

An Ayurvedic and Modern Review on Valued Medicinal Plant - Bakuchi (*Psoralea corylifolia* Linn.)

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Article History	Abstract
<p>Article Received: 9/04/2021</p> <p>Article Revised 10/05/2021</p> <p>Article Accepted: 15/06/2021</p>	<p><i>Plants provide food, shelter, cloths and medicine along with the oxygen we breathe. So, survival of mankind is impossible without plants. Throughout the world, plants have been the basis of many traditional medical systems since time immemorable and in this modern era, they still provide many new remedies to the mankind. These remedies are not only effective as compared to their modern counterpart but also devoid of any severe side effects. Psoralea corylifolia Linn., which is also called as Bakuchi in Ayurveda, is very famous herb which is mainly used to cure skin disorders. This magical plant is used in traditional Ayurvedic and Chinese medicine due to its variety of disease treating properties. As per the modern medicine, it shows various disease curing properties which are found in new researches. Along with medicinal uses, other aspects, like precautions and toxicology should also been discussed for proper use of this plant. It will be helpful in creating and formation of new remedies with more economical and therapeutic value.</i></p> <p>Keywords -Ayurvedic; Bakuchi; Modern; Plants; Review</p>

INTRODUCTION -

Bakuchi is an Ayurveda herb, very well known for its efficacy against skin diseases mainly leucoderma. Its botanical name is *Psoralea corylifolia* Linn. and it belongs to Fabaceae family^[1]. It is used in Indian and Chinese traditional medicine. Indian Traditional medicine i.e. Ayurveda is famous for the use of this plant and its various products to treat variety of disorders since time immemorable. Whenever there is need for new remedies, plants always been a wonderful source for various human illness. Bakuchi seeds have variety of coumarins along with Psoralen.^[2] Bakuchi is a crucial herb which is used for its medicinal properties. The seeds of Bakuchi are kidney shaped, having a bitter taste and a very unpleasant odor. However, each part of this plant is useful because of its medicinal properties.

Bakuchi have several pharmacological activities like antioxidant activity, anti-inflammatory activity, antimicrobial activity, immunomodulatory activity, antitumor activity, antipregnancy and estrogenic activity, antimutagenic activity, antiviral activity, hepatoprotective activity, photosensitization, antiasthma activity, antifilarial activity, antiplatelet activity, osteoblastic activity, hemostatic activity, antipyretic activity and antidepressant activity.^[2]

In Ayurveda, it is used in many pathological conditions but mainly in skin diseases such as leucoderma, Leprosy and psoriasis in the form of external as well as internal applications.^[3] Bakuchi oil is a most efficient home remedy for skin. Applying Bakuchi oil mixed with coconut oil helps to reduce

inflammatory reactions on skin due to anti-inflammatory property. Its application also helps to reduce boil and skin eruptions due to its strong healing property.

According to Ayurveda, Bakuchichurna helps to improve hair growth and controls dandruff when applied externally due to its Keshya property. It has various synonyms such as Avalguja, Krishnaphala, Putiphala, Kushthaghi, Somavalli, Kalmeshika, Kushthagari, Babchi, Babacha, Babichi, Habchu, Karkokil, Kaurkolari. Bakuchi seeds have Antibacterial, Antifungal, Aromatic, Diaphoretic, Diuretic and Laxative properties.^[4]

Psoraliacorylifolia fruits also have many medicinal uses. The seeds with the seed's pods, own high aphrodisiac properties, which means they are used as a remedy for various diseases related to infertility. Bakuchi fruits have bitter taste and can prevent urinary incontinence, burning micturition along with haemorrhoids, vomiting, anemia, bronchitis and it is also known to improve skin complexion. Besides this, extract of its fruit arrests the growth of *Mycobacterium tuberculosis*. Lichen induced dermatitis can be treated by Psoralen extract along with sunlight exposure. In tooth decay, Bakuchi root and seeds are very useful in preventive aspect. Bakuchi also promote bone calcification, and therefore it is very beneficial for treating osteoporosis and bone fractures.^[5]

Regional names - Marathi – Bavachi. Hindi – Bakachi, Bavachi. Guj. -Bavachi. Tam. – Karpokarishi. Tel. -Bhavanchi. Eng. – Psoralea seed. Mal – Kaurkoalari, karkokilari, Karkokil. Oriya- Bakuchi. Assam- Habucha. Nepalese- Bakuchi. Urdu- Babechi. German- Bawchan. Pers- Waghchi, Vabkuchi, Babkhi. Arabic- Loelab el abid.^[1]

Morphology – Bakuchi is erect, leguminous, annual herb which grows 60 to 100 cm tall. Stem is straight with firm branches. Leaf is 2.5 to 8 cm. long, cordate, alternate with serrated margins rounded along with toothed margin and its both sides covered with clearly visible black glandular dots. Flowering comes in winter. Flowers are yellowish blue in color, having a large stalk and with 10 to 30 flowers in the inflorescence. Calyx is nearly sessile. Corolla is little exerted and yellowish-blue in colour. Pods are 5 cm long, sub globose, closely pitted, slightly compressed and beaked; Fruits and seeds are black in colour. Seeds are small with a fragrant smell. Bakuchi seeds usually swell when they put into the water and when rubbed they give aromatic odour and slight bitter taste. These seeds are mainly surrounded by a sticky oily pericarp which carries psoralen.^[6]

Macroscopic Description -

Bakuchi Fruits are dark chocolate to almost black in colour with pericarp adhering to the seed-coat. Seed is 3- 4.5 mm in length and 2-3 mm in breadth. Its shape is ovoid-oblong or bean shaped. It is somewhat compressed, glabrous rounded or mucronate, closely pitted, seeds campylotropous, nonendospermous. Seeds are oily and free from starch. They are odourless but when chewed smell of a pungent essential oil felt. Its taste is bitter, unpleasant and acrid.^[7]

Microscopic Description -

Transverse section of fruit shows pericarp with prominent depressions and ridges, consisting of collapsed large secretory glands containing oleo-resinous matter testa and parenchyma, an outer layer of palisade epidermis, layer of bearer cells which are much thickened in the inner tangential and basal radial walls and 2-3 layers of parenchyma, cotyledons of polyhedral parenchyma and three layers of palisade cells on the axial side.^[7]

Identity, Purity and Strength of Dry ripe fruits of *Psoralea corylifolia* Linn.

Foreign matter -Not more than 2 %, Total Ash -Not more than 8 %, Acid-insoluble ash -Not more than 2 %, Alcohol-soluble extractive -Not less than 13 %, Water-soluble extractive- Not less than 11 %.^[7]

Habitat-Bakuchi plant is widely found in the tropical and subtropical regions of the planet, specifically Southern Africa and China. It grows all over the plains of India, specifically in the semi arid regions of Rajasthan and eastern Districts of Punjab along with Uttar Pradesh, Bihar, Assam, Bengal, Karnataka and Tamil Nadu.^[1]

Propagation and Cultivation—*Psoralea corylifolia* grows well in sub-tropical climate which needs low to medium rainfall and can bear in variety of soils such as sandy medium loam to black cotton soils. This plant grows nicely in the pH ranging from 6.5 to 7.5 along with red loamy soil with good organic matters. This plant does not need any pretreatment for seeds for germination. It can be grown easily through direct sowing of seeds. After 200 days, when the pods turn purple in color, crop becomes mature and seeds are collected after complete drying of the pods which is then shade dried and stored for further use.^[8]

Scientific Classification of Bakuchi-It comes under the Kingdom-Plantae, Division -Angiosperms, Class-Dicotyledoneae, Order- Rosales, Family-Leguminosae, Subfamily-Papilionaceae, Genus-*Psoralea* and Species -*corylifolia* Linn.^[9]

Medicinal properties as per Ayurveda

Taste (Rasa) – Pungent (Katu), Bitter (Tikta)

Qualities (Guna) - Light to digest (Laghu), Dry (Rooksha)

Potency (Veerya) – Hot (Ushna)

Taste conversion after digestion (Vipaka) - Pungent (Katu)

Effect on Tridosha – Bakuchi balances Kapha and Vata dosha.

Bakuchi is classified under tikta shandha in Charaka Samhita; Katukavarga in Sushrutasaṃhita and Shakavarga in Ashtangaśaṅgraha.^[10]

As per various nighantus, it is classified under Guduchyadi Varga in Dhanwantarinighantu and Shodhanighantu. It comes under the Haritakyadi Varga as per Bhavaprakasha Nighantu; Aushadhivarga as per Kaiyadevanighantu; Shatavhvadi Varga as per Raja nighantu; Shatapushpadi Varga as per Priyanighantu; Abhayadi Varga as per Madanapala Nighantu; Astavarga as per Shaligramanighantu; Tripadivarga as per Hridayadipakanighantu and Palashadi Varga as per Nighantuadarsha. Apart from this, it is mentioned that the white variety of Bakuchi is dry, aggravates pitta and vata and is heavy for digestion, according to Bhojana Kutuhalam.

Phytochemistry - Major constituents present in Bakuchi are Psoralen 1-7, bakuchiol 1 248-11 and bakuchicin 14. Other constituents present in Bakuchi are Angelicin, psoralidin, bavachromanol, bavachin, corylinal, bavachalcone, bavachinin, isobavachalcone, psoralenol, neobavachalcone, bavachromene, isopsoralen, neobavaisoflavone, corylidin, corylifolin, corylifolinin, corylinisobavachin, isopsoralidine, 7-O-methylbavachin, psoralidin oxide, isoncobavachalcone, bakuchalcone, bavacoumestan A and B, sophoracoumestan A, 5-formyl-2,4-dihydroxy-4' methoxychalcone, seed oil contains, stearic acid, glycerides of oleic acid, palmitic acid, myristoleic acid, myristic acid, linoleic acid, linolenic acid along with B-sitosterol and stigmasterol.^[11]

Formulation of Bakuchi–Shvitraharvi, Khadirarishta, MahamanjishthadiKwath, Bakuchitaila, Bakuchichurna, Shwitravati, Somarajighrita, Sarvangasundarigitika etc.^[1]

Dosages of Bakuchi - Bakuchi is available in the market to be bought and used. It is available in the forms of Churn, Capsule and Tablet forms. The Bakuchi powder is recommended to be used twice a day, the quantity being quarter or a half spoon and not more than that. Bakuchi Capsules should be taken twice a day, after meals. It is recommended to take 1 capsule with warm water.^[1]

Pharmacological uses of Bakuchi-

1. Skin diseases - Bakuchi has the main action on kushtha. It is very useful in shvitra (Vitiligo). Initially, vamana and raktamokshana should be done; then its decoction should be given with jaggery and its oil with honey. Following diet restrictions, Dhatri and Khadira decoction should be given with Bakuchi to eradicate Shvitra. Its paste should be ingested with a decoction of Bibhitaka and Fig bark and applying its oil one should expose white spots to weak sunlight. When blebs appear on the skin one must stop application of oil & reapply if after blebs subside. Patient should eat only rice and butter milk without adding salt.^[12]

Normal colour of the skin can also get by the application of paste of Bakuchi and Harital mixed with cow's urine to the patches of shvitra. It absorbs kleda due to tikta, katurasas;ruksha,ushnagunas;Kusthaghna and Rasayana properties and thus it eradicates kushtha and krimis and secretes healthy Pitta. Bakuchishows visible skin colour and complexion changes. The darker skin area steadily covers all white skin patches by helping in shrinking the white area.^[13]

Bakuchichurna along with honey or coconut oil is helpful to prevent the destruction of pigment forming cell. Hence, it is used in Shvitra and Dhatugatavastha of kushtha. It is also called as a kushtanashini. Ingestion of Bakuchi and black Sesame for a year cures advanced stage of kushtha. Butter mixed with Bakuchi powder and butter milk should be ingested to eradicate all types of kushtha. Bakuchi seed oil is used for the treatment of skin ailments. Bakuchi seed extracts have been used since very long time to treat the skin related problem such as dermatitis, eczema, boils, skin eruptions, vitiligo, scabies, leucoderma and ringworm. Bakuchi have anti-inflammatory, anti-oxidant, antibacterial properties due to which it has proven to reduce and control the all skin related problem and helps to promote natural color complexion and to maintain and normalizes individual skin pigmentation.^{[14][15]}

Bakuchi has raktshodhaka property which means blood purifier. All skin problems which are related to the flow and circulation of blood, Bakuchi has capacity to purify blood and cure the all skin inflammation, wounds and other problems.

2. Respiratory diseases - Bakuchi also used for the respiratory health. Bakuchi oil is responsible for accumulation of phlegm or mucus deposits in respiratory passages and lungs. It helps to reduce chronic fever and also provide relief from nasal congestion, cold, bronchitis, headache, whooping cough, breathing difficulties, asthma and sinusitis. It manages these conditions due to its UshnaVirya, Kapha balancing and Rasayana (rejuvenation) properties. It reduces the formation of mucus and helps to maintain overall health of an individual.^[16]

The Bakuchi seeds have antibacterial, anthelmintic, astringent, aphrodisiac, cytotoxic, cardiac, diaphoretic, deobstruent, diuretic and stimulant properties. These seeds are also useful in respiratory disorders like cough, asthma, nephritis, dyspnoea, bronchitis and various other respiratory conditions. Coumarins isolated from *Psoralea corylifolia* exhibit antiasthma activity. A Chinese herbal kwath, which is having 6 herbs, along with Bakuchi seeds shows immediate effect in the treatment of asthma especially in the convalescent stage to prevent emphysema. *Psoralea corylifolia* shows high antiasthma activity by stabilization of mast cell and inhibition of histamine releases.^[17]

3. Reproductive diseases- Bakuchi oil also used for reproductive health. Its fruits and seeds powder are used with its essential oil to treat impotence, incontinence, frigidity, premature ejaculation and lack of sexual interest. Bakuchi oil has aphrodisiac properties that support reproductive problems in both men and women.^[18]

4. Indigestion –Bakuchi helps in digestion of food by regulating the enzyme. As the enzyme are important for the fast and easy digestion process. As per the Ayurveda Bakuchi helps to improve digestion due to its Ushna (hot) potency. Imbalanced pitta leads to the formation of ama. Due to this, toxin remains in the body which leads to indigestion, which is consequently impares deeper body tissue. Bakuchi helps to manage this condition due to its Deepan (appetizer) and pachan (digestion) properties.^[18]

5. Cancer - Bakuchi oil is used for treating various Cancer types including lung cancer. Psoralea species have distinctive bioactive compound which is having anti-cancer properties. Properties of bakuchinol which act by inhibiting epidermal growth factor (EGF)- induce neoplastic cell transformation. Bakuchinol also reduce viability and inhibited independent growth of A431 human epithelial carcinoma cells.^[19]

Study shows that the chemical components such as Psoralen, Corylfolinin and Bavachinin slow the growth of lung cancer cells and Osteosarcoma. Psoralidin enhances activity of tumor necrosis factor related to apoptosis which stimulate apoptosis in cancer cell and spare normal tissue. Bakuchinol is tested for Human lung adenocarcinoma A549 cell line and it shows antitumor activity which was more effective in inhibiting the growth of tumor cell.^[20]

6. Worm infestation–It is said that Bakuchi has a property of Krimighnaas per Ayurveda. It means that the herb dose not let worm survive in host. The intake of Bakuchi kills the worm and cure the worm infection due to its anti-inflammatory activity and antibacterial properties.^[21]

7. Jaundice - Although enough scientific evidence isn't available to support the role of Bakuchi in jaundice. However, it may prevent liver injury due to its antioxidant activity and fights against free radicals and prevent hepatic cell damage. Bakuchi manages this condition due to its Rasayana (rejuvenation) and Deepan (appetizer) properties. It maintains overall health, improves digestion, and also enhances appetite.^[21]

8. Urinary System - Bakuchi also used in disorder like urinary incontinence, urination etc. It also strengthens the sphincter walls of the urinary tract.^[21]

9. Hair - As per Ayurveda Bakuchi removes dandruff and increases hair growth when applied externally because of its Keshya properties. It also improves quality and luster of hair. It is also beneficial for grey hairs.^[21]

10. Pain - It pacifies vatadosha and relieves spasmodic pains and chronic pains.^[22]

11. Photosensitivity – *Psoralea corylifolia* has ability to effect on tyrosinase and also improve the activity of tyrosinase by increasing the volume of melanine. Psoralen is a photosensitivity compound and it is superior to isopsoralen. It plays crucial role in managing vitiligo.

12. Diabetics–*Psoralea corylifolia* have higher antidiabetic activity .Seed extract of *Psoralea corylifolia* is administered orally in streptozotocin-nicotinamide induced diabetic rat, which shows increase in glycogen level content in liver and insulin level in plasma along with decrease cholesterol and blood glucoses in plasma.^[22]

13. Osteoporosis-In several studies *Psoralea corylifolia* extract showed notable inhibitory effect on osteoblastic proliferation in cultured cell line and boosting the bone formation and specifically Bavachin helps in inhibiting the bone resorption and to promote the proliferation of osteoblasts.^[23]

14. Other-Bakuchi also treat Alzheimer's diseases, they also have Pesticidal activity, Antiaging activity, Antidiabetic activity and antiulcer activity. It is effective against helicobacter pylori so can treat diseases caused by any infection.^[24]

MATERIAL AND METHODS -

The data related with this plant is obtained from the various ayurvedic textbooks, samhitas and websites. Along with this many research papers and journal articles have also been referred.

PRECAUTION AND TOXICOLOGY -

Bakuchi is usually consumed after purification. Because non-purified Bakuchi may create sever side effect like nausea and vomiting. Bakuchi cannot be used undiluted and in high doses on the skin, otherwise it can cause many sever infection on the skin like discoloration of the skin, allergies and rashes. Some products like curd, pickles, fish etc. should be avoided in case of vitiligo treatment with Bakuchi churna. Beacause these are Apathya with the treatment. Bakuchi should be taken in recommended dose and particular duration since high dose and prolonged uses cause sever hyperacidity and gastritis. Bakuchi should be used only under medical supervision during pregnancy, breast-feeding females and in children. Bakuchi has a hot potency due to this it should not be used on sensitive skin. Bakuchi seed paste should be used with milk, rose water or any cooling substance if patient's skin is hypersensitive since it is having in potency. Bakuchi oil also can cause mild skin irritation and burning sensation when applied externally. Due to excess use of Bakuchi, it may cause hepatotoxicity.^[25]

In over use, Psoralea corylifolia has been associated with rapid breathing, dizziness, blurred Vision, general weakness and vomiting. In severe cases of overdose, it is associated with Hematemesis, loss of consciousness and even coma. Various side effects such as renal complications, blistering, malaise, mental depression, dermatitis, biliousness, loose-motions, annoyance and sleeplessness has been reported. Prolonged therapy also reported to effect on the immune system, eyes and liver. The psoralen treatment along with UVA can cumulatively cause extensive chromosome Damage to mammalian cells and could lead to malignancy.^[26, 27]

CONCLUSION-

Bakuchi is the most important drug in ayurvedic pharmacopeia because of its pharmacological activities. It is utilized for many diseases due to its several properties. Each part of this plant is utilized for many types of diseases. Hence this review is beneficial for its better economic and therapeutic utilization and also to provide ayurvedic and modern view of Bakuchi on various diseases along with precaution and toxicology for better efficacy.

REFERENCES:

1. Deshpande A.P., Ranade S. DravyagunaVigyan. Part 1&2.Pune :A.R. Nandurkar, Proficient Publishing House;July2010: p. 367
2. Acharya MJ1, Singh TR2, Patgiri BJ; International Journal of Ayurvedic Medicine, Anti microbial activity of different dosage forms of Bakuchi (Psoralea corylifolia Linn.) taila, An Ayurvedic formulation; 2015, 6(3), 232-236

3. Sahara Shrestha, Jadav H. R. a , Bedarkar P. a, Patgiri B. J. a ,Harisha C.R. b ,Chaudhari S.Y. c, Pradeep K. Prajapati d; Journal of Ayurveda and Integrative Medicine; Pharmacognostical evaluation of *Psoralea corylifolia* Linn. Seed; 9 (2018) 209e212
4. Goel, M., Bhukya, S. and Shravya, S., 2021. *Bakuchi – Psoralea corylifolia – Usage, Benefits, Ayurveda Details*. [online] Easy Ayurveda. Available at: <<https://www.easyayurveda.com/2012/12/26/Bakuchi-psoralea-corylifolia-usage-benefits-ayurveda>> [Accessed 21 April 2021].
5. Dr. Chauhan Meenakshi; planet Ayurveda; bakuchi (psoralea corylifolia)-properties, benefit, uses and dosages;(2019)
6. Subasini. Vikaspedia Domains [Internet]. Vikaspedia.in. 2017 [cited 25 May 2021]. Available from: <https://vikaspedia.in/agriculture/crop-production/package-of-practices/medicinal-and-aromatic-plants/psoralea-corylifolia>
7. Government of India, Ministry of Health and Family Welfare, Department of AYUSH. The Ayurvedic Pharmacopoeia Of India [Internet]. 1st ed. Delhi: The controller of Publications; 2001 [cited 23 May 2021]. Available from: <http://www.ayurveda.hu/api/API-Vol-1.pdf>
8. Vikaspedia Domains [Internet]. Vikaspedia.in. 2017 [cited 6 May 2021]. Available from: <https://vikaspedia.in/agriculture/crop-production/package-of-practices/medicinal-and-aromatic-plants/psoralea-corylifolia>
9. Gupta A.K., Tondon Neeraj, Sharma Madhu. Quality Standards of Indian Medicinal Plants, Vol-7, New Delhi: Indian council for Medical Research; 2008: p.290-297
10. Krishnamurthy M, D'Souza R. Bakuchi – *Psoralea corylifolia* – Usage, Benefits, Ayurveda Details [Internet]. Easy Ayurveda. 2021 [cited 25 May 2021]. Available from: <https://www.easyayurveda.com/2012/12/26/bakuchi-psoralea-corylifolia-usage-benefits-ayurveda-details/>
11. Tondon N., Sharma P.; India council of medical research; Phytochemical reference standard of selected Indian medicinal plant; 2010, vol.1,
12. Patel K., Kumar V., Verma A., Rahman M., Patel D.; Current Bioactive Compounds; Health Benefits of Furanocoumarins 'Psoralidin' An Active Phytochemical of *Psoralea corylifolia*: The Present, Past and Future Scenario; Volume 15, Issue 4, 2019
13. Khandekar A., Jadhav J.H., Danga S.K., Management of vitiligo: An ayurvedic perspective, 2015, Volume : 1, Issue : 1, Page : 41-43 2015
14. Mohd. Shamim Khan, Qamrul Hasan Lari and Mahmood Ahmad Khan; Int. J. Pharm. Phytopharmacol. Res., Babchi (*Psoralea corylifolia* Linn.) and its therapeutic uses in Unani system Sadia Chishty, Monika, International Journal of Recent Scientific Research, A review on medicinal importance of babchi (*psoralea corylifolia*); Vol. 7, Issue, 6, pp. 11504-11512, June, 2016
15. Khushboo P. S., Jadhav V. M., Kadam V. J. and Sathe N. S.; Pharmacognosy Reviews; *Psoralea corylifolia* Linn.—“Kushtanashini” 2010 Jan-Jun; 4(7): 69–76.
16. Irshad Hussain, Hakim Ali Abro, Naem Mubarak; JIIMC; Skin Pigmentation Effects of *Psoralea Corylifolia*: A Case Study of Vitiligo; 2019 Vol. 14, No.1
17. Koul B, Taak P, Sanya I. Genus *Psoralea*: A review of the traditional and modern uses, phytochemistry and pharmacology. Journal of Ethnopharmacology [Internet]. 2018 [cited 6 May 2021];(232):201–226. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7127090>
18. Bakuchi (*Psoralea corylifolia*)- Best Herb for Vitiligo | [Internet]. | Buy Ayurvedic Medicine Online | Ayurvedic Treatment for Kidney Failure | Ayurvedic Treatment for Diabetes. 2021 [cited 21 April 2021]. Available from: <https://www.advanceayurveda.in/product/Bakuchi-psoralea-corylifolia-best-herb-for-vitiligo>

19. Jong-Eunkim, Kim Hawn Jae, Lee Younghyun, Yang Hee, Yong-seok Heo, Bode M. Ann, Lee Won Ki and Dong Zigang; Impact Journals, LLC; bakuchinol suppresses proliferation of skin cancer cells by directly targeting Hck, Blk and p38 MAP kinases; 2016 Mar 22; 7(12):14616-14627
20. Yin Zhenhua, Zhang Wei, Zang Juanjuan, Liu Huili, Guo Qingfeng, Chen Lin, Wang Jinmei, and Kang Wenyi; Molecules; Two Novel Polysaccharides in *Psoralea corylifolia* Land anti-A549 Lung Cancer Cells Activity In Vitro; 2019 Oct; 24(20):3733
21. Mathur M, Soni D, Kanodia L. Bakuchi [Internet]. 1mg.com. 2021 [cited 24 May 2021]. Available from: <https://www.1mg.com/ayurveda/bakuchi-72>
22. Suhashini.R, Sindhu.S2, Sagadevan.E3; Int J of Pharmacognosy and Phytochemical Research; Invitro Evaluation of Antidiabetic Potential and Phytochemical Profile of *Psoralea corylifolia* Seeds; Vol 6, Issue 2, June-August 2014, 414-419
23. Rajput1 Sunita, Meena2, Singh Satyendra 3, Murthy A Rama; Ayurpharm Int J Ayur Alli Sci., Brief review of Bakuchi (*Psoralea corylifolia* Linn.) and its therapeutic uses; Vol. 3, No. 11 (2014) Pages 322 – 330
24. Aggarwal A., Bakuchi (*Psoralea corylifolia*)- Best Herb for Vitiligo | [Internet]. Advanceayurveda.in. 2021 [cited 24 May 2021]. Available from: <https://www.advanceayurveda.in/product/bakuchi-psoralea-corylifolia-best-herb-for-vitiligo/>
25. Babchi, *Psoralea Corylifolia* Facts and Health Benefits [Internet]. Health Benefits | Health Benefits of foods and drinks. 2021 [cited 21 April 2021]. Available from: <https://www.healthbenefitstimes.com/babchi-psoralea-corylifolia>
26. Cyriac Abby Philips, Ahamed R., Sasidharan Rajesh, Tom George, Meera Mohanan, Philip Augustine; World Journal of W J H Hepatology, Comprehensive review of hepatotoxicity associated with traditional Indian Ayurvedic herbs; 2020 September 27; 12(9): 574-595.
27. Dhanokar, Chandrakant A., Yogesh Badwe, and Manish Dheshmukh. "Evaluation Of Analgesic & Anti-Inflammatory Property Of Polyherbal Formulation In Wister Rat." International Journal Of Pharmaceutical Sciences And Research 12, no. 1 (January 2021): 597–603. [https://doi.org/10.13040/IJPSR.0975-8232.12\(1\).597-03](https://doi.org/10.13040/IJPSR.0975-8232.12(1).597-03).