ejpmr, 2021,8(4), 304-310

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

THERAPEUTIC POTENTIAL OF *MARTYNIA ANNUA*

Pushpa Prasad Gupta[1]*, Jigyasa Latkar[1], Amit Roy[1], Shashikant Chandrakar[1], Akhilesh kumar[1], Shiv Bhardwaj[1], Jhakeshwar Prasad[2]

[1]Columbia Institute of Pharmacy Tekari, Raipur Chhattisgarh – 493111, India.
[2]RITEE College of Pharmacy, Chhatauna, Mandir Hasaud, Raipur Chhattisgarh – 492101, India.

***Corresponding Author: Jigyasa Latkar**

Columbia Institute of Pharmacy, Tekari Raipur, Chhattisgarh, India.

Article Received on 04/02/2021 **Article Revised on 24/02/2021** **Article Accepted on 14/03/2021**

ABSTRACT

India has a rich legacy of using medicinal plants. The knowledge of medicinal plants has been gathered within the course of the many centuries. Thousands of years a powerful number of modern drugs have been isolated from natural sources because nature has been a decent source of medicinal properties. In daily life diseases are treated by various medicinal plants for years altogether over the planet. Nature always stands as a golden mark to represent the outstanding phenomena of symbiosis Human diseases are treated by natural products from plant, animal and minerals. Martynia annua belongs to Martyniaceae is a crucial herbaceous annual medicinal herb found as a wild plant throughout India. It is commonly referred to as the Cat's claw or Devil's claw. In spite of the very fact that the bulk of its parts are utilized as a neighbourhood of folklore and it's referred to as kakanasika in Ayurveda, fruits, seeds, roots and Leaves are the foremost vital parts which are utilized therapeutically. Martynia annua Linn is a folklore medicinal plant used to heal wounds and treat cancer, rheumatism, epilepsy, inflammation, sore throat, burns, itching, respiratory tract and skin diseases. It is commonly referred to as Bichchhu, utilized in epilepsy and applied locally to tuberculosis glands of camel's neck. The juice of leaves is used as a gargle for sore throat, fruits used for inflammation, leaf paste has beneficial effect when applied to the bites of venomous insects and wounds of domestic animal.

KEYWORDS: Martynia annua, Therapeutic effect, Pharmacological activities.

INTRODUCTION

India has a rich legacy of using medicinal plants. The knowledge of medicinal plants has been gathered within the course of the many centuries.[1] Thousands of years a powerful number of modern drugs have been isolated from natural sources because nature has been a decent source of medicinal properties. In daily life diseases are treated by various medicinal plants for years altogether over the planet.[2] In step with World Health Organization different cultures has been maintained their health by herbal medicine or traditional medicine, which is the accumulation of the knowledge, skills and practices that is based on theories, beliefs and indigenized by locals. Nature always stands as a golden mark to represent the outstanding phenomena of symbiosis Human diseases are treated by natural products from plant, animal and minerals.[3] In India, about 80 % population in rural also as urban areas are getting used plants for various purposes like food, medicine, healthcare, clothing, shelter, agriculture etc. One of the best emporia of Ethanobotanical wealth has been represented with the aid of using over 53.8m tribal humans in 5000 wooded area ruled with the aid of using villages of tribal network and compromising 15% of the full geographical location of Indian landmasses, which occupies the Indian subcontinents.[5] During the beyond decade, the indigenous or conventional machine has won significance within side the subject of remedy. A massive variety populations rely on the conventional practitioners, who're depending on medicinal vegetation to fulfil their number one fitness care needs.[6] Although, cutting-edge drug treatments are available, natural remedy retained their picture for ancient and cultural reasons. Since using those natural drug treatments has increased, troubles and moto concerning their quality, protection and efficacy in industrialized and growing nations are cropped up.[7] Attention is in particular targeted at the research of efficacy of plant primarily based totally capsules used within side the conventional remedy because; they're low-budget and feature little aspect effects. According to W.H.O approximately 80% of the arena populace is predicated in particular upon natural remedies. In India, round 20,000 medicinal vegetation were recorded but conventional groups are the use of handiest 7,000 – 7,500 vegetation for the remedy of numerous feature diseases.[8] Since historical time, Martynia annua L. (Martyniaceae) is one of the medicinal herbs utilized by local humans for numerous medicinal purposes. The plant is local to Mexico

however now properly tailored during India on waste lands.[9] Martynia annua L. is a famous small herbaceous annual plant, allotted during India.[10] It is typically observed in dense clumps on roadsides, degraded wet and dry deciduous wooded area, waste lands and over-grazed pasture. It is a weedy alien species local to tropical and sub-tropical place of Mexico, Central America, Burma, West Pakistan and naturalized during India. Martynia annua Linn is a folklore medicinal plant used to heal wounds and deal with cancer, rheumatism, epilepsy, inflammation, sore throat, burns, itching, respiration tract and pores and skin diseases.[11] The plant is typically called the Cat's claw or Devil's claw due to the 2-hooked shape in their seed pods.[12] Fruits are hard, woody with 2-sharp re-curved hooks and seeds are oblong. It is typically called Bichchhu, utilized in epilepsy and implemented domestically to tuberculosis glands of camel's neck. The juice of leaves is used as a gargle for sore throat; end result used for inflammation, leaf paste has useful impact whilst implemented to the bites of venomous bugs and wounds of home animal.[13]

Taxonomy of *Martynia annua*

Kingdom : Plantae
Phylum : Magnoliophyta
Order : Scrophulariales
Family : Martyniaceae
Genus : Martynia
Species : Martyniaannua

Fig. 1: Flower and plant of *Martynia annua.*

Vernacular Name[14]

English : Devil's claw, Tiger's claw
Hindi : Hathajori, Bichu, Ulat-kanta
Gujrati : Vichchida
Marathi : Vinchu
Malayalam : Puli – Nakam
Telugu : Garudamukku, Telukondicchhettu

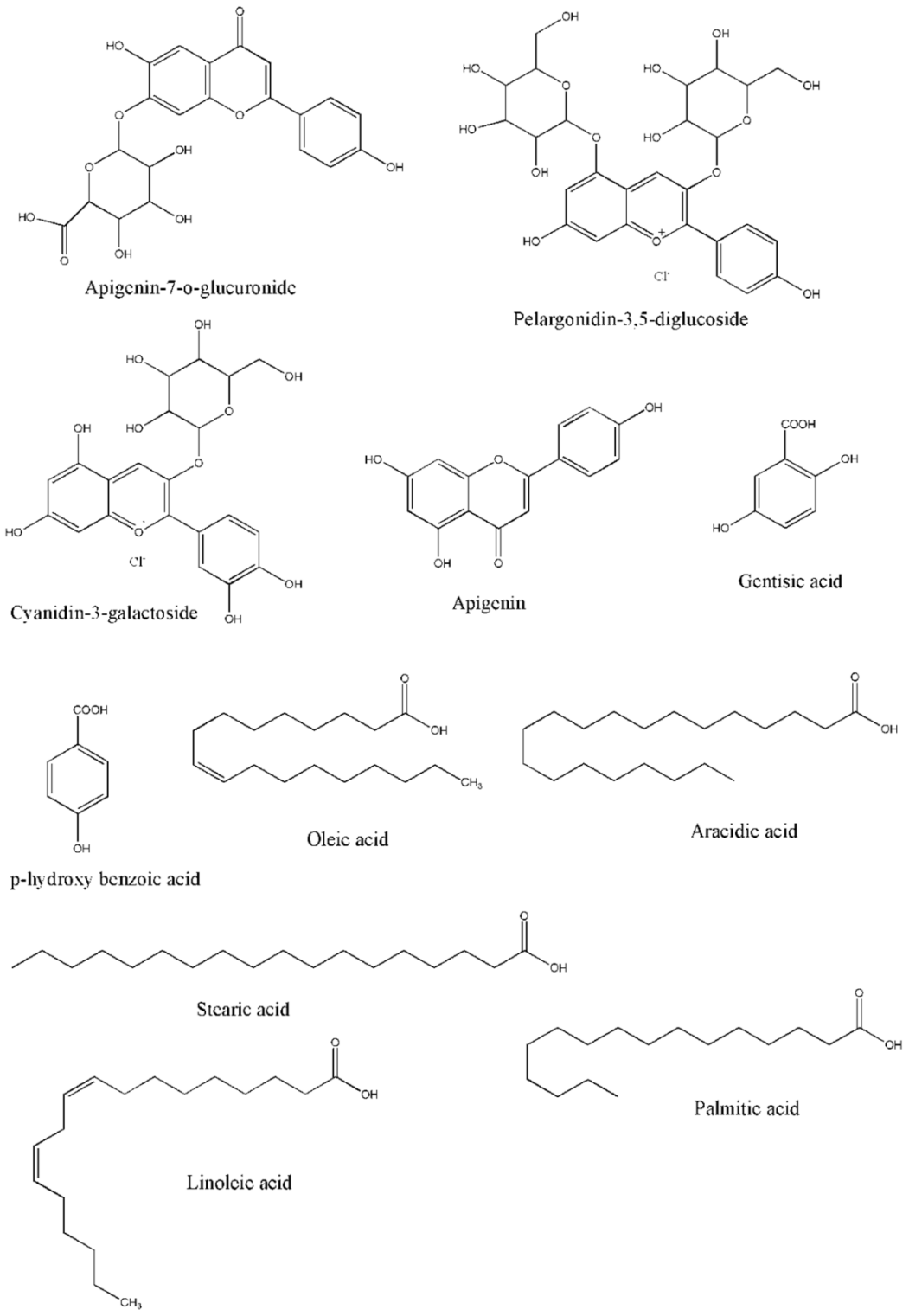


Fig. 2: Chemical structure of the phytoconstituents.

Ethnomedicinal uses

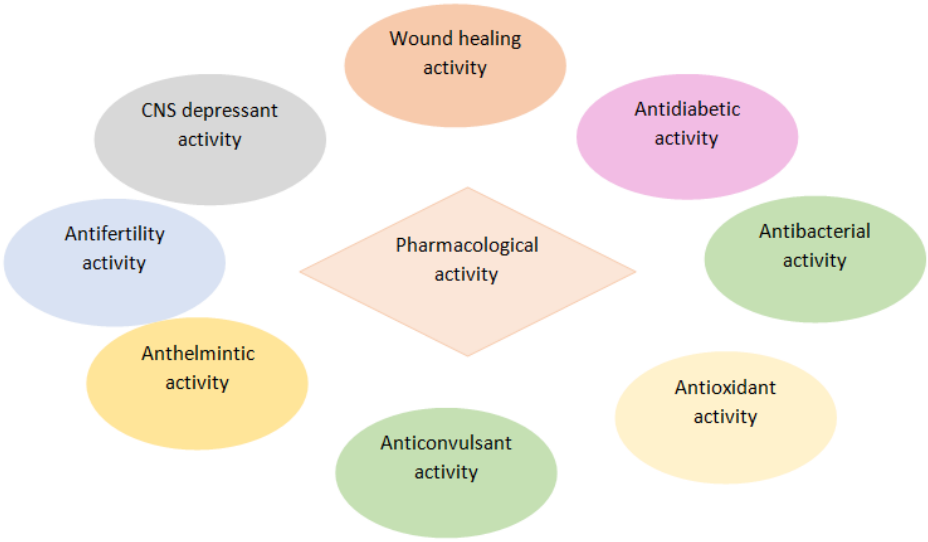
Leaves: The leaves of Martynia annua L are given in epilepsy and its juice is gargled for sore throat. The leaves are useful in remedy of gargle, deal with epilepsy, tuberculous, sore throat and additionally assumed as nearby sedative effect.[15] The leaves are fit to be eaten and they may be used as antiepileptic, antiseptic. The leaf paste is used for wounds of nearby animals.[16]

Root: The roots are used for the remedy of snakebite.[17]

Fruit: The fruit of Martynia annua L. is likewise used because the nearby sedative and end result also are useful in irritation and burns. The end result of Martynia annua L. also are used as antidote to scorpion stings and venomous bites. In people's medicine, the end results are used for the remedy of asthma.[18]

Seeds: Seed oil is implemented on swellings and additionally for treating itching and pores and skin affections.[19] The seeds also are implemented domestically for itching and eczema.[20]

Pharmacological Activity



Wound Healing activity

Lodhi and Singhai (2011) evaluated the wound recuperation ability of ethanol extract of *Martynia annua* leaves the usage of excision and incision version on rats. They mentioned that fraction MAF-C from ethanol extracts of M. annua depart is determined best in wound recuperation and histopathological observe additionally confirmed higher angiogenesis, matured collagen fibre's and fibroblast cells in comparison to the manage group. Moreover, phytochemical research tested that the methanol fraction particularly incorporates flavonoid luteolin liable for enhancement of the wound recuperation procedure because of the free-radical scavenging mechanism.[21]

Mechanism of wound healing

Epidermal wound healing

In an epidermal wound, central portion of wound may extend to the dermis while the edge of usually involves only slight damage to superficial epidermal cells. Epidermal wound is an abrasion and also it is a first-degree or second-degree burn. In response to injury, basal epidermal cells in wound area, break their contact with basement membrane and then enlarge migrate as a sheet across the wound until advancing cell from opposite sides of the wound meet. When epidermal cells encounter each other, their continue migration is stopped by contact inhibition. Contact inhibition appears to occur only among like cells (epidermal cells) and stops when it is finally in contact on all sides with other epidermal cells. Simultaneous with migration of some basal epidermal cells, stationary basal stem cells divide to replace the migrated ones and continue this until the wound is resurfaced to normal status. Following this, the migrated cells themselves divide to form new strata, thus thickening the new epidermis.[22]

Deep wound healing

If an injury extends to the epidermis, the repair process is more complex and scar formation results. This type of wound healing is known as deep wound healing. The first step in the deep wound healing involves inflammation, a vascular and cellular response that serves to dispose of microbes and foreign materials. During the inflammatory phase, a blood clots form in the wound and loosely units the wound edges. Vasodilatation and increase permeability of blood vessels enhance delivery of white blood cells such as neutrophils and monocytes (macrophages) that phagocytes microbes and mesenchymal cells, which develops in the fibroblasts. In the second phase that is a migratory phase, the clot becomes a scab, and epithelial cells migrate beneath the scab to bridge the wound. Fibroblasts migrate along fibrin threads and begin synthesizing scar tissue (collagen fibers and glycoprotein), and damaged blood vessels begin to redrew. During this phase tissue, finally, the wound is called granulation tissue. The third phase is a proliferative phase which is characterized by extensive growth of epithelial cells beneath the scab, deposition of collagen fibers by fibroblasts and continue growth of blood vessels. The final phase is the maturation phase, the scab sloughs off once the epidermis is restored to normal thickness. Collagen fibers become more organized, fibroblasts decrease in number, and the blood vessels are restored to normal.

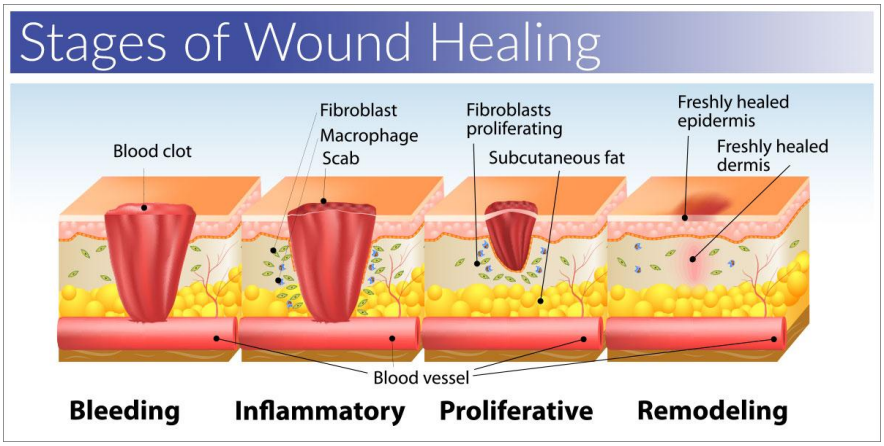


Fig. 3: Stage of wound healing.

Anticonvulsant activity

Shrivastav et al., 2014 investigated the current study anticonvulsant activity of an ethanolic and aqueous extract of *Martynia annua* leaves were investigated by means of PTZ and MES models. The results demonstrate the broad and potent anticonvulsant activity in rats (both MES and PTZ models) of the compounds in an ethanolic and aqueous extract of the leaves of *Martynia annua*. The development of anticonvulsants from an ethanolic and aqueous extract may produce natural anti-epileptic drugs.[23]

Antioxidant activity

Nagda D et al. (2009) documented the antioxidant activity of the methanol and aqueous extracts of *M. annua* leaves by reducing the power assay, DPPH radical-scavenging activity, gas scavenging activity, H2O2 radical scavenging activity, superoxide radical scavenging assay, hydroxyl scavenging activity, and the total antioxidant capacity method. The results revealed that the methanol extracts produced higher antioxidant activity than the aqueous extract.[24]

Anthelmintic activity

Nirmal SA et al (2007) are tested anthelmintic activity of the petroleum ether extract of *M. annua* roots in opposition to earthworms Pheritima posthuma. The locating of the end result exhibited effective anthelmintic activity as in comparison to standard drug Albendazole.[25] Analgesic and antipyretic activity Kar DM et al (2004) evaluated the analgesic impact of petroleum ether, chloroform, ethanol and aqueous extracts of *M. annua* end result in Swiss albino mice via way of means of the use of warm plate and tail flick methods, and for antipyretic impact in opposition to brewers-yeast- triggered hyperpyrexia in grownup Wistar rats. The extracts display massive analgesic and antipyretic activity at 20 mg/kg. it is been additionally discovered that the petroleum ether and chloroform extracts reveals more analgesic and antipyretic activities compared to different extract.[26]

Antibacterial activity

Sermakkani and Thangapandian (2010) evaluated antibacterial pastime of chloroform, ethyl acetate and methanol extract of *M. annua* leaves in opposition to six gram-fine and 9 gram-bad bacteria. All the extracts display antibacterial pastime in opposition to exceptional bacteria. Chloroform extract produces better antibacterial pastime in opposition to Proteus vulgaris, Bacillus thuringensis and Bacillus subtilis even as ethyl acetate extracts probably powerful in opposition to Salmonella paratyphi A, Salmonella paratyphi B, Proteus mirabilis, Proteus vulgaris and Klebsiella pneumonia, while the methanol extracts, suggests more antibacterial pastime toward Proteus vulgaris, B. subtilis, S. paratyphi B and Pseudomonas aeruginosa.[27]

Antidiabetic activity

Saiyad and Gohil (2013) investigated the antidiabetic pastime of methanol extracts of *M. annua* (MEMA) flower in streptozotocin (STZ) and Streptozotocin-Nicotinamide (STZ-NIC) triggered diabetes in Wistar rats. MEMA confirmed extremely good discounts in blood glucose, triglyceride and glycosylated haemoglobin degrees and improved HDL degrees in diabetic rats (after 21 days). A end result found out that the MEMA exhibited right antidiabetic pastime in STZ and STZ-NIC triggered diabetic rats.[28]

Antifertility activity

Mali PC, et al (2002) mentioned antifertility pastime of 50% ethanol extract of *M. annua* root. The locating of authors found out full-size decreases withinside the weights of testes, epididymides, seminal vesicle and ventral prostate. Moreover, discount withinside the testicular sperm remember, epididymal sperm remember and motility, range of fertile males, the ratio among brought and inseminated girls and range of puppies has been observed. Significant discount in serum awareness of luteinizing hormone and testosterone help the anti-fertility pastime of extracts. This plant is greater useful in comparison to different vegetation showing anti-fertility pastime due to the fact no changes in haematological parameters recorded.[29]

Antinociceptive activity and Central Nervous System (CNS) depressant activity

Bhalke and Jadhav (2009) evaluated antinociceptive and CNS depressant pastime of petroleum ether, ethyl acetate and methanol root extracts of M. annua. Among all extracts, petroleum ether extracts confirmed the full-size boom in response time in warm plate approach and additionally confirmed the greater inhibitory impact on writhing triggered via way of means of acetic acid in opposition to all extracts and fashionable drug Pentazocine and Paracetamol respectively. Apart from this, it in addition confirmed full-size discount withinside the locomotors pastime whilst as in comparison with fashionable drug diazepam, and it potentiates Pentobarbitone sodium triggered napping time.[30]

CONCLUSIONS

The plant M. annua is normally grown in wastelands at some stage in India, and additionally observed within side the tropical and sub-tropical area of America, Mexico, Burma, West Pakistan. The clinical research has indicated a enormous pharmacological impact of M. annua extracts. In the prevailing review, the pharmacological traits of Martynia annua L. are defined. Although the vegetation grown in garbage thousands and in waste places, the herb is getting used as an critical medicinal plant due to the fact an extended length of time. In view of the wide-ranging medicinal cost of Martynia annua L. vegetation as defined in Ayurvedic literature, it's far vital that greater medical and pharmacological trials are wanted to analyze the unexploited ability of this plant.

REFERENCE

1. Negi, R. S., Pareek, A., Menghani, E. and Ojha, C. K. Ethno-medicinal studies at Sanchor and Mount Abu regions, Located Sirohi district of Rajasthan. Cibtech Journal of Pharmaceutical Sciences, 2012; 1(1): 14-21.
2. Flora, G., Mary, J. M., Chandra,M., Nanthini, M., Shalini, K., Shantha, P., Siva, R. A. and Valli, S. Study on antioxidant potential of different parts of Martynia annua Linn.A road side weed. International Journal of Development Research, 2013; 3(9): 051-054.
3. Pandey, P., Sharma, P., Gupta, R., Garg, A., Shukla, A., Nema, N. and Pasi, A. Formulation and evaluation of herbal effervescent granules incorporated with Martynia annua Linn extract. Journal of Drug Discovery and Therapeutics, 2013; 1(5): 54-57.
4. Kenwat, R., Prasad, P., Satapathy, T. and Roy, A. Martynia annua Linn: An Overview.UK Journal of Pharmaceutical and Biosciences, 2013; 1(1): 7-10.
5. Chowdhuri, S. K. From Ethnobotany, In Studies in Botany, Mitra, D., Guha, J. and Chowdhuri, S. K. (Eds), (pp-855-867). Kolkata: Manasi Press, 2000.
6. Chauhan Khushbu, Patel Anar, Patel Mayuree, Macwan Carol, Solanki Roshni, Adeshara Subodh. Paederiafoetida Linn. As a potential medicinal plant: A Review, Journal of Pharmacy Research, 2010; 3(12): 3135- 3137.
7. Shankul k., prasad A.K., lyer V.S., Vaidya S.K., Sahu A.R. systemic review: pharmacognosy, phytochemistry and pharmacology of martynia annua Int J Res Med., 2012; 1(1): 34-39.
8. Kamboj V P., Herbal Med Chinese Medicine. Current Science, 2000; 78: 35-38.
9. Suryawanshi, J. S.andTare, H. L. Phytochemical Screening and antibacterial activity of Martynia annua Linn unripe fruits and flower extracts. International Journal of Universal Pharmacy and Life Sciences, 2013; 3(2): 81-86.
10. Hosamani KM, Sattigeri RM, Patil KB. Studies on chemical compounds of Martynia annua syn. M. diandra seed oil. Journal of Medicinal and Aromatic Plant Sciences, 2002; 24(1): 12.
11. Gupta A Critical Review on Ethnobotanical, Phytochemical and Pharmacological Investigations of Martynia annua Linn. Review Article Rahul Kumar Gupta1*, Meena Deogade International Journal of Ayurvedic Medicine, 2018; 9(3): 136-143.
12. Babu HB et al. Studies on phytochemical and anticonvulsant property of Martynia annua Linn. International Journal of Phytopharmacology, 2010; 1(2): 82-86.
13. Lodhi, S and Singhai, A. K. Preliminary pharmacological evaluation of Martynia annua leaves for wound healing, Asian Pacific Journal of Tropical Biomedicine, 2011; 10(2): 421 - 427.
14. Kumar S, Prasad AK, Iyer SV, Vaidya SK, Sahu AR. systemic review: pharmacognosy, phytochemistry and pharmacology of martynia. Int J Res Med, 2012; 1(1): 34-39.
15. Flora, G.,Mary, J. M., Chandra,M., Nanthini, M., Shalini, K., Shantha, P., Siva, R. A. and Valli, S. Study on antioxidant potential of different parts of Martynia annua Linn.– A road side weed. International Journal of Development Research, 2013; 3(9): 051-054.
16. Dhingra, A. K., Chopra, B. and Mittal, S. K. Martynia annua L.: A Review on Its Ethnobotany, Phytochemical and Pharmacological Profile. Journal of Pharmacognosy and Phytochemistry, 2013; 1(6): 135-140.
17. Rehman, A., Ahmed, S., Riaz, T., Abbas, A., Abbasi, M. A., Siddiqi, S. Z. and Ajayib, M. Martynia annua Linn: Comparative Antioxidant Potential of Its Stem and Leaves. Asian Journal of Chemistry, 2012; 24(8): 3335-3338.
18. Gadhavi H.A.a review on pharmacological, medicinal and ethnobotanical important plant: martynia annua L. International Journal of Current Research in Life Sciences, 2017; 06: 768-771.
19. Khare, C. P. (Ed.). Indian Medicinal Plants An illustrated Dictionary. (pp-399-400): Springer publications, 2007.
20. Suryawanshi, J. S.andTare, H. L. Phytochemical Screening and antibacterial activity of Martynia

annua Linn unripe fruits and flower extracts. International Journal of Universal Pharmacy and Life Sciences, 2013; 3(2): 81-86.
21. Bhalke RD, Jadhav RS. Antinociceptive activity and CNS depressant activity of Martynia annua L. root. International Journal of Pharmaceutical Sciences, 2009; 1(2): 333-335.
22. Taranalli AD, Tipare SV, Kumar S, Torgal SS. Wound healing activity of *Oxalis corniculata* whole plant extract in rats. Indian J Pharm Sci., 2004; 66(4): 444-6.
23. Srivastav N., Saklani S., Juyal V., Tiwari B.K. Antioxidant activity of leaf extract of *Martynia annua*linn in experimental rats International Journal of Phytomedicine, 2014; 6(1): 59-62.
24. Nagda D, Saluja A, Nagda C. Antioxidant activities of methanolic and aqueous extract from leaves of Martynia annua Linn. Journal of pharmacognosy, 2009; 1: 288-297.
25. Nirmal SA, Nikalye AG, Jadav RS, Tambe VD. Anthelmintic activity of Martynia annua roots. Indian Drugs, 2007; 44(10): 772-773.
26. Kar DM, Nanda BK, Pardhan D, Sahu SK, Dash GK. Analgesic and antipyretic activity of fruits of Martynia annua Linn. Hamdard Med, 2004; 47: 32.
27. Sermakkani M, Thangapandian V. Phytochemical and Antibacterial activity of Martynia annua L. against the different pathogenic bacteria. J of Herb Med Toxico, 2010; 4(2): 221- 224.
28. Saiyad Moinali F, Gohil Kashmira J. To investigate antidiabetic potential of Martynia annua linn. flower extracts in wistar rats. WJPR, 2013; 2(2): 486-499.
29. . Mali PC, Ansari AS, Chaturvedi M. Antifertility effect of chronically administered Martynia annua root extract on male rats. J Ethnopharmacol, 2002; 82(2–3): 61–67.
30. Lodhi S, Singhai AK. Preliminary pharmacological evaluation of Martynia annua Linn leaves for wound healing. Asian Pacific Journal of Tropical Biomedicine, 2011; 1(6): 421-427.