

RAT'S BEHAVIOR ASSESSED BY RADIAL MAZE EXPLORATORY TEST

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ABSTRACT

To assess the efficacy of nux-vomica, reserpine & anacardium on radial maze exploratory test parameter as an indicator of the significant modifying impact on behavior. This was an observational study. This research was approved by the institute's ethical review board. The trials were performed from January 2013 to June 2013 at the Faculty of Pharmacy, Hamdard University, Karachi. In this study, research on rats weighing 180-250 mg was used for either sex. Psychotropic parameters of rats are studied for the effects of natural prescription and homoeopathic drugs. Doses were administered to rats by weight. Strychnus Nux-vomica has a powerful effect on the cholinergic system, C.N.S behavior and regular radial maze (4.6 ± 3.6) when used at a dosage of 0.2 mg. No major radial maze effect was observed in reserpine (2.2 ± 1.2) Rauwolfia serpentine is a dynamic alkaloid currently. Anacardium (1.38 ± 1.46) shows the results of the decline effects. The therapeutic significance of these medications or current studies was expected in this scenario to screen these medicines for intense action on the cholinergic system, CNS activity and frequent radial maze on rats.

Keywords: *Strychnus nux-vomica*, reserpine, anacardium, psychotropic drugs, rat.

INTRODUCTION

The radial rate is a variable that illustrates exploration and activity. The eight-armed radial maze, which exhibited movement and exploration, was investigated. A standard exploratory set-up to investigate contextual integration and perception execution in rats is the eight-armed radial maze.

The key test is to discover the areas of nutrition rewards at the end of the arms and remember these areas for progressive tests. Accordingly, the animal must be able to distinguish visual prompts beyond the limits of the labyrinth. Achievement and movement may be determined by measuring the development of methodology or when to complete the test. A most relevant

considerations documented by the module are varying time parameters, organization of arm visits and blunder scoring (Olton *et al.*, 1976; Olton *et al.*, 1978).

Radial arm apparatus was first developed by Olton and Sameulson in 1976, and since then it has been widely used by radial arm maze studies to research therapeutic effect to investigate the behavior change of a variety of drugs. Due to its inability to differentiate between drugs which are divergent in their effects, its use as a screening tool has a narrow spectrum. Radial arm maze consists of eight horizontal arms (5.7×11 cm) placed radially around a focal stage over the floor. Automated entryways (20 cm high) are located at each arm's passage (Suzuki *et al.*, 1980; Mazmanian *et al.*, 1983). Experimental subjects are placed

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on a focal stage from which they need to pick shrouded traps placed at the end of the arms, there is temporary memory impairment (Babb *et al.*, 2003). Products centered on herbal remedies are one of the major frontiers of research. After experimental trials, the perceived clarity of the herbal product found out to be misleading. Due to its simple sensitivity and its involvement in many problems like depression, convulsions and coma, etc., nervous system disorders have been researched more systematically. Many new structural analogues have been established in the handling of psychiatric diseases and effects memory (Reynold *et al.*, 1961). The effects of some natural prescriptions on the psycho-pharmacological model were observed in our analysis. Chemical analysis of herbal drugs helps us to investigate further and use of such herbs / alkaloids and / or to understand better the detrimental consequences that use of these herbal products may have shown (Reynold *et al.*, 1961; Cai *et al.*, 1998). Nux-vomica is a dried, ripe seed of strychnous Nux-vomica Linn that belongs to the Loganiaceae family. Strychnous is the Greek name for a variety of toxic plants. Nux vomica got from the two Latin terms that mean a nut that induces vomiting (Bandyopadyay *et al.*, 1995).

The Nux-vomica tree grows in Srilanka, India and Northern Australia and is about 12 meters high.^[6] Strychnine, a highly toxic agent that severely damages the nervous system, is found in the seeds, barks and leaves of Strychnous Nux-Vomica (Balakrishna *et al.*, 1992). Small doses of strychnine have a positive effect on the body, helping the digestive tract and improving urination. As a CNS stimulant, strychnine is extremely toxic in high doses (Bisset *et al.*, 1989). All parts of the CNS are excited by the alkaloid and the blocks inhibit spinal impulses at the post - synaptic level. This results in convulsions which are harmful. Brucine is less toxic than strychnine and is used as an alcohol denaturant commercially (Bisset *et al.*, 1989; Sha *et al.*, 1989). A snake root plant belongs to the Apocynaceae is Rauwolfia serpentine. The

Rauwolfias are evergreen trees with shrubs. For conditions like snakebite, hypertension, and sleeping disorder extracts of Rauwolfia serpentina is commonly used as an Ayurvedic medication (Janscar *et al.*, 1983). Indole alkaloids such as Reserpine, Rescramine, Yohimbine, Ajmaline and Serpentine are the active constituents of Rauwolfia serpentine. Two distinct properties of rauwolfia were recognized by Indian physicians in 1940, as a hypotensive effect and as a sedative effect. They have started to use the agent for clinical purposes (Benjamin *et al.*, 1994). It was used to lower hypertension after the isolation of reserpine in 1952, and its property of delivering severe wretchedness as a reaction also made it useful in psychiatry to use it as a sedative in the control of annoyed mad patients (Goodman *et al.*, 2001). Reserpine produces its antihypertensive effects by depleting catecholamine (adrenaline and adrenaline) from peripheral sites. The hypotensive effect is primarily due to a drop in cardiac output and peripheral resistance. Large doses cause respiratory depression and hypothermia. Reserpine's cardiovascular symptoms include hypotension, decreased heart rate and cardiac output. Due to the impairment of adrenergic transmission, the hypotensive response of the drug is prolonged. Parasympathomimetic consequences, like increased gastric erosion, G.I hypermotility and miosis (Epsten *et al.*, 1984). The marking nut of the Seme carpus is Anacardium. It is a small tree with a place for the anacardiaceae. The squashed seeds prepare a tincture from the marking nut. Patients with Anacardium suffer from a very peculiar and contradictory state of mind, such as laughing at serious and serious over insignificant things. As their mind and body are separate, they presume everyone and everything around them. They also suffer from fixed ideas. They are also subject to the illusion of hearing and smelling. Anacardium patients have a peculiar sensation of a hook or a pin on the surface of the body, as well as a sensation of a plug causing a pressing, penetrating pain. These sensations, whenever present and in any condition, make it the first rare remedy (Chopra *et al.*, 1956).

MATERIALS AND METHODS

Study on Rats

In this study, 25 rats belonging to both sexes were included. Rats weighing 180-250 mg were divided into five groups. Four groups were given drugs and one group was kept as control.

Animals

Animals have been observed during and after 21 days. Tablets crushed in 10 ml of 1cc water were administered. All these animals are fasted for 24 hours when they are trained on a radial maze. After 21 days of dosing, the activity is seen on the radial maze.

Table 1.1: Dosage of Medications

S. No	Drug	Dosage
0	Control	--
1	Nux-vomica	0.2mg
2	Reserpine	0.3mg
3	Anacardium	0.4mg

Table 1.2: Behavior Rat Pattern

S.No	Drug	Dosing (mg)				
1	Control	--	--	--	--	--
2	Nux-vomica	0.2	0.2	0.3	0.4	0.5
3	Reserpine	0.2	0.2	0.3	0.4	0.5
4	Anacardium	0.2	0.2	0.3	0.4	0.5

Table 1.3: Effect of Herbal Drug on Exploratory Activity of Rats (mean \pm SEM)

Treatment	Radial maze
Control	2.6 \pm 5.11
Nux-vomica	4.6 \pm 3.6
Reserpine	2.2 \pm 1.2
Anacardium	1.38 \pm 1.46

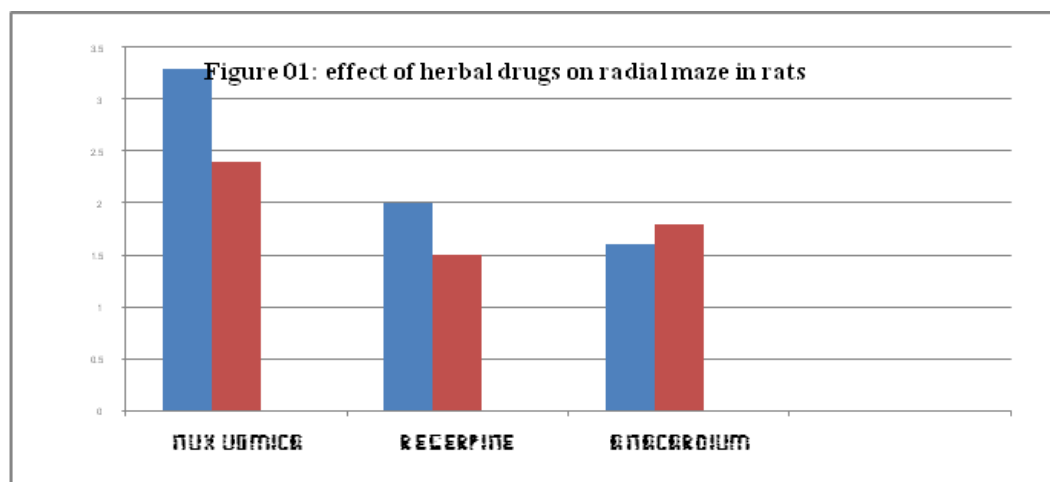
Values are mean \pm SEM (n=5) critical contrasts by understudy t-test $p < 0.01$ when contrasted with control.

Table 1.4: Table of Significant / Non-Significant drug effects on radial maze

Drug	Radial maze
Control	--
Nux-vomica	Decrease
Reserpine	Decrease
Anacardium	No significant effect

Apparatus and the experimental design

The radial maze of arms consists of eight flat arms (57×11 cm) set radially around the focal stage of the floor. Automated entrances (20 cm high) are located at the entrance of each arm. Trial subjects are set at the focal stage that they need to gather shrouded snares set toward the end of the arms. One bit of reinforcement is put towards the end of each arm in a well that hides food from sight and allows the creature to explore the labyrinth unreservedly.



Vertical bars represent mean \pm S.E (n=5). Significant differences $p < 0.05$

Each session lasts until each of the eight arms has been entered (think of entering as an arm when the whole body recognizes the tart, is inside the arm) 10 mm has passed since the beginning of the test, or 2 minutes has passed since the end of the test (Finger *et al.*, 1972; Ghosh *et al.*, 1987).

Arm passages are recorded for further investigation in order to avoid hints of smell, the maze must be cleaned between creatures. The van capable camels used for the examination of the execution are the number of lapses in each session (entering the arm that has gone before to consider a slip) and the aggregate number of errors during the eight sessions. The number of correct decisions in the initial eight brackets of each session, the area of adjacent brackets in each session, the time set aside to visit each aggregate time to complete the session, separated by an aggregate number of sessions to meet the criteria of one slip or less, was found to have a mean value of more than four back-to-back (Brown *et al.*, 1992; Jarrad *et al.*, 1978).

RESULTS AND DISCUSSION

All rats weighing between 180-250g, our final analysis applied to all 25 rats that completed the study protocol. The values of the parameter were compared and analyzed for statistical significance by the t-test version of the student. Statistical analysis using the student t-test revealed a non-significant distribution of behavioral data. The number of parameters was analyzed using the student t-test followed if there was a significant analysis to detect statistically significant differences between groups. The significance level was set at $p < 0.05$ and $p < 0.1$. All values have been expressed as mean \pm SEN.

Radial maze results

Significant reductions in exploration have been observed due to *Nux vomica* and Reserpine in the radial maze. Anacardium did not produce a significant reduction in exploration compared to control.

The radial arm maze is a united worldview for the assessment of memory. In spite of the fact that the most extensive model used as part of this type of test is the rat, the RAM ham has also shown its crosswise legitimacy over the species of other creatures (counting people). Throughout the years, distinctive forms of RAM have been developed, each of which has been shown to be as strong as the conventional in terms of memory evaluation. Creature models have been increased in the same way. Rodent is a rat that has recently been identified as a significant exploratory creature for the testing of dementia-related memory impairment. In this sense, assessing the execution of this late model using RAM is extremely helpful in understanding the many intellectual and behavioral segments of memory testing, the aim of this study is to evaluate the different behavioral changes produced by the healing properties of herbs that are finally being scientifically investigated. There are two main areas of research. One is the examination and the other was the evaluation of the efficacy of some herbal extracts using behavioral assessment tools. This research provided a scientific basis for this study (Jarrad *et al.*, 1983).

Psychopharmacological screening must be carried out in order to establish herbalism on scientific grounds. Psychopharmacological screening has generally been conducted in such a way as to simply indicate the presence or absence of a response. The basic elements of the drug discovery program are therefore the bioassays used to detect biologically active substances. The CNS screening included radial maze, open field activity, cage-crossing and swimming-induced depression. There was a group in which 6 per group and one group was kept as control. They've been provided food and water. Different CNS screening tests, including a radial maze, have been performed. Three herbs, Rauwolfia, serpentine, Nux-vomica and anacardium have been studied in the course of this study. Rauwolfia serpentine has been used in folk medicine in East India for centuries.

Reserpine is now used in Western medicine as an antihypertensive and tranquilizer (Haque *et al.*, 1995). Chronic reserpine therapy has shown a non-significant effect on water intake. Previously, reserpine was reported to increase the intake of water during the light phase and the animal consumed less water during the dark phase. Other herbal drugs such as *Nux-vomica* and *anacardium* have not had a remarkable effect (Seiden *et al.*, 1964). In summary, the present results show that oral intake of *Rauwolfia serpentina* in rats results in behavioral changes. Reserpine affects the behavior of the diet and body weight.

CONCLUSION

In this context, given the therapeutic significance of these drugs, this experiment was intended to screen the activity of the CNS in rats.

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