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Concept of Contraception in Unani System of Medicine: Contemporary Research and Application

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ABSTRACT

It was already reported that increasing population is a matter of concern in India. In an order to control the population, Indian government promotes the family planning with several means of contraceptives. These contraceptives include oral contraceptive pills (OCP's), intra uterine devices (IUCD's), condom, barrier methods and irreversible surgical methods. They are available in market with several reported adverse effects. Thus, search for an effective, safe and user-friendly contraceptive is remains a challenge. In this article an approach was made to explore the Unani contraceptives measures. The validated studies on Unani contraceptives were also described in the present review.

Key words: Unani contraceptives, *Mane'y hamal*, *Mudir-e-haiz*, *Musqit-e-janeen*.

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INTRODUCTION

The world population is increasing day-by-day. The world population is reached more than 7 billion now (up to March, 2012). This Increasing population in developing countries is a matter of concern. According to last census the population of India is 1210×10^6 (2011)¹. The rise in population can be a serious problem, because of damaging economic and environmental consequences. This created a feeling of insecurity among the people towards food, shelter and life. To combat this problem, several efforts have been made. Under the concept and guidance of conventional system of medicine, several methods of contraception like; OCP's, IUCD's, barrier tools, have been developed. These tools and techniques are efficiently practiced for contraception but with many reported adverse effects as well as failure results such as unwanted pregnancy². Hence, the search for an effective and safe contraceptive agent remains a challenge. Unani system of medicine is a non-conventional stream of medicine based on the holistic concept of health and disease. For the purpose of treatment Unani pharmacopoeias are based on mainly herbal partially mineral or metallic and animal origin drugs. Buqrat/ Hippocrates (460-370BC), Jalinoos/Galen (120-200CE) Al-Razi (850-925CE), Ibn sina/Avicenna (980-1037 CE), Al-Majoosi (d.994 CE) are few renowned Unani physicians, who enriched the system considerably. The concept of contraception has a significant place in Unani system of medicine. It can be emphasized in the light of fact that while description of human physiology, the Unani physicians enumerated male and female reproductive organs among the *aza-e-raisa* (vital organs). *Zabt-e-tauleed* is a specific term used for description of prevention from unwanted pregnancy or to prolong the duration between the pregnancies^{3, 4}. Unani formulations in different dosage forms have been used to control the fertility and/or prevent the unwanted conception successfully. Through this review an effort has been made to find, trace and explain the origin and use of birth control measures in Unani system of medicine. The main objective of this review is to evaluate the concept and practice of contraception in Unani system of medicine and practical suitability of these measures as a choice or an effective alternative method in the light of need and recent development and information. Furthermore, a list of validated studies on Unani contraceptives is also given.

Contraception in Unani system of medicine

The origin of contraception lies in antiquity. However, it is presume that the search for contraceptives has been eluded since the birth of human. The oldest evidence of use of contraceptive measure found in *Khun* papyrus (1750), found in Egypt. According to this papyrus, a part of gummy substance is inserted in vagina for prevention of conception⁴. Unani medicine is

enriched with various oral as well local contraceptive measures as single drug and compound formulation^{5, 6}. Considerable information regarding the types, modes and scope of contraceptive measures are mentioned in Unani classical literature in the writing of Buqrat/Hippocrates (460-370 BC) and Jalinoos/Galen (120-200 CE). Later on further description finds a mention in *al-Hawi* by Rhazi (850-950 CE), *Kamil al Sana't* by al- Majoosi (d. 994 CE), *al-Qanoon fi-al-tib* by Ibn Sina (980-1030 CE), *Zakhira-e-Khawarzaam shahi* by al-Jurjani (d. 1135 CE), *Kitab al-irshad li masalih al anfus wal ajsad* by Jami Israili (d. 1198 CE) and *Jami li mufradat* by Ibn Baitar (1197-1248 CE).

Measures of Unani contraceptive

The contraceptive measures mentioned in Unani classical literature are shown in figure 1.

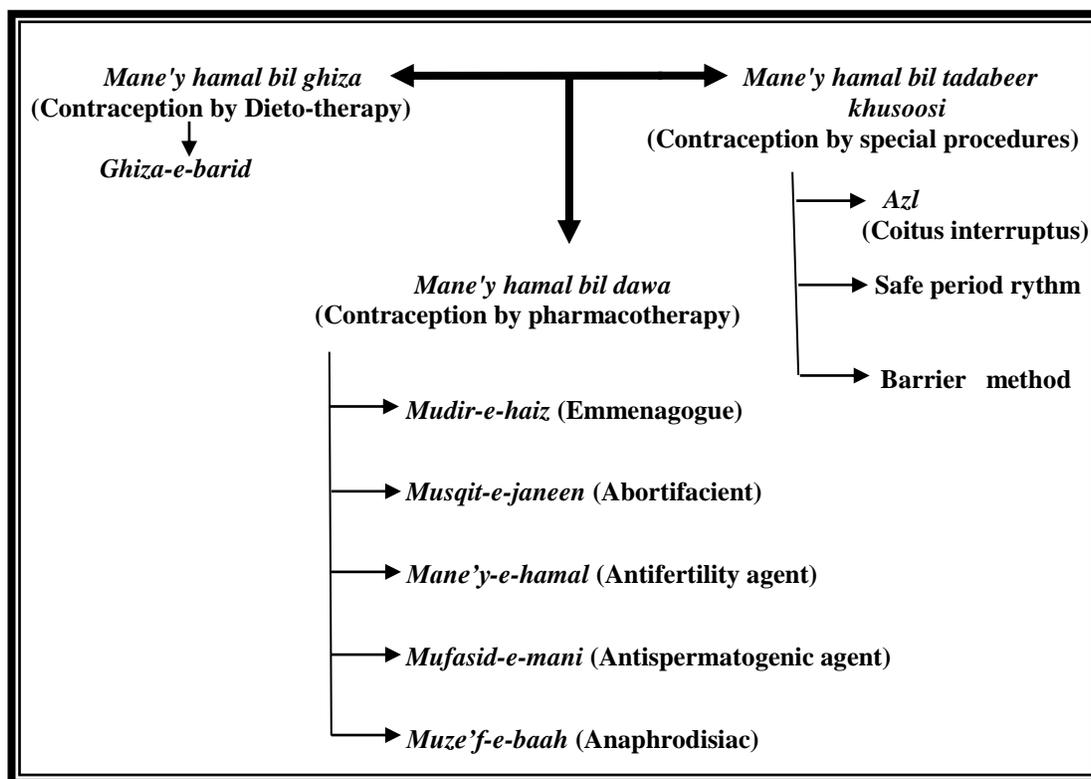


Fig 1: Unani contraceptive measures

(a) *Mane'y hamal bil ghiza* (Contraception with Dieto-therapy)

Al-Majoosi (d. 994 CE) in *Kamilus sana't* described several contraceptive diets like *Chaulae* (*Amaranthus gangeticus*), *Bathua* (*Chenopodium album*), *Kadu* (*Cucurbita moschata*) etc. They possess *mizaj-e-barid* that act as spermicidal^{5, 8}.

(b) *Mane'y hamal bil tadabeer khusoosi* (Contraception with special procedures)

It includes *azl* (coitus interruptus), *safe period rhythm* and barrier methods^{4, 53}. Zakarya Razi (850-925 CE) advocated the use and practice of coitus interrupts as *azl*, meaning coitus interrupts in

Arabic. This method considered as the method of choice for the purpose of protection/prevention from unwanted pregnancy. Soranos of Ephesus (circa 2nd century CE) is a famous Roman physician who recommended a method of contraception i.e. “one should abstain from coitus in fertility period” for prevention of pregnancy. Nowadays it’s called as Ogino calendar method³. Barrier Methods are documented by Al-Jurjani (d. 1135 CE) in *Zakhira-e-Khwarzjam shahi* in the form of a covering meant to cover the organ with the help of cloth and *roghan Kunjud* (sesamum oil).

(c) Contraception with pharmacotherapy

Under the pharmacotherapy several contraceptive agent were described by Unani physicians. It has following five broad categories.

- 1) *Mudir-e-haiz* (emmenagogue)
- 2) *Musqit-e-janeen* (abortifacients)
- 3) *Mane'y hamal* (antifertility agent)
- 4) *Mufasid-e-mani* (antispermatogenic agent), and
- 5) *Muze'f-e-baah* (anaphrodisiac)^{3,7}.

These contraceptive mentioned in following dosage forms i.e. *humool*, *firzaja*, *fatela*, *shayaf* (types of vaginal pessary), *tila* (liniment), *aabzan* (sitz bath), *pichkari or zarewiq* (vaginal douche), *bukharat* (fumigation), *zimad* (paste)⁹ etc.

Unani contraceptives validated by scientific studies:

For validation, the experiments include both animal as well as human trails to assess the efficacy of Unani contraceptives. In the year 2006, *Unsul* (*Allium cepa*) was validated by Thakare, et al (2006). Ethanolic extract of *Unsul* showed significant antifertility activity as implantation sites inhibited when wistar rats were treated with orally at a dose of 300 mg/Kg of body weight⁵⁰. In the year 2007, *Tukh-e-Kaknaj* (*Nigella sativa*) was validated by Keshri, et al (2007) as hexane extract of *tukhm-e-kaknaj* prevented pregnancy in Sprague-Dawley rats when treated orally at 2 g/Kg daily dose on day's 1-10 post coitum. The significant antifertility and anti-implantation activity was observed³⁹. In the year 2008, *Gul-e-gudhal* (*Hibiscus rosa sinensis*) was validated by Neeru & Sharma (2008) as strong anti-implantation (inhibition 100%) and uterotropic action. This activity was observed at the dose level of 400 mg/kg body weight. Histological studies were also carried out to confirm this effect³³. In the year 2009 another Unani drug, i.e. *Haldi* (*Curcuma longa*) was validated by Thakur et al (2009). The female albino rats after oral administration of different doses of aqueous and ethanolic extract of *Haldi*, showed a significant antifertility activity. FSH and LH level was significantly decreased. Increase in the weight of ovary, uterus and body weights in

mature fertile rats, uterine weight in immature rats increased in extract treated group were also observed⁵⁰. In the year 2010, *Ghongchi surkh* (*Abrus precatorius*) was validated by Okako et al (2010). Methanolic extract of *Ghongchi surkh* caused reversible alterations in the estrous cycle pattern and completely blocked ovulation in Sprague-Dawley rats. In addition, the extract demonstrated anti-implantation activity and Abortifacient potential³². In the year 2012, *Sibith* (*Anethum graveolence*) was validated by Malihezaman, et al (2012). Different fractions of *sibith* were tested for antifertility potential in female rats. Results showed that each fraction produced some changes, such as hormonal level reduction (chloroform fraction), diestrus phase prolongation and infertility (water fraction), and increase in pregnancy duration (chloroform and ether fractions)⁴⁰. In the year 2013, *Beekh-e-biskhapra* (*Trianthema portulacastrum*) and *Farfiyoon* (*euphorbia nerrifolia*) was validated. The antifertility activity of *Biskhapra* was validated by pare et al (2013) in female albino rats. Abortifacient potential of stem, leaves and roots of *Biskhapra* was assessed. *Biskhapra* shows significant antifertility activity ranging from 20.31% to 94.02%. The alcoholic extract of *biskhapra* was found to be most effective in causing strong antifertility activity²⁹. While *Farfiyoon* (*Euphorbia nerrifolia*) validated by Maskare et al (2013). The Ethanolic extract showed significant antifertility activity in wistar rats. Pretreatment with ethanolic extract showed significant inhibition of a number of implants site at a dose of 400 mg/Kg. There is no change in ovulation. Hence, it was observed antifertility activity attributed largely to its anti-implantation activity³⁰. Further description was listed in Table-1

Table 1: List Single Unani Contraceptive Drugs validated by scientific study

Name of Single Unani Contraceptive Drugs	Scientific Name	Mode of Action in Experimental Studies
<i>Abhal</i> ^{4, 10, 11}	<i>Juniperus communis</i>	Anti-implantation
<i>Baobarang</i> ^{4, 5, 12, 25}	<i>Embelia ribes</i>	Anti-implantation
<i>Khayar shambar</i> ^{12, 16, 26}	<i>Cassia fistula</i>	Anti-oestrogenic and angti-ovulatory
<i>Rehan</i> ^{4, 17, 24, 27}	<i>Ocimum sanctum</i>	Anti-fertility
<i>Biskhapra</i> ^{8, 13, 19, 28}	<i>Trianthema portulacastrum</i>	Abortifacient
<i>Farfiyoon</i> ^{12, 14, 29}	<i>Euphorbia nerrifolia</i>	Anti-implantation
<i>Filfil siyah</i> ^{12, 15, 30}	<i>Piper nigrum</i>	Anti-spermatogenic and anti-fertility
<i>Ghongchi surkh</i> ^{19, 31, 48}	<i>Abrus precatorius</i>	Anti-ovulatory & Anti-implantation
<i>Gul-e-Gudhal</i> ^{13, 32}	<i>Hibiscus rosa senensis</i>	Post coital antifertility
<i>Haldi</i> ^{12, 17, 24, 33}	<i>Curcuma longa</i>	Anti-ovulatory as FSH & LH decreases significantly
<i>Halela</i> ^{12, 17, 34}	<i>Terminalia chebula</i>	Spermicidal
<i>Hilteet</i> ^{12, 17, 19, 35}	<i>Ferula assafoetida</i>	Post coital antifertility
<i>Pudina</i> ^{22, 19, 36}	<i>Mentha arvensis</i>	Reversible contraceptive
<i>Banoola</i> ^{4, 37}	<i>Gossypium herbaceum</i>	Spermicidal
<i>Shonez</i> ^{18, 38}	<i>Nigella sativa</i>	Post-coitul contraceptive

<i>Sibith</i> ^{17, 39}	<i>Anethum graveolens</i>	Anti-ovulatory
<i>Suddab</i> ^{4,12, 40, 41}	<i>Ruta graveolens</i> Linn.	Spermicidal
<i>Baidinjeer</i> ^{4, 14, 42, 43}	<i>Ricinus communis</i>	Anti-implantation and abortifacient
<i>Dhak</i> ^{12, 44, 45, 54}	<i>Butea monosperma</i>	Anti-implantation
<i>Kahu</i> ^{4, 21,46}	<i>Lactuca sativa</i>	Anti-spermatogenic
<i>Kaknaj</i> ^{4,12, 47}	<i>Physalis alkekengi</i>	Anti-implantation
<i>Sambhalu</i> ^{12, 19, 48}	<i>Vitex negundo</i>	Spermicidal and post coital antifertility
<i>Unsul</i> ^{12, 17, 24,49}	<i>Allium cepa</i>	Abortifacient
<i>Kamoon</i> ^{8, 22,50, 51}	<i>Carum carvi</i>	Anti-ovulatory
<i>Neem</i> ^{20, 21, 23,55}	<i>Azadirachta indica</i>	Antispermatic and spermicidal in Human

Future prospective

Several Unani drugs, single as well as compound formulations are capable to inhibit male and female fertility as mentioned in Unani literature. Out of these several single drugs have been validated. The validated drugs possess spermicidal, antispermatic, anti-ovulatory, anti-implantation, anti-estrogenic and abortifacient activity. These drugs need further evaluation to explore their lesser known or unknown pharmacological activity as well as toxicity or adverse effects. After complete satisfaction regarding their efficacy as well as safety contraceptive dosage form should be prepared in future by using these drugs.

CONCLUSION

It is concluded that fertility control is the need of present era. Already available methods for female fertility regulation include hormonal pills, condom, intrauterine devices, skin patches etc. In spite of that search for an effective, safe and user friendly antifertility method has been remains a challenge. The Unani system of medicine is enriched with several single drugs as well as compound formulations possessing antifertility activity. Historically, Unani drugs have been used to control the fertility and rural population of developing nations like India used these methods even now a days as they are assessable, cheap and innocuous. Out of these several are validated which ultimately give a sign of efficacy of Unani drugs.

REFERENCES

1. www.censusindia.gov.in in size, growth rate and distribution of population
2. Dutta, D.C. Text book of gynaecology. New central book agency. 2008.
3. Razzack, Hakim Mohammad Abdur and Fazal, Hakim Ummul. The concept of birth control in Unani medicine. Central Council For Research in Unani medicine. First edition 1993. :11
4. Anonymous. Zabta-e-taukleed wa islah nasl, Hamdard Sahat Delhi. H.H. Mohammad Sae'd Printer wa Press. 1939. Pp. 9-39

5. Majoosi, Ali Ibn Abbas. Kamil Us Sanaa't (urdu tarjuma by Gulam Hossain Kantoori), chapter 31. Matba'a Munshi Nawal Kishor Lucknow, Y.N.M. pp. 224
6. Ibn Sina, Al-Qanoon-fit-tibb, Vol 2nd, Aejaz Publishing house, New Delhi. 2010:340, 435, 308
7. Fazal, Hakim Ummul. Unani Tibb mein Mane'y hamal advia aur tadabeer. Taraqqi urdu Bureau. Y.N.M. pp. 18
8. Qamri, Abu Almansoori Alhasan. Ghana Mana Tarjuma Masmi Ba Minhajul Ilaj. Central Council for Research in Unani Medicine. Y.N.M. pp. 387 & 397.
9. Multani, H.C. Scientific Birth Control. Propairator printing press. Y.N.M. pp. 4-16.
10. Aleem Lucknawi, Abdul. Mufradat-e-Azizi. Central Council for Research in Unani Medicine, New Delhi. Y.N.M. Pp. 79
11. Hasrat Lucknowi, Azmat Ali Sahab. Qarabadeen-e-Azam wa Akmal. Ram Kumar Book Depot Press. Y.N.M. pp. 14.
12. Khan, Mohammad Azam, volume 3rd (Persian). Ikseer-e-Azam. Munshi nawalkishor, Lucknow. 1885: 1917
13. Kapoor, B.B. Ilajul Ghurba. Matba'a Munshi Nawal Kishor Lucknow. 1944. Pp. 152-153
14. Anonymous. Tibb-e-Akbar (Urdu) Vol 1. Matba-Munshi Nawal Kishorn Lucknow. 1995. Pp. 34-38.
15. Ibn Sina, Al qanoon fit tibb Vol 3rd. Idara-e-kitab-e-shifa, Delhi. Y.N.M. pp. 323-324
16. Ghani, Najmul, Khazauinul Advia, H.S. Offset Press, Delhi, 3rd edition 2011, pp. 1286-1288, 468-470, 597-599, 308-312.
17. Rhazi, Zakarya. Kitabul Hawi, Vol 9th, chapter 4. Central Council for Research in Unani Medicine, New Delhi. 2001:144-145
18. Ibn Baitar, Aljameli Mufradatul Advia wa Aghzia, vol 3rd, Central Council for Research in Unani Medicine, New Delhi. Y.N.M., Pp.170-175, 27, 42, 55, 60, 45, 118, 133, 158, 189.
19. Kabiruddin, M., Ifada-Kabeer mufassal mojazul qanoon. 8th edition 1970. National fine printing press Char Kaman, Hyderabad. Pp. 157-164.
20. Ibn Baitar, Aljameli Mufradatul Advia wa Aghzia, vol 2nd, Central Council for Research in Unani Medicine, New Delhi. Y.N.M., Pp. 213, 295, 304, 339, 378, 383 and 392.
21. Tabri, Abu Alhasan Ali Bin Sahal Raban. Firdaus Ul Hikmat, Faisal Publications Jama Masjid New Delhi. 2002: 344 & 346
22. Rhazi, Zakarya. Kitabul Mansoori. Central Council for Research in Unani Medicine. 1991. Pp. 230

23. Ibn Baitar, Aljameli Mufradatul Advia wa Aghzia, vol 4th, Central Council for Research in Unani Medicine, New Delhi, Y.N.M. Pp. 35, 38, 62, 95, 96, 130, 135, 144, 243 and 397
24. Arzani, Mohammad Akbar. Qarabadeen-e-qadri. Bharat Offset Press, Delhi. First edition 1998. Pp. 366.
25. Agrawal, O.P., Bharadwaj, S., Mathur, R., Antifertility effects of fruit of *Juniperus communis*. e-journal planta medica. 1980. Pp.98-101
26. Anand O. Prakash. Antifertility Investigations on Embelin - an Oral Contraceptive of Plant Origin. e-journal planta medica. 2007. 41(3): 259-26.
27. Yadav, R. and Jain, G. C., Effect of petroleum ether extract of *Cassia fistula*. Indian Journal of Fundamental and Applied Life Sciences. 2013;3 (1) :167-174.
28. Batta, S.K. and Santhakumari, G. The Antifertility effect of *Ocimum sanctum* and *Hibiscus rosa sinensis*. Indian journal of medical research. 1970. 59(5): 777-781.
29. Pare, I., Zade V., Dabhadkar, D., Evaluation of potential antifertility activity of plant *Trianthema portulacastrum* in female albino rat. International Journal of Applied Pharmaceutical science and biomedical Science. 2013;2.(1):007-011.
30. Maskare, R., Mishra, M., Turaska, A. *Euphorbia Nerrifolia* : Herbal tool for birth control. International Research Journal of Pharmacy. 2013. 4(9) pp. 153-155.
31. Mishra, R.K. and Singh SK. Antispermatoxic and antifertility effects of fruits of *Piper nigrum*. Indian Journal of Experimental Biology.2009. pp. 706-714.
32. Okoko II, Osinubi AA, Olabiyi OO. Kusemiju TO, Noronha CC, Okanlawon AO. Antiovarian and anti-implantation potential of the methanolic extract of seeds of *Abrus precatorius*. Endocrine Practice journal of the American college of Endocrinology and the American association of clinical endocrinologist. 2010. 16(4):554-560.
33. Neeru V, Sharma SK, Post-Coital Antifertility Activity of *Hibiscus rosa-sinensis* Linn. Roots, Evid Based Complement Alternat Med., 5(1), 2008, 91-94.
34. Thakur, Shweta, B., Bhavna, D., Aditi, N. D., Chauhan, N., Saraf DK. Effect of *Carum carvi* and *Curcuma longa* on hormonal and reproductive parameter of female rats. International journal of phytomedicine. 2009; 1(1): 31-38
35. Srivastav, Archana., Chandra, A., Singh M., Jamal, F., Rastogi, P., Rajendran, S M., Bansode, FW., Lakshmi V. Inhibition of hyaluronidase activity of human and rat spermatozoa in vitro and antispermatoxic activity in rats in vivo by *Terminalia chebula*, a flavonoid rich plant. Reproductive Toxicology. (2009) . 29 (2), pp. 214-224.

36. Keshri, G, Lakshmi V, Singh, M.M,Kamboj V.P., Post-coital antifertility activity of ferula assafoetida extract in female rats. *Pharmaceutical Biology*, 1999;37(4):273-276
37. Sharma, N., D, Jacob. Assessment of reversible contraceptive efficacy of methanol extract of *Mentha arvensis* L. leaves in male albino mice. *J Ethnopharmacology*. 2002; 80(1): 9-13
38. Zp, Gu., By, Mao., Wang Yx, Zhang Ra, Tan Yz, Chen Zx, Cao l, You Gd, Segal SJ. Low dose gossypol for male contraception. *Asian J Androl*, 2000, 2, pp. 283-287
39. Keshri, G., Singh M.M., Laxmi, V. and Kamboj V.P. post coital contraceptive efficacy of the seeds of *Nigella sativa* in rats. *Indian j physiol pharmacol*. 1995. 39(1): 59-62.
40. Malihezaman, Monsefi. , Mojaba, Masoudi. , Elham, Hosseini., Farnaz, Gramifar., Ramin, Miri., Antifertility effects of different fractions of *Anethum graveolens* L. extract on female rats. *African journal of traditional, complementary and alternative medicine*. 2012; 9(3): 336-341.
41. Harat ZN,Sadeghi MR,Sadeghipour HR,Kamalinejad M,Eshraghian MR. Immobilization effect of *Ruta graveolens* L. on human sperm: a new hope for male contraception. *Journal of ethnopharmacology* 115(1); 2008: 36-41
42. Halveri, I., Roodsari, H.R.S., Harat, Z.N. Acute effect of *Ruta graveolens* L. on sperm parameter and DNA integrity. 2012; 13(1):33-38.
43. Makonnen, E., Zerihun, L.,Assefa, G.,Rostom, AA. Antifertility activity of *Ricinus communis* seed in female guinea pigs. *East African Medical Journal*. 1999; 76(6): 335-337
44. Raji, Y., Oloya, A.K, Morakinyo, A.O. Effect of methanol extract of *Ricinus communis* seed on reproduction of male rats. *Asian Journal of Androl*. 2006; 8(1): 115-121.
45. Bhargava, S.K. Estrogenic and postcoital anticonceptive activity in rats of butin isolated from *Butea monosperma* seed. *J Ethnopharmacology*. 2012; 18(1): 95-101.
46. Gupta, Neelam. , Singh, Gajendra. ,Singh, S. M. ,Reddy, K. R. C. Histological changes in ovaries of Mice exposed to *Butea monosperma*: Preliminary Study. *Int. J. Morphol*. 2010. 28(4): pp. 1309-1314
47. Ahangarpour, A. , Oroojan, A.A., Radan, M., Effect of aqueous and hydro-alcoholic extracts of Lettuce seed (lactuca seed) on testosterone level and spermatogenesis in NMRI mice. *Iranian JReproductive Medicine*. 2014. 2(1):65-72.
48. Montaserti, Azadeh.,Pourheydar, Maryam., Khazaei, Mozafar. and Ghorbani, Rostam. Anti-fertility effect of *Physalis alkekengi* alcoholic extract in female rat. *Iranian journal of reproductive medicine*. 2007; 5 (1): 13-16.

49. Vasudeva, Neeru. , Sharma, Surendra Kumar. , & Mor, Anand. Spermicidal and post coital anti-fertility activity of *Vitex negundo* stem bark. Journal of Herbs, Spices & Medicinal Plants. 2012;18(4): 287-303
50. Thakare, Vishnu N., Kothavade, Pankaj, S.K., Dhote Vipin V., Deshpande, Avinash D. Antifertility activity of Ethanolic extract of *Allium cepa* Linn in rats. International journal of pharmatech research. 2009; 1(1):73-78
51. Priya G, Saravanan K, Renuka C. Medicinal plants with antifertility activity-a review. International Journal of Pharma-tech Research. 2012. 1(4): pp. 481-494
52. Malini T, Vanithakumari G. Estrogenic activity of *Cuminum cyminum* in rats. Indian Journal of Experimental Biology. 1987;25: pp.442–444.
53. Jurjani, Ismail. Zakhira-e-Khwarzam Shahi (Urdu translation by Hadi Hossain Khan), Vol 6, Chapter 20. Matba-Munshi Nawal Kishor, Lucknow. 1878. Pp. 1431-1432
54. Shah, Gulam Mujtaba. , Khan, Mir Ajab. , Ahmad, Mushtaq. , Zafar, Mohammad. , Khan, Aftab Ahmad. , Observation on antifertility and abortifacient herbal drug. African J Biotechnology. 2009. (8) pp. 1959-1964
55. Khillare B & Shrivastav T. Spermicidal activity of *Azadirachta indica* (neem) leaf extract. Contraception. 2003. 68(3): pp. 225-229.

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