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EVALUATION OF ANTIDEPRESSANT ACTIVITY OF ARILS OF *MYRISTICA FRAGRANCE* IN ANIMAL MODELS

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ABSTRACT

In Unani literature *Mufarrih* (exhilarant and mood elevator) terms are used at many places. *Mufarrih-i-Qalb* means having exhilarant and mood elevator action on heart which gives *Farhat* (pleasant feeling) to the brain which in other words means making a person to feel happy. There are so many drugs in literature which have *Mufarrih* action, one such drug is *Bisbasa* (arils of *Myristica fragrance* Houtt.) commonly called as mace. The present study was carried out to investigate the antidepressant activity of arils of *M. fragrance* using Forced swimming test (FST) and Tail suspension test (TST) in rats and mice respectively. Petroleum ether extract (Fixed oil) and volatile oil of arils of *M. fragrance* was used in the dose of 43 mg/kg bw. Immobility period was decreased significantly by fixed oil (FO) and volatile oil (FO) obtained from arils of *M. fragrance* in both type of test in rats and mice. It has been observed that FO have greater antidepressant action than the VO but both have produced significant antidepressant activity.

KEYWORDS: Fixed oil (FO), Volatile oil (VO), Antidepressant, Aril, *Myristica Fragrance*, Mace.

INTRODUCTION

The fruits of *Myristica Fragrance* have a single seed covered by bright red arils. In Unani system of medicine seed (nutmeg) is known as *Joz-e-Bua* and bright red arils (mace) as *Bisbasa*. Both have medicinal properties and widely used for various ailments by Unani practitioners. Pharmacological actions of *Bisbasa* (Mace) as described in literature are *Mufarrih-i-Qalb* (Exhilarant), *Muqawwi-i-Bah* (Aphrodisiac), *Muqawwi-i-Mi'da* (Stomachic), *Muqawwi-i-Jigar* (Hepatotonic), *Muqawwi-i-Rahim* (Uterine tonic), *Hadim* (Digestive), *Kasir-i-Riyah* (Carminative), *Mudirr-i-Bawl* (Diuretic) and *Dafi'-i-'Ta'ufun* (Antiseptic/antibiotic) etc.[1,2] In Unani system of medicine management of many psychotic ailments like *Mālankhūliya* (melancholia) *Sahr* (insominia) and *Maniya* (psychosis) etc., usually done by *Mufarrih-i-Qalb* drugs. Difference lies between the *Muharrik-i-Dimagh* (stimulant to brain) and *Mufarrih-i-Qalb*/ *Dafi'-i-Hamm* (antidepressant) drugs as *Mufarrih-i-Qalb* drugs not only stimulates brain but also elevates the mood of a person and make him feel happy while *Muharrik-i-Dimagh* advia stimulate and increase the function of brain. Medicinal properties and actions of nutmeg and mace are described in Unani literature separately in detail.[3]

Myristica fragrans is used for various medicinal properties and many studies have shown very promising results in many diseased conditions. The fruit and seed extracts show various activities like hepatoprotective activity,[4,5] anti-oxidant activity,[6] memory enhancing activity,[7,8] anti-cancer activity,[9,10] aphrodisiac activity,[11] anti-diabetic activity,[12] anti-depressant activity,[13] hypolipidaemic and hypocholesterolemic effect,[14,15] anti-microbial activity, anti-bacterial[16,17] and anti-inflammatory[18] actions. Most studies have done on nutmeg and only few studies have seen using mace which is an important part of the fruit and have lots of therapeutic actions. Thus the present study has been undertaken to evaluate the antidepressant activity of volatile oil (VO) and fixed oil (FO) obtained from Mace (arils of *Myristica fragrance* Houtt.) in rats and mice by forced swimming test (FST) and tail suspension test (TST) respectively.

MATERIALS AND METHODS

Animals

Male albino rats weighing around 160-180 gm (for forced swimming test) and Male albino mice weighing 20-25 gm (for tail suspension test) were obtained from central animal house of Osmania Medical College, Hyderabad. The Male albino rats were chosen because of their docile nature and easy to handle, as well as to avoid the possibility of variation in response with changing hormonal status due to oestrous cycle of female on brain excitability. Rats were kept in Makrolon cages while mice in plastic cages with free access of food and water and were maintained under standard laboratory conditions with alternate light and dark cycles of 12 hours each. They were brought to the laboratory five days prior to the experiment.

Drugs and Treatment

Arils of *Myristica fragrance* were purchased from local market and used to obtain fixed oil and volatile oil. Fixed oil (FO) was obtained by Soxhlet Apparatus;[19] crushed drugs were placed in thimble and extracted with petroleum ether, (b.p. 60^0-80^0C) in a continuous extraction for 6 hours. Filtrate was evaporated on water bath and residue dried at 105^0C to constant weight. Volatile oil (VO) was obtained by Clavengers Apparatus[19] by distilling the crushed drug with a mixture of water and glycerin, collecting the distillate in a graduated tube in which the aqueous portion of the distillate automatically separated and returned to the distilling flask. The distillate was stored in air tight container.

Forced Swimming Test (FST)

FST or behavioral despair test was planned as a model to test antidepressant activity by Porsolt et al.[20] Nomura et al, proposed some modification in this model in which water wheel was used to test behavioral despair. Depression was induced in animal by placing the animal in plexiglass water tank containing fresh water upto a height of 15 cm and maintained at 25^0C. Rats tried to climb onto the wheel in order to escape from the water but could not climb sufficiently due to the rotation of the water wheel. As a result they continued to turn the wheel.[21] They were allowed to remain in water for 15 minutes. Initially rats were very active, vigorously swimming and trying to exit. After 2-3 minutes their activity began to subside and after 5-6 minutes duration of immobility reached a plateau where the rats remain immobile for approximately 80% of time. After 24 hour each rats was again forced to swim individually and after initial 2 minutes vigorous activity rats assumed a typical immobile posture. The total duration of immobility was recorded for next 4 minutes of total 6 minutes test. Any change in the immobility period was calculated after drug administration in different groups. Numbers of rotations of water wheels were also recorded for each animal. Rats were randomly divided into three groups of five animals in each group. First group (normal control) was treated with 43 ml/kg bw distilled water orally, second group was given VO in dose of 43 mg/kg bw and third group was administered FO in dose of 43 mg/kg bw for three successive days. The immobility period was recorded on 3rd day after one hour of administration of test drug.

Tail Suspension Test (TST)

The 'tail suspension test' has been described by Steoru et al.[22] the total immobility period induced by tail suspension was measured by this method. The immobility displayed by rodents when subjected to an unavoidable and inescapable stress has been hypothesized to reflect behavioral despair which in turn may reflect depressive disorders in humans. Mice were suspended on the edge of a shelf 58 cm above a table top by adhesive tape placed approximately 1cm from the tip of the tail. Immobility period was recorded for last 4 min of total 6 minutes test. Changes in the immobility period were studies after administration of test drugs in separate groups of animals. Mice were randomly divided into three groups of five animals in each group. First group (normal control) was treated with 43 ml/kg bw distilled water orally, second group was given VO in dose of 43 mg/kg bw and third group was administered FO in dose of 43 mg/kg bw for three successive days. The immobility period was recorded on 3rd day after one hour of administration of test drug.

Statistical analysis

All results are expressed as mean ± standard error of mean (SEM). Data were analyzed by students 't' test. In all test, the criteria for statistical significance was $p < 0.05$.

RESULTS AND DISCUSSION

The observations of the study have shown remarkable increase in number of rotations of water wheel and decrease in duration of immobility in groups treated with VO and FO. FO has shown better result than VO at same dose in FST (Fig. 1 & Table 1). While significant decrease in duration of immobility was observed in VO and FO group in TST, here also FO has shown better result than VO in same dose (Table 2). In the present study FO produced significant antidepressant effect in FST & TST, VO also shown significant effect but lesser than FO. The FST and TST models are common as well as specific for antidepressant activity of many antidepressants.

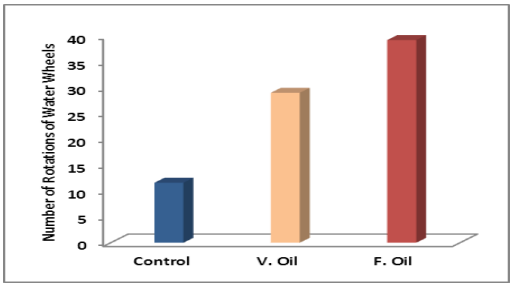

Fig 1: Effects of Fixed oil and Volatile oil on the number of rotations of the water wheel in last 4 min during a 6 min test. Significantly different from control $^a p < 0.006$ ^{a} & $^b p < 0.0005$.

Table 1: Effect of antidepressants on immobility period (seconds) using forced swiming test in last 4 min of a 6 min test in rats.

Group	Drug	Dose	Immobility Period (Sec.)
1	Control (Vehicle)	43 ml/kg bw p.o.	190.80 ± 1.43
2	Volatile oil (VO)	43 mg/kg bw p.o.	124.60 ± 1.36[a α]
3	Fixed oil (FO)	43 mg/kg bw p.o.	82.60 ± 1.50[b α]

Value as Mean ±SEM, p.o., per orally, bw, body weight. Statistical analysis of data was carried out by students 't' test. n=5, [a]p < 0.006 and [b]p < 0.0005 when compared with control. [α]p < 0.0006 when VO compared with FO.

Table 2: Effect of antidepressants on immobility period (seconds) using Tail Suspension Test in last 4 min of a 6 min test in mice.

Group	Drug	Dose	Immobility Period (Sec.)
1	Control (Vehicle)	43 ml/kg bw p.o.	177.40 ± 1.29
2	Volatile oil (VO)	43 ml/kg bw p.o.	116 ± 1.73[a α]
3	Fixed oil (FO)	43 ml/kg bw p.o.	77.80 ± 1.39[b α]

Value as Mean ±SEM, p.o., per orally, bw, body weight. Statistical analysis of data was carried out by students 't' test. n=5, [a]p < 0.0001 and [b]p < 0.0001 when compared with control. [α]p < 0.0001 when VO compared with FO.

CONCLUSION

In above study it may be concluded that FO and VO obtained from arils of *Myristica fragrance* Houtt. posses antidepressant activity and FO is more potent in its action in comparison with VO. In a similar study by Dhingra & Sharma[13] in which nutmeg of *M. fragrance* was used for antidepressant activity in mice has shown significant result. We have used aril of *M. fragrance* and results are promising. In Unani system of medicine aril of *M. fragrance* is described in detail and separate from nutmeg (seed of *M. fragrance*). The dose in this study is calculated according to human dose given in Unani literature and by converting it into animal dose. It is described as *Mufarrih-i-Qalb* (exhilarant) in Unani literature and this study have proved that it has antidepressant action.

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REFERENCES

1. Kabeeruddin M. Kitubul Advia (Makhzanul Mufradat), Daftarul Masih, Bazar Noorul Amra, Hyderabad; National Fine Printing Press, 1955; 134.
2. Najamul Ghani. Khzainul-ul-Advia, New Delhi; Idara Kitabus Shifa, 2011; 549-550.
3. Arzani, MA. Tibb-e-Akbar Urdu. Deoband (UP); Faisal Publication, 1924; 40-45.
4. Morita T, Jinno K, Kawagishi H. J Agric Food Chem, 2003; 51: 1560-5.
5. Sohn JH, Han KL, Kim JH, Rukayadi Y, Hwang JK. Biol Pharm Bull, 2008; 31: 273-7.
6. Murcia MA, Egea I, Romojaro F, Parras P, Jiménez AM, Martínez-Tomé M. J Agric Food Chem, 2004; 52: 1872-81.
7. Parle M, Dhingra D, Kulkarni SK. J Med Food, 2004; 7: 157-61.
8. Mukherjee PK, Kumar V, Houghton PJ. Phytother Res, 2007; 21: 1142-5.
9. Piras A, Rosa A, Marongiu B. J Food Sci, 2012; 77: 448-53.
10. Prakash E, Gupta DK. Universal J Food Nutrition Sci, 2013; 1: 1-3.
11. Tajuddin, Ahmad S, Latif A, Qasmi IA. BMC Complementary Altern Med, 2003; 20: 3-6.
12. Somani RS, Singhai AK. Asian J Exp Sci, 2008; 22: 95-102.
13. Dhingra D, Sharma A. J Med Food, 2006; 9: 84-9.
14. Ram A, Lauria P, Gupta R, Sharma VN. J Ethnopharmacol, 1996; 55: 49-53.
15. Sharma A, Mathur R, Dixit VP. Indian J Physiol Pharmacol, 1995; 39: 407-10.
16. Dorman HJ, Deans SG. J Appl Microbiol, 2000; 88: 308-16.
17. Orabi KY, Mossa JS, el-Feraly FS. J Nat Prod, 1991; 54: 856-9.
18. Ozaki Y, Soedigdo S, Wattimena YR, Suganda AG. Jpn J Pharmacol, 1989; 49: 155-63.
19. Afaq, SH, Tajuddin, Siddiqui, MMH. Standardization of Herbal Drugs, AMU Press, Aligarh, 1994; 37: 100-101.
20. Porsolt RD, Le Pichon M, Jalfre M. Nature, 1977; 266: 730–2.
21. Nomura S, Shimizu J, Kinjo M, Kametani H, Nakazawa T. Eur J Pharmacol, 1982; 83: 171–175.
22. Steru. L, Chemat. R. Psychopharmacology, 1985; 85: 367-70.