

AYURVEDA MANAGEMENT FOR DHATUKSHAYA JANYA VANDHYATVA W.S.R TO LOW ANTI-MULLERIAN HORMONE- A SYSTEMATIC REVIEW & META-ANALYSIS

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ABSTRACT

The low anti-mullerian hormone is a severe problem in the present scenario in women seeking infertility. It is the leading cause of unable to conceive or delayed conception due to poor quality of ovum. The main factors behind these are mainly due to the westernization of lifestyle, deviating from the traditional way of living. Endocrine-disrupting chemical contributes to premature ovarian senescence. In Ayurveda, it can be compared with *Dhatukshaya janya Vandhyatva*. *Agni of dhatu nirmana* affected by *Annavaha Srotodushti* due to intake of *ati matra aahara, akala & ahita aahara*. *Dhatu's dhatwagni* supplies the necessary source to succeeding tissues, enhancing their ability to clone. By using Ayurveda formulations, ovarian ovum quality can be increased to be available for conception for healthy progeny. Intake of *Kapikacchu & Talmakhana churna* with *sharkara & ksheera* act as *Dhatu vardhaka*. *Kapikacchu & ksheera* has *shukra Janaka pravartaka* property, which improves quality and quantity with nourishes *shukra dhatu* in females. This medication altogether works on the microenvironment of cells and thus prevents Apoptosis. *Kapikacchu* has been reported to enhance fertility in pre-clinical studies; however, there is a shortage of literature on its effect on the function of the female reproductive system. *Kapikacchu* seed extract has the potential to enhance fertility by increasing serum levels of FSH and LH, which in turn increases the number of oocytes released at ovulation, possibly through its antioxidant properties. *Talma-*

khana effectively restored the Haematological parameters, serum iron and serum protein and normalized the microcytic, anisocytosis and hypochromic RBCs, as it mainly works on Rasa dhatu nirvana.

Keywords: Firelog, *Snigdha*, L-dopa, Follicles, Steroidogenesis

INTRODUCTION

Dhatukshaya janya Vandhyatva is one of the six types of *Vandhyatva* described by *Acharya Harita*. *Acharya Charaka* described *Balakshaya Janya Vandhyatva* as treatable. Infertility is a significant

health issue worldwide in India; it is one of the burning issues of couples of reproductive age. As per data, 15-20 million people are affected by infertility in India.

Prevalence rate

1. According to a research study, in females seeking infertility treatment-

Age	Percentage of Total Females whose AMH Level < 2
<30 Years	28.7%
30-34 Years	48.7%
35-39 Years	70.6%

According to data, Indian females in their late 20s and early 30s visiting fertility centres showed a worrisome trend of low AMH.

Premature ovarian insufficiency/failure is the loss of oocytes and surrounding support cells. The incidence has been estimated at 1 in 1000 women younger than 30 and 1 in 100 women younger than 40¹.

2. Alexandra J. White et al.- Anti-Mullerian Hormone (AMH) in relation to tobacco and marijuana use and sources of indoor heating/cooling-

Result- Lower AMH levels were associated with indoor heating sources, including burning wood and artificial firelogs, at least ten times/year in a residential indoor stove or fireplace. Lower Anti-mullerian hormone levels were also observed in women who were current smokers of more than 20 cigarettes/day relative to non-smokers and in women with ten plus years of adult environmental tobacco smoke (ETS) exposure. There were no associations observed for marijuana use.

The conclusion confirmed previously reported findings of lower AMH levels in current heavy smokers and also found associations between long-term environmental tobacco smoke exposure and indoor burning of wood or artificial firelogs. These research find-

ings suggest that combustion by-products from common exposures can harm the human ovary².

3. Jaffar M et al.- Geographical Diversity in the Age Specific Anti Mullerian Hormone Levels in Infertile Women: A Hospital-based Cohort Study- AMH levels remarkably decreased with increasing age in the North Indian population, but in the South Indian population, they did not decline beyond 1.5 ng/mL. Further, in the North Indian population, AMH levels were significantly higher in the age group of 22–30 years (4.4 ng/mL) than in the South Indian population (2.04 ng/mL)³.

Aim

To study the Ayurveda management for *Dhatukshaya janya Vandhyatva* w.s.r to Low Anti-Mullerian Hormone.

Objectives

1. To study the primary mode of action of *Kapikachhu* & *Talmakhana* for the female reproductive system.
2. To study in detail about Anti-mullerian hormones & *Dhatu kshaya janya Vandhyatva*.

Methodology

Literary study, collected from Ayurveda classics, modern text, PUBMED and other web sources, etc.

Etiology & Ovulatory dysfunction

It accounts for 30-40%, which includes anovulation/oligo-ovulation. The cause of Low AMH and premature ovarian insufficiency may be the accelerated rate of germ cell depletion (Apoptosis). This results in either no follicle or only a few follicles left behind in the ovary. Aetiology is unknown in most cases, but it probably may be due to a genetic cause, Turner's syndrome, an auto-immune disorder, infections, radiation, or chemotherapy, as per modern science⁴.

AMH Values

- ❖ AMH level > two ng/ml suggests good reserve.
- ❖ AMH level < 0.5 ng/ml suggest Decreased ovarian reserve.

AMH is a glycoprotein hormone produced by the granulosa cells of the pre-antral and small antral follicles and is considered a surrogate marker for ovarian reserves. AMH levels reach a peak at 20–25 years of age.

Other diagnostic criteria by hormone assay, Serum estradiol < 50pg/ml and FSH > 40IU/ml on repeated occasions, show Premature ovarian failure. The serum FSH level starts increasing, and the ovaries become resistant to the effect of the stimulation by these hormones due to the exhaustion of oocytes in the ovaries⁵.

Symptoms & indices of ovarian ageing

Gradual shortening of menstrual cycle raised FSH, Low inhibin B level, low AMH, decrease in antral follicles and ovarian volume in USG scan.

Presence of Shukra dhatu in female

Acharya Sushruta mentioned that Shukra dhara kala is present in all males and females. Females do not have veerya, but shukra dhatu is present, called stri shukra. The nourishment of succeeding dhatu occurs by the preceding dhatu. Thus, Shukra dhatu is nourished by majja dhatu according to Ksheera dadhi Nyaya. Through Khale kapota Nyaya, direct nourishment of shukra dhatu by intake of Vrishya dravya can be inferred.

Dhatukshaya Janya Vandhyatva

The signs and symptoms of a patient with a low AMH level can be compared to those of Dhatukshaya

janya Vandhyatva. Dhatu's dhatwagni supplies the necessary source to succeeding tissues, enhancing their ability to clone. According to Dhatu Pushti Nyaya, organs can survive a lifetime because tissue-specific stem cells can self-renew. Nidana of dhatu kshaya- Rasavaha Srotodushti mainly cause by intake of guru aahara (i.e. Mamsa, paneer, dahi), sheeta (Atyambu paana), ati snigdha aahara (Cheese, butter, hydrogenated vegetable oil, and bakery products), ati matra aahara, samasana, Chintana (overthinking). Agni of dhatu nirmana affected by Annavaaha Srotodushti due to intake of ati matra aahara, akala & ahita aahara. Akala aahara intake means food intake when not feeling hungry, before digestion of a previous meal, intake of aahara after sunset & during midnight. Ahita aahara includes pizza, burger and guru anna. Forbidden food articles for habitual consumption- Preserved food (instant food-stuff), dry food items (packed food), dried meat, paneer (Kurchika, kilada), tubers (potato, beetroot, and tapioca), dahi, masha, and fish. These all-affect rasa dhatu nirmana and hampers Uttarothara dhatu nirmana. At last due to chronic use of these food articles results into shukra dhatu dushti & kshaya. Shukra dhatu kshaya lakshana- Daurbalya, mukha-shosha, pandu, sadana (lassitude), Shrama (tiredness), klaibya (impotence). All these symptoms are also present in females with low AMH values.

Treatment according to modern science of premature ovarian failure

Careful evaluation is mandatory as diagnosis and effective treatment may have significant implications for the patient's psychology, cardiovascular, bone and sexual health. Fertility potential is a remote high dose of estrogen, or HMG therapy may result in ovulation, as reported in some cases⁶. IVF with the donor's oocyte is advised. Sometimes, immunotherapy may reverse the autoimmune ovarian failure.

Dhatu Siddhanta and Vrishya rasayana: Probable predecessor of Stem cell therapy

Recently modern management for Low AMH & low antral follicular count is autologous stem cell therapy (Bone marrow) for follicular recruitment. But in Ayurveda, it can be done by following Uttarothara

dhatu nirmana with the help of Ayurveda medications, i.e. *Vrishya rasayana*- as mentioned in *dhatu kshaya avastha* by Acharya Susruta.

Ayurveda protocol for *Shukra dhatu kshaya*

‘स्वयंगुप्तेक्षरकयोः फलचूर्णं सशर्करम्।

धारोष्णेन नरः पीत्वा पयसा न क्षयं ब्रजेत् ॥ ‘ (Shu.chi. (26/33)

Kapikacchu & Talmakhana churna along with *sharkara & Ksheera* is indicated in *dhatukshaya*.

	<i>Kapikacchu</i>	<i>Talmakhana</i>
Latin Name	<i>Mucuna Prurita Hook.</i>	<i>Asteracantha Longifolia Nees.</i>
Family	Leguminosae	Acanthaceae
Sanskrit Synonyms	<i>Kapikacchu, Atmagupta, Markati, Kandura, Shookshimbi, Kevanch, Konch</i>	<i>Kokilaksha, Ikshurak, Talmakhana, Gokula</i>
Rasa	<i>Madhura, Tikta</i>	<i>Madhura</i>
Guna	<i>Guru, Snigdha</i>	<i>Guru, Snigdha, Picchila</i>
Veerya	<i>Ushna</i>	<i>Sheeta</i>
Dosha karma	<i>Vatashamak Kapha pitta vardhaka</i>	<i>Vatapitta shamak</i>
Useful Part	<i>Beeja, Moola, Roma</i>	<i>Mula, Beeja, Panchanga</i>
Matra	3-6 gm (1/2 Karsha)	3-6 gm (1/2 Karsha)
Chemical composition	Calcium, Phosphorus, Sulphur, Magnesium, Lecithin, Gallic Acid, Glutathione, Nicotine, Pruriyenidin, Pruriyenin	Albuminoyid, Dystes, Lipase, Proties

Probable mode of action

Intake of *Kapikacchu & Talmakhana churna* with *sharkara & ksheera* act as *Dhatu vardhaka*, taken for three months. *Kapikacchu & ksheera* has *shukra Janaka pravartaka* property, which improves quality and quantity with nourishes *shukra dhatu* in females. These medications all together work on the microenvironment of cells and thus prevent Apoptosis. Despite increasing sexual arousal, these drugs have *vrishya* property, acting as *Shukra srutikaram*, which typically modulates the level of pituitary hormones FSH & LH (Work on Pituitary-gonadal axis), and it is proved in pre-clinical studies also. Phytochemicals of *Talmakhana* have been shown to have Antioxidant properties, help remove free radicals/have potent free radical scavenging effects, and prevent the ovarian follicles from apoptosis. These drugs are also constituents of ayurvedic formulations "*Strirativallabhpugpak*" and "*Rativardhanyog*" described in ancient textbooks to improve sexual behaviour as well as a general tonic.

Pre-clinical research studies on *Kapikacchu* (*Mucuna pruriens*)

1. Ojo Temitope Noah et al.- Fertility Enhancing Potential of *Mucuna pruriens* Seeds in Female Sprague-Dawley Rats⁷

Mucuna pruriens is reported to enhance fertility in male rats. However, there is a dearth of literature on the effect of *M. pruriens* on the function of the female reproductive system. This study was carried out to evaluate the impact of *Mucuna pruriens* on the reproductive function of mature female Sprague-Dawley rats.

Methodology: Forty female Sprague-Dawley rats weighing 145 g and with a regular four-day cycle were used. Methanolic extract of *Mucuna pruriens* was given orally at 50mg/kg, 100mg/kg, and 200 mg/kg body weight. The oestrous cycle was monitored daily. At the end of the experiment, animals were sacrificed by cervical dislocation. Oocytes were counted, and blood and ovaries were analysed for hormonal and biochemical studies.

Results: The oestrous cycle remained unchanged in the treatment groups. Catalase and superoxide dismutase levels were increased slightly compared to the control group. A dose-dependent increase in Follicular stimulating hormone and luteinizing hormone (p < 0.05 at 200 mg/kg) level was observed

with an increase in the number of oocytes released at ovulation compared to the control group.

Conclusion: *Mucuna pruriens* seeds extract has the potential to enhance fertility by increasing serum levels of FSH and LH, which in turn increases the number of oocytes released at ovulation. This is possibly due to its antioxidant properties.

This study showed a dose-dependent increase in the level of follicle-stimulating hormone and luteinising hormone compared to the control group. The increase in luteinising hormone was significant at 200 mg/kg body weight of the extract. Treatment with *M. pruriens* significantly improved blood levels of dopamine, adrenaline and noradrenaline in infertile males⁸, L-dopa and its metabolite dopamine are reported to stimulate the hypothalamus and forebrain to secrete gonadotropin-releasing hormone (GnRH)^{9,10}. This ultimately activates the anterior lobe of the pituitary gland to secrete FSH and LH.

2. S. K. Prasad et al.-*Mucuna pruriens* seed powder feeding influences reproductive conditions and development in Japanese quail, *Coturnix coturnix japonica*.

The study was designed to test whether *Mucuna pruriens*, a natural source of L-dihydroxyphenylalanine (L-DOPA, a dopamine precursor) feeding, can influence development and reproductive conditions in the high-food-value bird, Japanese quail, *Coturnix coturnix japonica*¹¹.

Methodology—The experiment was performed on both male and female Japanese quail. One-week-old quail chicks were divided into three groups of 36 birds each.

Group I -Provided with a regular diet and served as control. Group I was divided into two sub-groups, IA (male) and IB (female), of six birds each.

Group II -Provided with food mixed with L-DOPA (50 mg/15 g food).

Group III -Provided with food mixed with *M. pruriens* seed powder (480 g/kg food). At the age of 3 weeks (when birds were sexually distinguished).

Groups II and III were subdivided into IIA (male), IIB (female), IA (male), and IIB (female), respectively, with six birds each.

Result- Observations were made up to the age of 5 weeks. Male experimental groups (IIA and IIIA) showed significantly increased testicular activity, cloacal gland volume, body weight (BW), plasma testosterone and LH level in comparison to control (IA). Similarly, female experimental groups (IIB and IIIB) showed significantly greater weight of reproductive organs (uterus, ovary, ovarian follicle, oviduct), body weight, egg weight, size and number of follicles. Plasma prolactin level was significantly low in comparison to control (IB). Results suggest that *Mucuna pruriens* is a rich natural source of L-DOPA, and development and reproduction in Japanese quail might be associated with the brain's dopaminergic system.

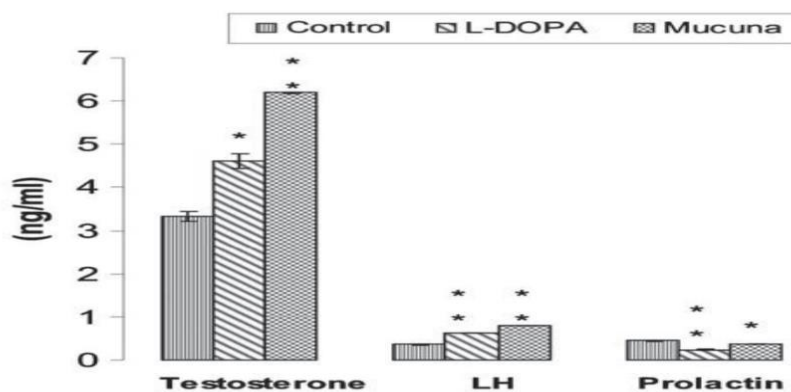


Figure 1. Effect of L-DOPA and *Mucuna pruriens* seed powder feeding on Japanese quail plasma testosterone, LH and prolactin level. Values mean six s.e. The significance of the difference from the control (*P, 0.01, **P, 0.001; Student's t-test).

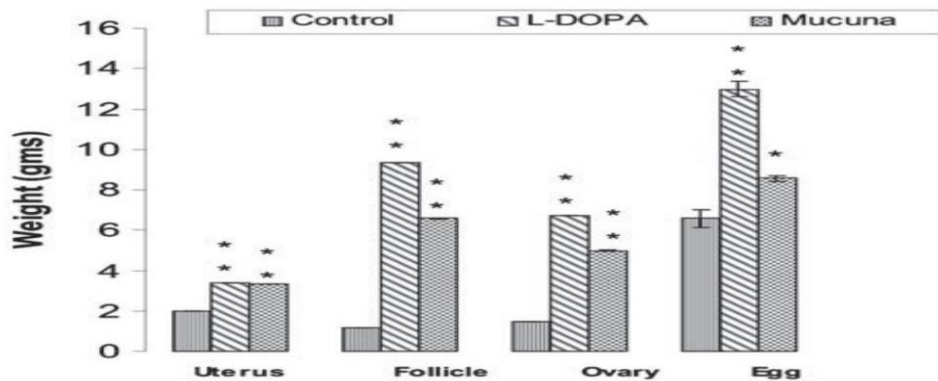


Figure 2. Effect of L-DOPA and Mucuna pruriens seed powder feeding on the weight of eggs, follicles, ovary and uterus of female Japanese quail. Values are mean six s.e. Significance of difference from control (*P, 0.01, **P, 0.001; Student's t-test).

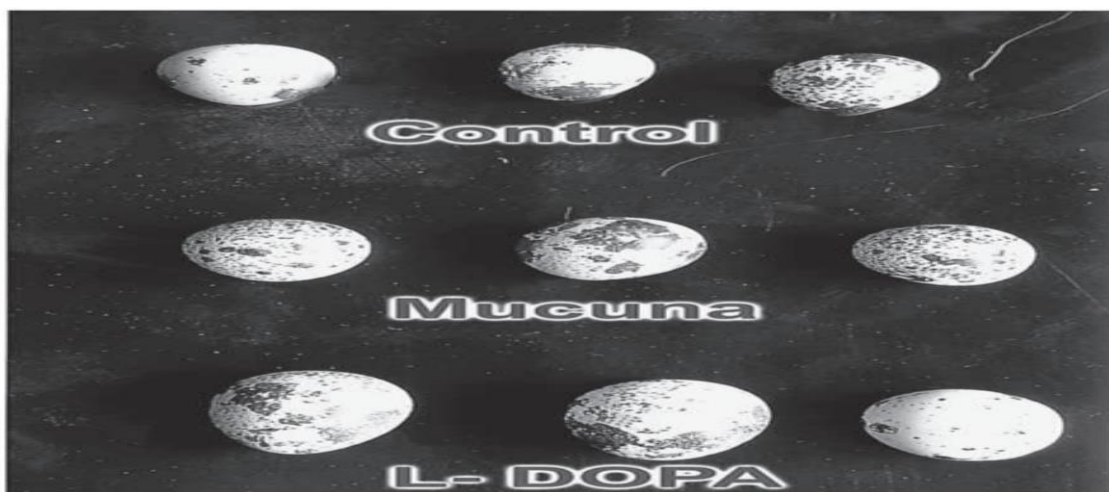


Figure 3. Photograph showing significant (P-0.01) difference of the egg size between the control, L-DOPA and Mucuna pruriens seed powdered group.

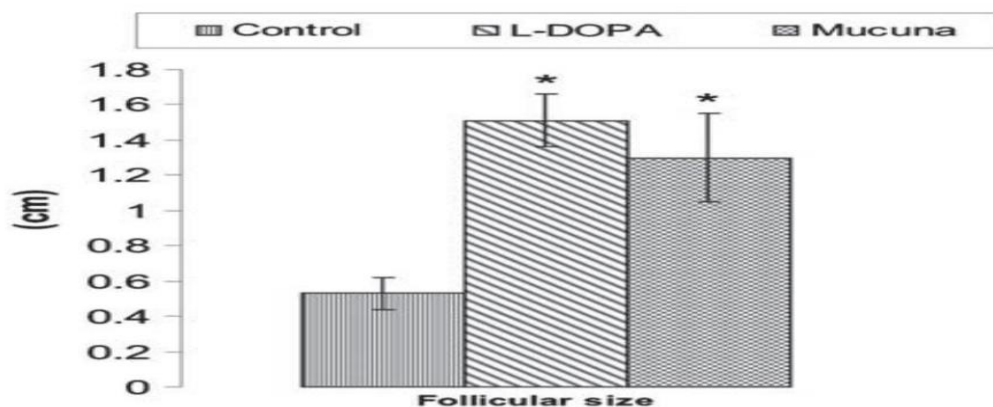


Figure 4. Effect of L-DOPA and Mucuna pruriens seed powder feeding on the size of follicles in female Japanese quail. Values are mean six s.e. Significance of difference from control (*P-0.01, Student's t-test).

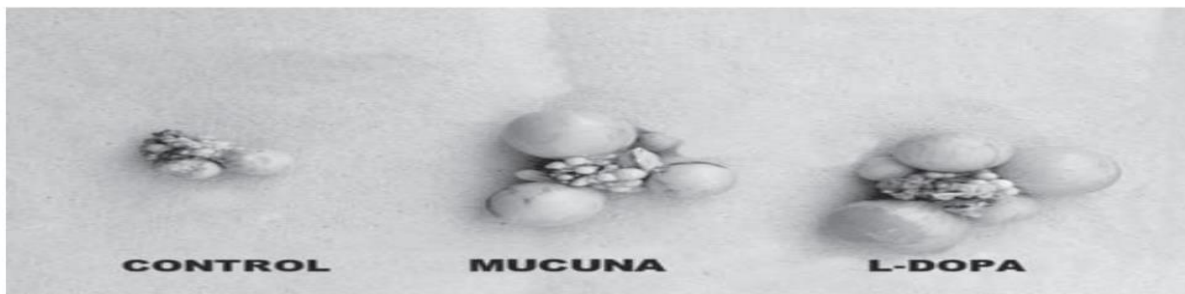


Figure 5. The photograph shows a significant (P, 0.01) difference in follicular size between the control, L-DOPA, and Mucuna pruriens seed powder-fed groups.

Pre-clinical Research studies on *Talmakkahna* (*Asteracantha longifolia*)

1. Pawar RS et al.- Erythropoietic activity of *Asteracantha longifolia* (Nees.) in rats¹².

Results: An administration of ethanolic extract of *Asteracantha longifolia* at a dose of 100 mg/kg and 200 mg/kg body weight, i.p., demonstrated a significant (P<0.05) increase in erythrocyte count, haemoglobin count, serum iron & serum protein etc. This effect may be due to the presence of iron (622 microns/50 mg) in the extract estimated by the spectrophotometric method.

Conclusion: An ethanolic extract of AL effectively restored the haematological parameters, serum iron, and serum protein and normalised the microcytic (smaller in size), anisocytosis (disturbed shape), and hypochromic RBCs. These observations could justify the inclusion of *Asteracantha longifolia* in the management of iron deficiency anaemia due to the presence of iron and other constituents such as flavonoids, terpenoids, steroids, lupeol, and betulin.

DISCUSSION

Kapikacchu churna and *talmakhana churna* increase the quality and quantity of *beeja* (ovum) and the AMH value and fertility. Both drugs are *Madhura, guru* and *snigdha* in property & act as *shukrajanana, balya, santarpaka & brimhana*. They nourish dhatu in a sequential pattern right from *aahara rasa* to *sukra dhatu*.

Research studies find that *Mucuna pruriens* has an excellent scavenging ability that wipes away excessive production of reactive oxygen species

(ROS) and free radicals^{13,14}. Reactive oxygen species play a physiological and pathological role in the female reproductive tract. Numerous animal and human studies have demonstrated the presence of reactive oxygen species in the female reproductive tract, such as in the ovaries and the fallopian tubes as well as in embryos, which results in delayed & inability for conception. ROS modulates the entire spectrum of physiological reproductive functions, such as oocyte maturation, rupture, ovarian steroidogenesis, corpus luteal function and luteolysis¹⁵. On the other hand, the pathological effect is exerted by various mechanisms, including lipid damage, inhibition of protein synthesis, and depletion of ATP¹⁶. ROS have been implicated in more than a hundred diseases¹⁷. The superoxide radical is formed when electrons leak from the electron transport chain¹⁸. Superoxide dismutase decomposes superoxide anion into hydrogen peroxide and oxygen at very high rates. The superoxide radical is involved in diverse physiological and pathophysiological processes¹⁹. Catalase catalyses the decomposition of hydrogen peroxide into water and oxygen. High concentrations of hydrogen peroxide are harmful to cells, such as DNA, proteins, and lipids, leading to mutagenesis and cell death. That's why *Ayurveda* formulations *Kapikacchu* and *Talmakkana*, along with milk & sarkara, act as the best formulations to prevent body ROS & free radicals development. This formulation can be suggested after proper Panchkarma and Shodhana of the body. It can be given as an integrated approach with Assisted reproductive techniques also for early and best results in cases of Low AMH with infertility.

CONCLUSION

These *Ayurveda chikitsa* are one of the unique principles. By reciprocal addition of the concept of *Dhatu siddhanta*, Ayurveda drugs can replace costly stem cell therapy. Lacuna of practical research work based on integrated medical approach still exists. The use of Kapikacchu & talmakkana formulation will be helpful for a female to undergo IVF treatment with her own ovum, which is not possible with a Low AMH level.

REFERENCES

1. Barbara L. Hoffman et.al, Williams Gynecology, Mc Graw Hill Educaiton, Third edition, 2016, Pg.no. 373.
2. White AJ, Sandler DP, D'Aloisio AA, Stanczyk F, Whitworth KW, Baird DD, Nichols HB. Antimüllerian hormone in relation to tobacco and marijuana use and sources of indoor heating/cooking. *Fertil Steril*. 2016 Sep 1;106(3):723-30. doi: 10.1016/j.fertnstert.2016.05.015. Epub 2016 May 27. PMID: 27240193; PMCID: PMC5010988.
3. Jaffar M, Ahmad SN, Monica, Ashraf M, Shaik SA, Asif M. Geographical Diversity in the Age Specific Anti Müllerian Hormone Levels in Infertile Women: A Hospital based Cohort Study. *J Hum Reprod Sci*. 2023 Jan-Mar;16(1):29-35. doi: 10.4103/jhrs.jhrs_163_22. PMID: 37305773; PMCID: PMC10256946.
4. Sudha Salhan, Textbook of Gynecology, Jaypee Brothers Medical Publishers (P) Ltd, First edition, 2011, Pg.no. 90.
5. Sudha Salhan, Textbook of Gynecology, Jaypee Brothers Medical Publishers (P) Ltd, First edition, 2011, Pg.no.126.
6. Sudha Salhan, Textbook of Gynecology, Jaypee Brothers Medical Publishers (P) Ltd, First edition, 2011, Pg.no. 90.
7. Ojo Temitope Noah et.al- Fertility Enhancing Potential of *Mucuna pruriens* Seeds in Female Sprague-Dawley Rats, *British Journal of Medicine & Medical Research* 4(16): 3148-3157, 2014.
8. Shukla KK, Mahdi AA, Ahmad MK, Shankwar SN, Rajender S, Jaiswar Sp. *Mucuna pruriens* improves male fertility by its action on the hypothalamus-pituitary-gonadal axis. *FertilSteril*. 2009; 92:1934–40.
9. Singh AP, Sarkar S, Tripathi M, Rajender S. *Mucuna pruriens* and Its Major Constituent L-DOPA Recover Spermatogenic Loss by Combating ROS, Loss of Mitochondrial Membrane Potential and Apoptosis. *PLOS ONE*. 2013;8(1):54655.
10. Vermes I, Toth EK, Telegdy G. Effects of drugs on brain neurotransmitter and pituitary testicular function in male rats. *Horm Res*. 1979; 10:222–32.
11. S. K. Prasad et.al-*Mucuna pruriens* seed powder feeding influences reproductive conditions and development in Japanese quail *Coturnix coturnix japonica*, *Animal* (2009), 3:2, pp 261–268 & The Animal Consortium 2008 doi:10.1017/S175173110800339X.
12. Pawar RS, Jain AP, Lodhi S, Singhai AK. Erythropoietic activity of *Asteracantha longifolia* (Nees.) in rats. *J Ethnopharmacol*. 2010 May 27;129(2):280-2. doi: 10.1016/j.jep.2010.03.015. Epub 2010 Mar 27. PMID: 20347947.
13. Agbafor KN, Nwachukwu N. Phytochemical analysis and antioxidant property of leaf extracts of *Vitex doniana* and *Mucuna pruriens*. *Biochem Res Inter*. 2011; Article ID 459839, 4 pages.
14. Shukla KK, Mahdi AA, Ahmad MK, Jaiswar SP, Shankwar SN, Tiwari SC. *Mucuna pruriens* reduces stress and improves the quality of semen in infertile men. *Evid Based Complement Alternat Med*. 2010; 7:137–44.
15. Ishikawa M. Oxygen radicals-superoxide dismutase system and reproduction medicine. *Nippon Sanka Fujinka Gakkai Zasshi*. 1993; 45:842–8.
16. Ray SD, Lam TS, Rotollo JA, Phadke S, Patel C, Dontabhaktuni A, et al. Oxidative stress is the master operator of drug and chemically induced programmed and unprogrammed cell death: Implications of natural antioxidants in vivo. *Biofactors*. 2004; 21:223–32.
17. Madamanchi NR, Vendrov A, Runge MS. Oxidative stress and vascular disease. *Arterioscler Thromb Vasc Biol*. 2005; 25:29–38.
18. Halliwell B, Gutteridge JM, Cross CE. Free radicals, antioxidants, and human disease: where are we now? *J Lab Clin Med*. 1992; 119:598–620.
19. Johnson F, Giulivi C. Superoxide dismutases and their impact upon human health. *Mol Aspects Med*. 2005;26:340–52.

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