PHARMACOLOGICAL SCREENING OF "SUVARNAMAKSHIKADI-WATI"

AN AYURVEDIC COMPOUND FORMULATION IN ANIMALS

ABSTRACT

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INTRODUCTION

The Indian system of Ayurvedic Medicine is one of the oldest ones, having many sources of drugs such as indigenous plants, minerals, and animal products. Though, the practice of Ayurvedic Medicine has developed a lot in this century, still there are many people working entirely on the knowledge of their forefathers. It has been unreservedly admitted by all unbiased Eastern and Western scholars that, Ayurveda in all its aspects is the fountain source or mother of many other medical systems of the world.

There are numerous first rate manufacturers in India, who manufacture efficacious combinations of Ayurvedic medicines having synergistic actions showing better effects.

What is the exact action of the preparation, with so many diverse ingredients? and what is the exact utility?

One such preparation from an Ayurvedic pharmaceutical institute "The Parashuram Aushadhalaya, Pune" managed by a renowned Vaidya, V. Khadiwale, has been taken to screen for its pharmacological actions. This preparation is sold in the market by the name "Suvarnamakshikadi-wati" and contains the following different ingredients.(Vaidya khadiwale)

1) Suvarnamakshik Bhasma
2) Abhrak Bhasma
3) Loha Bhasma
4) Genuine Vanshalochana
5) Pure shilajit
6) Shringa Bhasma
7) Arjuna Sal
This is claimed to be effective in several conditions for which presently it is routinely prescribed.

1) Heart trouble 8) Tachycardia
2) Chest pain 9) Psychosis (Confusion)
3) Hypertension 10) Depression
4) Paralysis 11) Weakness
5) Anaemia 12) Karshya (Leaniness)
6) Rajayakshama (T.B.) 13) Dryness of mouth
7) Breathlessness 14) Disease of Valves of Heart

Hence this preparation was taken for the study with following objects in mind...

AIMS & OBJECTIVES

1. Toxicity profile
2. Actions on Central nervous system.
3. Actions on Autonomic nervous system.
4. Actions on Cardio vascular system.
5. Hepatoprotective action in animals.
6. Adaptogenic activity.
7. Separation of principles by chromatographic studies.
8. To study Heavy metal's contents of the preparation by Atomic Absorption spectroscopy.
AYURVEDA : A BRIEF REVIEW

Virtually every country, that has a system of traditional medicine, presents a unique configuration designed to be compatible with its own future and meeting the needs of its own population.

Traditional medicine has been defined by WHO as "The sum of total of all knowledge of practices whether applicable or not used in diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observations handed down from generation to generation verbally or in writing".

Ayurveda, Unani and Siddha all three systems are fundamentally similar in their approach to health and disease. It is therefore not surprising that Ayurveda thoughts and methods have had a deep impact on the lifestyle of the people of India. The Ayurvedic formulary is rich and diverse and holds a very sound position. This is because it has grown and matured in the soil of India.

Ayurveda as the name implies (Ayu-life, Veda-knowledge) is the knowledge of healthy living and is not confined only to the treatment of illness.

The exact origin of Ayurveda is controversial, however the period of ancient Indian Hindu medicine may be divided into three different periods: the pre-vedic, vedic and Arsha.

Putting aside all claims of a divine origin of science, one can say that the pre-vedic period is the long period of development, during which the pre-historic man built the basis of this system of keeping healthy with the help of his accumulated
experience. This experience was gained by the primitive man in course of the prolong struggle for existence, in the face of adverse condition of nature.

In Ayurveda, we have a medical system which still trusts the human sense organs. The knowledge of how to live would be a ready translation. However for the benefit of people living in our hi-tech civilization, we should expand this to "the knowledge of how to live naturally". Ayurveda is a knowledge of natural harmony and a method of removing which makes use of the power of nature to restore living being to a state of balance. The human body is one such living being.

The heat of sun, light, air and water and mineral, vegetable and animal substances, are employed in therapy and as remedies. In addition, Ayurveda has something to say on health education and health presentation. Ayurveda helps us to recognize the correct way to live at a given movement in order to overcome special problems, it helps us in fact to analyze our habits and our environment and to see where we are going wrong.

Ayurveda is a holistic medical system and it has no room for that split between spiritual and the physical and the physical that is part and parcel of our Western archetype. At the heart of Ayurvedic thinking, is the insight that the universe as macrocosm and man as microcosm are in direct relationship; that they reflect one another and that the one is always present in the other.
3) PLAN OF WORK

For our work we have selected the formulation Suvarnamakshikadi-wati with an intention of screening it on the following parameters.

The work was divided into different groups of experiments.

1) TOXICOLOGICAL STUDIES:

1.1 Acute toxicity study in Rats.
1.2 Subchronic Toxicity study in Rats.

2) GENERAL BEHAVIOURAL STUDY

3) ANALGESIC ACTIVITY

3.1 Tail pinch method
3.2 Radiant heat method

4) ANTICONVULSANT STUDY - IN RATS

4.1 Electroconvulsive shock method.
4.2 chemical method (pentylentetrazole induced convulsions)

5) MODIFICATION OF PENTOBARBITONE SLEEPING TIME IN RATS

6) EVALUATION OF ENZYME INDUCTION ACTIVITY - in Rats and effect of test compound on pentobarbitone sleeping time.

7) ADAPTOGENIC ACTIVITY

7.1 In rats - effect on weight
7.2 swimming performance

8) SEQUENTIAL EXTRACTION OF TEST COMPOUND

8.1 Sequential extraction by using different solvents.
8.2 50% alcohol extraction

9) ATOMIC ABSORPTION SPECTROPHOTOMETRY

To estimate percentage of inorganic elements in the compound preparation.
10) HEPATOPROTECTIVE ACTIVITY

In Rats using CCl\textsubscript{4} induced hepatotoxicity model.

11) CARDIOVASCULAR ACTIONS

In Anesthetised dogs, the effect of standard pressor and depressors on B.P. and respiration and its modification by test compound by Intravenous route and oral route.

12) To study the effect of the preparation on Hb content-in Anaemia-in Rats.

MATERIALS

A) The test material, suvarnamakshikadiwati in the form of powder was obtained from an Ayurvedic pharmaceutical firm. This firm is named Hari Parashuram Aushadhalaya. Vaidya Khadiwale is incharge of it and under his supervision and guidance compounds are prepared. This compound preparation contains following ingredients and each ingredient is processed separately as per Ayurvedic methodology.

Each 200 mg tablet contains

\begin{align*}
\text{SUWARNMAKSHIK BHASMA} & \quad 100 \text{ mg} \\
\text{ABHRAK BHASMA} & \quad 20 \text{ mg} \\
\text{SHILAJIT} & \quad 20 \text{ mg} \\
\text{VANSHELCHAN} & \quad 20 \text{ mg} \\
\text{SHRING BHASMA} & \quad 20 \text{ mg} \\
\text{LOHA BHASMA} & \quad 20 \text{ mg} \\
\text{ARJUNA SAL} & \quad --
\end{align*}
For this work, material (test compound) was provided in one lot of about 3 kg in powder form. For all experimental work the same test compound was used.

Results which were observed after pharmacological testing

1) Pentobarbitone sleeping time.

There is significant increase in sleeping time with the test compound. Probably it could be due to enzyme inhibition.

2) Effect on liver enzymes.

Further studies were carried out, to see the effect on enzyme induction. In this study, phenobarbitone was used as enzyme inducer. The results of this study indicates that as compared to control group there is a significant increase in pentobarbitone sleeping time in drug treated groups. It is possible that the test compound produces enzyme inhibition and hence an increase in pentobarbitone sleeping time.

Atomic absorption spectro photometry

The compound preparation Suwarnamakshikadi wati contains a number of ingredients. Out of these, the majority are bhasmas. An attempt was made to explore the possibility of estimation of trace elements in this compound formulation. Analysis of the inorganic components was carried out by using atomic absorption spectrophotometer.

It appears that the compound preparation contains Nickel, Cadmium, Copper and Iron in different concentrations. Out of these four elements, Iron and Copper is present in abundant quantity. Hence the further studies were carried out to study the effect of the material as Copper is useful element in the enzymatic reactions in liver and Iron is useful in anaemia.
Hepatoprotective study

CCL₄ was used as a hepatotoxic agent and a possibility of hepatoprotective activity of the test compound was explored. In control group, CCL₄ produces significant increase in S.AlP, S.Bilirubin and S-ALT. Similar results were seen by Histopathology.

In control group there is no change in any of the parameter i.e. liver volume, weight and S. bilirubin, A-transferase, A-phosphatase. While with test compound there is improvement in levels of S-bilirubin S-ALP, S-ALT as compared to CCL₄ group. This efficacy was further correlated with histological changes.
Anaemia

Our compound preparation, Suvarnamakshikadi wati contains, Iron as a major inorganic constituent, as there is Suvarnamakshik Bhasma and also Loha Bhasma. At the same time, our study of vitro analysis confirms the presence of Iron in large quantity. We assessed its utility in Anaemia. The results of one month study shows that when anaemia was developed by blood loss over a period of 1 week, the initial basal haemoglobin which was normal in all groups of animal had come down significantly. Then to the control animals gumtragacanth was administered and the test group of animals received 640 mg/100 gms of test compound over a period of one month. Every week Hb was estimated and was found increased from day 15th (2nd week) and day 28th and 35th readings it appears from results that as compared to control group there was significant increase in haemoglobin level and that came to normal basal levels within a month.

Therefore our results indicate that test compound is useful in Iron deficiency anaemia and can be used in various anaemias, also in diseases in which there is associated anaemia. Therefore we can recommend use of compound preparation on scientific basis for Iron deficiency anaemia.

CVS

Test compound produces fall in blood pressure. This is also observed with hydroalcoholic extract of test compound. The possible mechanism of this activity was further studied.

Adaptogenic activity

One of the simple parameter to evaluate Adaptogenic activity is an increase in body weight. Suvarnamakshikadi wati does not produce significant increase in body weight.
**Analgesic**

The compound preparation Suvarnamakshikadi wati was evaluated for analgesic activity by using two methods and different doses of test compound. It appears from the results that there is no significant increase or decrease in pain threshold. **Anticonvulsant**

Evaluation of compound preparation was carried out for its anticonvulsant property by using two standard models. It appears from the results, that compound preparation has failed in blocking or abolishing convulsions either induced by chemical substance or by MES.

**Results of Acute Toxicity study**

In acute toxicity study, results show that there was no occurrence of death in 24 hours after single dose administration. Therefore from the results it appears that test compound $LD_{50} > 2560$ mg/100gms. It is safe even from histological studies.

**Sub-chronic toxicity study**

Over a period of one month test compound (Suvarnamakshikadi wati) was administered. Daily oral administration was done. It appears from observations in various groups that compound is not producing any obvious toxic effect.

**General behaviour study**

No significant change (impairment in either direction) in sleeping score by test compound was observed. It did not produce any action like abnormal body movements, convulsions, salivation or lacrimation. Therefore it appears, test compound is not producing any acute adverse effects over a period of 4 hours after single dose administration.
Sequential Extraction

In this procedure original compound powder (500 gms) was subjected to extraction. Following are yields from different solvents.

Yield of 40-60 Petroleum ether extract - 20 mg
Yield of 60-80 Petroleum ether - 10 mg
Yield of Chloroform - 30 mg
Yield of Alcohol - 1 gm

Therefore from the sequential extractions it appears that test compound contains material which is not soluble in these solvents. The content of organic material thus appear to be very small, and is in a range of 0.004-0.2%.

50% Alcohol extract = 15% yield.