all the samples must be first crushed to have uniform size granular nature. For this, approximately 50 gms of

Material is taken and is crushed in mortar and pestle and then sieved through 20 mesh sieve to have uniform sized granular powder. This powder is them mixed well and used as SAMPLE.

Part 2 : Extraction Procedure :

Exactly 10 *gms* (± 0.005 *gms*) of the material is taken in a 100 ml stopper flask. The solvent (Ethanol, Diethyl Ether, Sodium Hydroxide, Water etc.) is added slowly and then stirred well by using rotary shaker for given time. Then the extract is filtered in pre weighed filter paper (*Filtroll* no. 201, 12.5 cm Diameter). The supernatant and residue are measured and treated further as per procedure.

Part 3 : Volatile Oil is obtained by using the standard VOLATILE OIL APPARATUS (As per *Ayurvedic* pharmacopoeia) .

Part 4 : The residue obtained at various stages are dried in oven at temp. of 100° C at a constant weight.

Part 5 : The filtrates when required are evaporated in a pre-weighed evaporating dish in an oven at 100° C to a constant weight.

Part 6. Calculations are carried out with W/W , where weight of sample is 10 gm.

PROCEDURE:

1. Exact 10 gms of Powdered *hirabol* sample is weighted on electronic balance and added in to Stoppered flask.
2. 100 ml of Solvent Ether is measured exactly in 100 ml *Borosil* measuring cylinder and transferred the same in to the flask.
3. The flask is labeled and kept for shaking on a shaker for 4 hrs.
4. All the 4 samples are kept for ethereal extraction in the same above manner.
5. The shaker is then switched off after 4 hrs and flasks are allowed to stand for 30 minutes.
6. The 12.5 cm circular filtroll filter paper is the weighed and folded to place on funnel.
7. The extract is then filtered through this filter paper and collected in 100 ml measuring cylinder and the volume at the end of filtration is recorded.
8. The filter paper containing residue is then transferred carefully to pre weighed glass Petri dish and kept in OVEN at 60 ° C for 1 hour.
9. After drying is over, the filter paper with residue is weighed and the exact weight of residue is noted down. (This can also be obtained by weighing Petri dish directly and tearing off the Petri dish weight.)
10. The residue along with filter paper is washed in another solvent system, ethyl alcohol previously measured in 100 ml measuring cylinder and then transferred to another Stoppered flask and the Extraction procedure is repeated.
11. The Etheral extract is then subjected to distillation with the help of Volatile Oil apparatus so as to separate Volatile and non-Volatile part. Both parts are then isolated and recorded to Obtained figures C & D.
12. After completing the process of extraction, the alcoholic extract is also filtered in the same manner of Etheral extract to obtained Residue and Filtrate.

These residue and filtrates are measured.

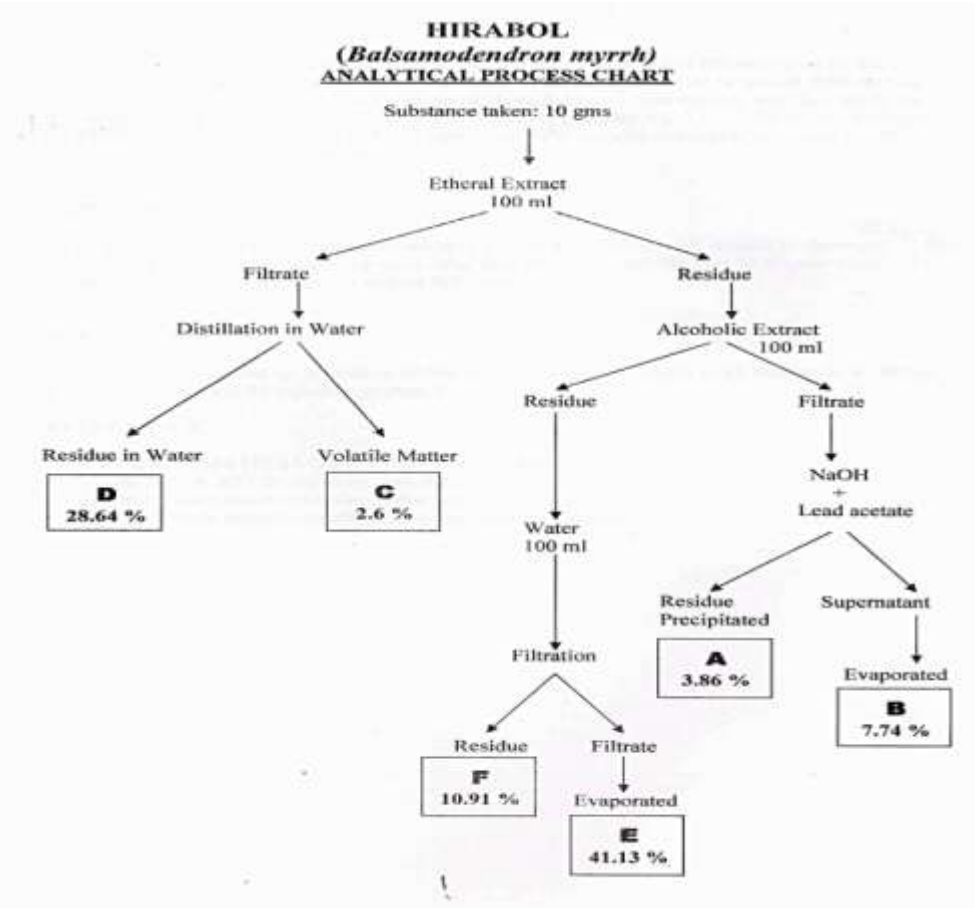
13. The filtrate is then transferred to flask and Sodium Hydroxide solution is added so as to make it Alkaline. (Approx 2 ml of NaOH solution is sufficient). The flask is to be shake well and Lead Acetate solution (Prepared as per Indian Pharmacopoeia - IP) is added drop wise till the precipitate is formed.
14. The flask is then shaken well and allowed to stand for 10 minutes.
15. The precipitate in the flask is then separated with the help of pre weighed Filtroll filter paper. The filter paper is then dried completely and weighed. "A"
16. The supernatant is evaporated in pre weighed evaporating dish and residue now obtained is also recorded "B".
17. The residue obtained from Alcoholic extract is then subjected to aqueous extract in exactly the same manner. The residue obtained after filtration is recorded as "F" and supernatant is evaporated to get value of "E".

CALCULATIONS:

Thus at the end of this procedure, we have 6 figures, A,B,C.D, E & F. The percentage can be calculated directly by multiplying the result by 10.

(The total of percentage of A+B+C+D+E+F < 100).

Hirabol namely SAMPLE I, II, Ill & IV for all the tests A, B, C, D, E & F are as follows.



OBSERVATION AND DISCUSSION:

From the obtained data and tests carried out, the main claimed effect of *Hirabol* must be due to various volatile matter ("C")in it along with a & *herbo myrrhol* (Can be traced from residue "A"). So the final gradation was done based on these 2. From above results, one can clearly say that sample III (A 3.52 + C 3 = 6.52%) and SAMPLE II (A 3.86 + C 2.6 = 6.46 %) are amongst the BEST of 4. From Production point of view, Sample II is more acceptable as F, non soluble matter is less than that of sample III.

CONCLUSION:

By looking at this full method one can not only get the best quality with respect to chemical constituents or contents but also can have clear idea about non soluble may be impure matter. This method even though is tedious. its almost full proof.

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