Research Article

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MAMSYADI KWATHA AS LEARNING ENHANCER: AN EXPERIMENTAL STUDY

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ABSTRACT
Mamsyadi kwatha, an Ayurvedic formulation mentioned in siddha yoga sangraha is highly effective in minor mental disorders. The ingredients are Jatamamsi (*Nordostachys jatamamsi* DC), Ashwagandha (*Withania somnifera* Linn.) and Parasika yavani (*Hyoscymus niger* Linn.) in 8:4:1 ratio respectively.The test formulation was subjected to assess its effect on learning phenomenon. The model selected for the evaluation was Rotarod performance. The test formulation enhanced learning ability in Mice.
Key Words: Mamsyadi kwatha, Jatamamsi, Ashwagandha, Parasika yavani, Rotarod performance.

INTRODUCTION
Learning is the symbol of progress. Learning is the stepping stone in evolution. All Indian forms of art nurture the process of learning. In Charaka samhita[1], special forms of learning skills are explained under the heading of Trividha jnanopayas. Many Ayurvedic formulations are said to be the modulators of learning phenomenon and Mamsyadi kwatha[2] is one among them. In this competitive era, learning enhancers/ boosters are getting wide scope. Here an effort has been made to explore the ancient learning boosters.

OBJECTIVES
- To assess the effect of Mamsyadi kwatha on learning phenomenon.
- To assess the effect of components of Mamsyadi kwatha on learning process.

MATERIALS AND METHODS
Animals
Swiss albino mice of either sex weighing between 20g – 40g were randomly selected and maintained in the animal house attached to the pharmacology laboratory of I.P.G.A & R.A. They were maintained on 'Amrut' brand mice pellets. Both food and tap water were given ad libitum. Animals were exposed to natural day and night cycle. 60-85% of humidity was maintained. The drugs under trial were administered orally with help of a specially prepared catheter.

Grouping
Albino mice were divided into 5 groups each containing 6 mice.
Control group:- Mice of this group were administered with 80ml/kg/day of distilled water.
Jatamamsi kwatha group- Jatamamsi kwatha of 80ml/kg/day was administered to each mouse of this group.
Ashwagandha group- Ashwagandha kwatha was administered in the dose of 80ml/kg/day for each mouse of this group.
Parasika yavani group- Each mouse of this group was administered with the decoction of Parasika Yavani in the same dose as stated as above.
Mamsyadi kwatha group-80ml/kg/day of the Mamsyadi kwatha was administered for each mouse.

Route of administration, Duration and Dose
Freshly prepared decoction of above mentioned drugs administered orally in a dose of 80 ml per kg per day, with the help of specially prepared catheter. The duration was 7 days for chronic study and one day for acute study.

Statistical Analysis
Statistical analysis was carried by employing students't' test for paired and unpaired data and also by non parametric methods. A 'p' value of less than 0.05% was considered as statistically significant.

Experimental Procedure
Experiments were carried with 2 dosing schedules[3].
1. Acute Study – Test drugs administered one hour prior to experimentation. On the same day experiments were conducted.
2. Chronic Study – Trial drugs were administered for 7 days, on 8th day morning experiments were conducted one hour after the administration of test drug.

Test Formulation: Mamsyadi Kwatha
Reference: Siddha Yoga sangraha
Ingredients: 1) Jatamamsi – 1 part
2) Ashwagandha – 1/4 parts
3) Parasika yavani – 1/8 parts

Preparation of medicine
1. Jatamamsi Kwatha: decoction prepared by boiling 1 part of coarse powder of jatamamsi in 16 parts of water & reducing into 1/4th part
2. Ashwagandha Kwatha – Prepared as mentioned above
3. Parasika Yavani kwatha – Prepared as mentioned above
4. Mamsyaadi kwatha – Prepared as mentioned above
For each experimentation fresh decoction was prepared. Here 1ml of decoction consists of the water extractable material of 500 mg of the drug.
The ingredients used in Mamsyadi quatha and the drug details are dealt in Table No.01.

Experimental model
Modified method of Watzman et al. (1967) as described by Bansinath et al. (1982) was employed[4]. Animals used were albino mice of either sex.
To assess learning phenomenon Rotarod instrument was used (INSIF Rotarod Instrument, Ambala, India). It consists of a rotating rod of diameter 3.5 cm and speed of rotation was 13 rotations per minutes. One hour after administration of test drugs each mouse observed for following activities.
(1)Number of attempts made by mouse to complete the prescribed 120 seconds duration
(2)Number of free rides (Mice remaining on the rod without falling while taking a full round).

OBSERVATIONS
The observations made in the study are presented in the Table No.02

The table shows the data on the effect of test drugs on Rotarod performance of albino mice during chronic administration. A marginal decrease in trial/min in Jatamamsi[5] administered group was observed. Marked decrease in trials required for training observed in parasika yavani 49.6%) administered group was also found to be statistically no significant. There is decrease in the trial observed (P<0.05) in Ashwagandha and Mamsyadi kwatha administered group was found to be statistically significant.

A marginal decrease in free rides/2 min was observed in Ashwagandha administered group. (39.54%) slight reduction in free rides/2min was observed in Parasika yavani and Mamsyadi kwatha administered group which was not statistically significant. Mild increase in free rides/2min was observed in Jatamamsi administered group which was not statistically significant.

DISCUSSION

The classical Rotarod test is normally employed to assess central muscle relaxant activity or sedative effect. The test protocol was modified to assess the learning ability of the mice. Normally the mice are trained over few days to make them remain on the rotating rod for at least a minimum of two minutes. In this study test drugs were administered at least one hour before the training session everyday and total number of sessions required by each mouse was noted. When this testing protocol was followed it was found that in control mice an average of 7.6 training sessions were required to train the mice to remain on the rotating rod for the specified two minutes period. In Ashwagandha and Mamsyadi kwatha administered groups the number of training sessions required were significantly less. In jatamamsi administered group it was marginally less than control and in parasika yavani administered though it was less it was not statistically significant. The data obtained indicate that ashwagandha and Mamsyadi kwatha have significant learning ability enhancement effect. Parasika yavani has moderate effect.

Now it is well accepted fact that learning and memory are dependent on the establishment of the phenomenon known as long term potentiation (LTP) in cerebral neurons. It is establishment of long lasting synaptic excitability by the stimulation of a particular neuronal pathway. N-methyl D-aspartate (NMDA) a major neurohumor in the brain is reported to be involved in the establishment of LTP. Some non-NMDA pathways have also been reported to be involved. Recent evidences have clearly shown that multiple neurotransmitters and receptor mechanisms are involved in learning and memory processes. The well known neurotropic drug piracetum and its congener aniracetum antagonise benzodiazepine receptors. This mechanism is considered to enhance memory and learning abilities. (A.Manocha, 1998) it would be interesting to study the effect of test formulation for the above mechanism and it would also be necessary to evaluate it in other test paradigms before arriving at an unequivocal inference.

CONCLUSION

Test formulation Mamsyadi kwatha enhances the learning ability.
The learning ability enhancing effect of Mamsyadi kwatha is due to its ingredients mainly Ashwagandha.
Modified Rotarod test is an ideal experimental model to evaluate learning ability enhancement.

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Table No 01. The ingredients used in the Mamsyadi quatha and the drug details

Sl. No	Sanskrit name	Botanical name	Family	Guna	Part used
1	Jatamamsi	*Nardostachys jatamamsi* DC	Valerianaceae	Samjna Sthapana	Rhizome & oil
2	Ashwagandha	*Withania somnifera* Linn	Solanaceae	Balya brumhana vishagna (Ca) Shothahara Ropana (Su)	Roots
3	Parasika Yavani	*Hyoscymus niger* Linn	Solanaceae	-	Dried leaves with flowering tops,seeds

Table No.02 Effect of test drugs on "Rota rod" performance of albino mice chronic administration

Group	Dose ml/Kg	Trial / 2 Min (Mean ± SEM)	Free rides / 2 Min. (Mean ± SEM)
Control	80	7.6 ± 1.248	2.2 ± 1.2
Jatamamsi	80	5.166 ± 1.4	2.5 ± 1.33
Ashwagandha	80	2.83 ± 1.166*	1.33 ± 0.42
Parasika Yavani	80	3.83 ± 1.275	2 ± 0.516
Mamsyadi Kvatha	80	2.33 ± 1.11*	2 ± 0.258

*P<0.05   **P<0.01