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The phytochemicals and pharmacological activity of five potential medicinal plants in the Fabaceae family: A review

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Abstract
Fabaceae family includes 740 genera and 19,400 species. The medicinal properties of *Enterolobium contortisiliquum* include anticancer, anti-Snakebite, antibacterial, pro-inflammatory, and hepatoprotective effects. Isoflavones have been proven to have a hepatoprotective impact. *Lens culinaris* has anticancer, antidiabetic, anti-inflammatory, wound healing, antihyperlipidemic, antifungal, and anti-platelet properties. Kaempferol derivatives are anticancer. *Vigna unguiculata* has been shown to have *in vitro* antifungal, antibacterial, antinociceptive, and antihyperglycemic effects on seeds, betel leaves, and human breast cancer. Human breast cancer cells were shown to have a trypsin chymotrypsin inhibitor in an *in vitro* investigation. *Phaseolus vulgaris* has antidiabetic, analgesic, anti-inflammatory, antibacterial, and antiproliferative activities and treats Leukemia and lymphoma. The protease inhibitor in Tepary beans reduce leukemia and lymphoma growth. *Butea monosperma* contains several phytochemicals, including Butrin, a flavanone that inhibits liver cancer. Phenols are anti-inflammatory and tannins anthelmintic. Anti-cancer activity was the main therapeutic characteristic of these five herbs.

Keywords: Fabaceae, traditional uses, phytochemicals, pharmacological activity

Introduction
Nature provides therapeutic plants for wellness. The ancients used plants and bioactive substances for medicine. Many medicinal plants and chemicals fight cancer [1]. About 10% of 250,000 plant species have been researched for medicine. Flowers, stigmas, pericarps, sprouts, fruits, seeds, roots, rhizomes, stems, leaves, embryos, and bark contain phytochemicals and their counterparts with various pharmacological effects [2]. *Enterolobium contortisiliquum* is Earpod Tree. The tree is almost 20 feet tall and has a broad crown. Its gigantic blooms, beautiful seedpods, and texture-rich fruit and leaves attract attention [3]. *Lens culinaris*, a legume, is grown for its delectable seeds. The annual, bushy herbaceous plant grows 60-75 cm tall. The slender, pubescent stems are heavily branched. Multipinnate leaves finish in a tendril or bristle. The tiny, laterally compressed pods contain two or three lens-shaped seeds in grey, green, brownish, bright red, or black [4]. The plant *Vigna unguiculata* is known by a variety of names throughout the globe, including asparagus bean, black eye bean, China pea, Kaffir bean, southern pea, lobia, and yard long bean. It has a maximum potential height of 80 cm, with climbing varieties reaching 2 m. Its root system is robust. After an epigeal germination period, the plant will produce simple, opposing leaves; later leaves will be trifoliate with alternating, oval leaflets measuring 6-15 cm in length and 4-11 cm in width. Racemose inflorescences at the tips of peduncles that emerge from the axils of the leaves with papillonaceous flowers that may be white, yellowish, light blue, or violet in colour [5]. The leaves of *Phaseolus vulgaris*, attached to elongated green petioles, are either green or purple and have a trifoliate structure. The blooms are organised in pairs or alone along the rachis, ranging from white to purple and are frequently papillonaceous. The seeds are 0.5-2 cm in length, have a kidney form, and display significant colour variability according on the variety, including white, red, green, brown, purple, grey, or black [6]. *Butea monosperma* is a medium-sized deciduous tree with a twisted trunk and unequal branching; it reaches a height of 12-15 metres and stands erect. The wood has a delicate, greenish-white colour, and it weighs around 14 to 15 kg/cu. ft. Ash is the colour of the bark [7].

Taxonomic Classification of *Enterolobium contortisiliquum*
- **Kingdom:** Plantae
- **Class:** Magnoliopsida

- **Order:** Fabales
- **Family:** Fabaceae
- **Genus:** *Enterolobium*
- **Species:** *Enterolobium contortisiliquum* [8].

Traditional Uses
According to traditional Chinese medicine, the dried flowers contain febrifuge, carminative, and blood tonic properties. Brazilian herbal remedy for the treatment of gonorrhoea and parasites. An anthelmintic that works quickly is found in the seedcoat and the roots [9].

Fig 1: Leaves, Flower & Whole Plant of *Enterolobium contortisiliquum*

Phytoconstituents: *E. contortisiliquum* pericarps phytochemical examination revealed saponins, triterpenes, sterols, fatty acids, carbohydrates, proteins, and phenolic compounds. The main compounds were α-amyrin (31.75%), 4-methyl-2,6-di-tert-butylphenol (21.55%), and β-amyrin (10.19%). The identified fatty acids were 43.10% saturated and 56.90% unsaturated, with palmitic acid accounting for 23.68% and linoleic acid for 53.80%. The protein fraction contains 16 amino acids. ESI-MS found one bisdesmosidic and two monodesmosidic triterpene saponins of acacic acid for the first time. From the phenolic fraction, gallic, protocatechuic, syringic, p-coumaric acids, pyrogallol, quercetin-7-O-rutinoside, catechin, isovitexin, and quercetin were isolated [9-10].

Pharmacological Activity
Enterolobium contortisiliquum are responsible for a variety of therapeutic characteristics like anticancer activity, anti-Snakebite, antibacterial, pro-inflammatory activity, hepatoprotective activities. Flavonols have been found to exhibit antibacterial properties, alkaloids have demonstrated pro-inflammatory activity, and isoflavanones have shown hepatoprotective effect.

Table 1: Phytochemical and Pharmacological Activities of Plant Extracts

Plant Part Use	Solvent Extract	Dose	Method	Phytochemi-cals/ Bioactive compounds	Pharmacological Activity	References
Seeds	Acetone	150 mg	MTT assay and *in vitro*	-	Anticancer activity	[11]
Seeds	Acetone	1 mg/mL.	*In vitro*	-	Anti-Snakebite	[12]
Seeds & Bark	Hexane	5 mg/ml	Microdilution method.	Flavonols	Antibacterial	[13]
Seeds	Ethanol	50 mg/kg	Paw oedema	Alkaloids	Pro-inflammatory activity	[14]
Roots	Methanolic extract	100, and 200 mg/kg,	Paracetamol (PCM)-induced liver injury model	Isoflavanones	Hepatoprotective activity	[12]

2.1 Taxonomic Classification of *Lens culinaris*
- **Kingdom:** Plantae
- **Class:** Magnoliopsida
- **Order:** Fabales
- **Family:** Fabacaeae
- **Genus:** *Lens*
- **Species:** *Lens culinaris* [15].

Traditional Uses: The seeds laxative and mucilaginous. Constipation and other digestive issues may be treated with them. In paste form, they cleanse dirty and indolent ulcers. The high fibre content in lentils helps control cholesterol and blood sugar. With high folate and magnesium content, lentils help heart health. Lentils include soluble and insoluble fibre. Soluble fibre gels in the gut to capture bile. Insoluble fibre increases stool production and prevents constipation and IBS, according to research. Energy is also increased by lentils' iron content. The poultice of lentil seeds may heal skin disorders [16].

Fig 2: Leaves, Flower & Whole Plant of *Lens culinaris*

Phytoconstituents
A wide range of phytochemicals, including as phenolics (those that are insoluble and those that can be extracted), carotenoids, tocopherols, saponins, phytic acid, and phytosterols. Several different types of phenolic compounds, such as acids, flavan-3-ols, proanthocyanidins, anthocyanidins, stilbenes, flavones, and flavanones, may be found in lentils [17].

Pharmacological Activity: *Lens culinaris* demonstrates a wide array of therapeutic qualities, encompassing anticancer, antidiabetic, anti-inflammatory, wound healing, antihyperlipidemic, antifungal, and anti-platelet activities. Kaempferol derivatives have been found to exhibit anticancer action, while flavonoids have been associated with antidiabetic, wound healing, and antihyperlipidemic effects. Phenolic chemicals have been identified as the causative agents behind the observed anti-inflammatory activity. The anti-platelet activity can be attributed to the presence of Quercetin molecules.

Table 2: Phytochemical and Pharmacological Activities of Plant Extracts

Plant Part Use	Solvent Extract	Dose	Method	Phytochemicals	Pharmacological Activity	References
Aerial parts	80% Aqueous methanol	10-50 µg ml	*In vitro* and *in vivo* studies & leukemic mouse model	Kaempferol derivatives	Anticancer activity	[18]
Seed	Methanol	100, 200, and 400 mg/kg	Streptozotocin (Stz)-induced mice model	Flavonoids, polyphenols, and saponins	Antidiabetic activity	[19]
Whole Plant	Methanol	300mg /kg	Paw oedema model	Phenolics compounds	Anti-inflammatory activity	[20]
Seeds	Ethanol	105µg/ml	Wound model	Flavonoids	Wound healing activity	[21]
Seed	Methanol	100, and 400 mg/kg	Streptozotocin-induced diabetic mice model	Flavonoids	Antihyperlipidemic activity	[22]
Leaves	Ethanol	-	*In vitro* and *In vivo*	-	Antifungal activity	[23]
Seeds	-	-	*In vitro*	Quercetin and kaempferol derivatives	Anti-platelet activity	[24]

Taxonomic Classification of *Vigna unguiculata*

- **Kingdom:** Plantae
- **Class:** Magnoliopsida
- **Order:** Fabales
- **Family:** Fabaceae
- **Genus:** *Vigna*
- **Species:** *Vigna unguiculata* [25].

Traditional Uses

Vigna unguiculata treats constipation, bilharzia, chest discomfort, and epilepsy. Neuritis, sleeplessness, memory loss, dyspepsia, indigestion, limb needles, and pins are treated with roasted seeds. It treats stomatitis, corneal ulcers, and celiac disease well. V. unguiculata is rich in amino acids and protein, some of which help treat sickle cell disease. Seeds prevent cardiovascular disorders and are cardioprotective. Leaf decoction for hyperacidity, nausea, and vomiting [26]. Seeds cure burns, chest pains, epilepsy, fever, headaches, menstruation, and delivery. The herb treats measles, smallpox, adenitis, and sores. Decoction or soup treats liver and spleen diseases, intestinal colic, leucorrhea, and urine discharges. The seeds are astringent, antipyretic, diuretic, and cardiovascular disease treatment. The vitamin C deficient illness might employ green leaves. 100 cc *V. unguiculata* seed decoction administered twice a day for 30 days to dissolve kidney stones [27].

Fig 3: Leaves, Flower & Whole Plant of *Vigna unguiculata*

Phytoconstituents

The entire plant, including the leaves and seeds, contains secondary metabolites, including flavonoids, alkaloids, tannins, sterols, reducing sugar, terpenoids, and phenolic acids (including p-hydroxybenzoic acid, protocatechuic acid, 2,4-dimethoxybenzoic acid, and cinnamic acid derivatives like p-coumaric acid, caffeic acid, and ferulic acid). The *vigna unguiculata* was thought to be a good place to get L-asparginase. The plant contains isoflavone, which is a form of oestrogen, along with other plant compounds such as glycitein (7,4'-dihidroxy-6-methoxyisoflavone), hydroxybenzoic acids, flavonols, myricetin 3-O-glucoside, quercetin 3-O-galactoside, quercetin 3-O-glucoside, quercetin feruloyldiglycoside, and another diglycoside of quercetin found in cowpeas. There are phenolic acids (e.g., p-hydroxybenzoic acid, protocatechuic acid, 2,4-dimethoxybenzoic acid), tannins (ranging from 0.18 to 59 percent), and cinnamic acid derivatives (e.g., pcoumaric acid, caffeic acid, ferulic acid) in the whole cowpea seed [28-29].

Pharmacological Activity

Vigna unguiculata possesses antifungal, antibacterial, antinociceptive, and antihyperglycemic properties *in vitro*, specifically in relation to seeds, betel leaves, and human breast cancer. The review indicates the presence of many phytochemicals, such as flavonoids, alkaloids, tannins, sterols, reducing sugar, terpenoids, and phenolic acids. The *in vitro* study demonstrated the presence of trypsin chymotrypsin inhibitor in human breast cancer cells, while tannins exhibited antinociceptive effect.

Table 3: Phytochemical Composition and Pharmacological Activities of Plant Extracts

Plant Part Use	Solvent Extract	Dose	Method	Phytochemicals	Pharmacological Activity	References
Seeds	-	188.1 mg GAE/l	*In vitro*	Ferulic and p-coumaric acids	Human breast cancer invitro	[30]
Seeds	Hydroalcohol	0.125 to 64 µg /ml	Microdilution method	-	Antifungal activity	[31]
Seeds	Ethanol	100 µg/ml, 200 µg/ml and 300 µg/ml	Agar cup method	-	Antibacrterial activity	[32]
Beans	Methanol	200 and 400 mg per kg	Acetic acid-induced pain model	Tannins	Antinociceptive activity	[33]
Beans	Methanol	50, 100, 200 and 400 mg per kg body	Alloxan-induced diabetic rats model	-	Antihyperglycemic activity	[33]

Taxonomic Classification of *Phaseolus vulgaris*
- **Kingdom:** Plantae
- **Class:** Magnoliopsida
- **Order:** Fabale
- **Family:** Fabaceae
- **Genus:** *Phaseolus*
- **Species:** *Phaseolus vulgaris* [34].

Traditional Uses
Many people utilize *Phaseolus vulgaris* as a weight loss aid. The lack of solid scientific proof for its use in the treatment of diabetes, colon cancer, high cholesterol, kidney stones, and many other disorders is a major drawback. If you suffer from mild diarrhea or kidney or cardiac problems, you may want to try eating some seeds. They have a diuretic effect. As a diabetic therapy, it is used. Rheumatism, arthritis, and urinary tract diseases are some of the conditions that it helps alleviate. Its primary use is in the external management of ulcers [35].

Fig 4: Leaves, Flower & Whole Plant of *Phaseolus vulgaris*

Phytoconstituents: *Phaseolus vulgaris* contains several compounds that have been studied in the field of phytochemistry. These include anthocyanins, brassinosteroids, caffeic acid, gallic acid, daidzen, delphinidin, equol, ferulic acid, galactomanans, gallic acid, genistein, hemagglutinins, kaempferol, lectins, malvidin, myrecitin glycoside, paracoumaric acid, petunidin, phaseolamin, phaseolin, para hydroxybenzoic acid, phyticacid, phytohaemagglutinin, proanthocyanidins, proanthocyanins, quercetin, robinin, and vanillic acid [36]. Beans are known to be a good source of protein, carbohydrates, fibre, and minerals, and they also contain a lot of phytochemical components that have positive effects on health. Anthocyanins, condensed tannins, flavonoids, phenolic acids, and flavan-3-ols are all examples of such substances. In addition to being an antioxidant and anti-inflammatory, it provides protection against peroxyl, 2,2-diphenyl-1-picrylhydrazyl (DPPH), and 3-ethylbenzothiazoline-6-sulfonic acid (ABTS). The primary bioactive components of the common bean are detailed below [37].

Pharmacological Activity
Phaseolus vulgaris has been identified as possessing many therapeutic characteristics, including antidiabetic, analgesic, anti-inflammatory, antibacterial, and antiproliferative effects. The presence of glycosides in Tepary beans is linked to their antidiabetic characteristics, whilst the antiproliferative action of these beans is ascribed to flavonoids.

Table 4: Phytochemical Composition and Pharmacological Activities of Plant Extracts

Plant Part Use	Solvent Extract	Dose	Method	Phytochemicals	Pharmacological activity	References
Seeds	Ethanol	300 g/kg	Hyperglycemic rats model	Glycosides	Antidiabetic activity	[38]
Seeds	Hexane	4ml/kg	Acetic acid induced writhing, hot plate and tail flick tests, carrageenan induced paw edema	-	Analgesic and Anti-Inflammatory activity	[39]
Leaves	Ethanol extracts	25 µL	Paper-disk agar-plate method	-	Antimicrobial activity	[40]
Bean	Acetone	300 µL	*In vitro*	Flavonoids	Antiproliferative activity	[41]

Taxonomic Classification of *Butea monosperma*
- **Kingdom:** Plantae
- **Class:** Magnolipsida
- **Order:** Fabales
- **Family:** Fabaceae
- **Genus:** *Butea*
- **Species:** *Butea monosperma* [42].

Traditional Uses
Chest pain, persistent fevers, earache, hydrocele, and lumbago are treated with carminative and depurative seeds. In India, the seeds treat skin illnesses, keratitis, piles, urine discharges, and brain, eye, head, and skin problems. Plant juice and oil are antiseptic [43]. After chewing, the petiole juice is swallowed to alleviate stomach disorders, colds, and coughs. Taking powdered leaves with water helps regulate diabetes. Its extract helps with sore throats, intestinal worms, irregular menstrual bleeding, etc. Its paste and juice help heal and prevent snake bites [44]. Kino tannic acid, allophonic acid, shellolic acid, butrin, lanin, histidine, etc. are in bark. *Butea monosperma* stem bark contains buteaspermin A and B, cajanin, isoformonentin, and cladrin. *B. monosperma* is utilised in Ayurvedic preparations like Kunkumadi Taila, Ayaskrti, Krmimudgara Rasa, Vanda Bhasma. The Charaka Samhita, an ancient Ayurvedic text, says *B. monosperma* seeds kill insects. Ayurvedic physicians mixed their own diarrhoea and dysentery remedies. Patients received root, bark, and leaf juices for colic, intestinal worms, and menstrual flow management. An ointment made from leaves treats boils, zits, swellings, and other skin disorders. The blooms are tonic and astringent [45].

Fig 5: Leaves, Flower & Whole Plant of *Butea monosperma*

Phytoconstituents
Flavonoids, alkaloids, phenolic compounds, amino acids, glycosides, steroids, butin, butein, butrin, isobutrin, palasitrin, coreopsin, isocoreopsin (butin 7 glucoside), sulphurein, and monospermoside are some of the substances that are found in this plant. The primary glycoside found in the flower is butrin. Chalcones and aurones are among of the most beautiful flowers. There is also the presence of seed sucrose isolate, alpha amyrin, beta sitosterol, and its glucoside. The antihelmintic palasonin is present in this product. It has been shown that seeds contain plasmatic, stearic, and linoleic acids [46].

Pharmacological Activity
Butea monosperma medicinal properties, including but not limited to anti-cancer activity specifically against liver cancer,

antidiabetic effects, anthelmintic properties, anti-inflammatory actions, anti-ulcer effects, and antimicrobial activities. Butrin, a flavanone with the chemical formula 7,3′,4′-trihydroxyflavanone, has been found to exhibit anti-cancer properties specifically against liver cancer. Tannins have demonstrated anthelmintic activity, while phenols have shown anti-inflammatory effects. Saponins have been observed to possess anti-ulcer properties, while phenolic compounds have exhibited antimicrobial activities.

Table 5: Phytochemical Composition and Pharmacological Activities of Plant Extracts

Plant Part Use	Solvent Extract	Dose	Method	Phytochemicals	Pharmacological Activity	References
Flower	Ethanol	100 mg/kg, 25 mg/kg	(*In vitro* and *in vivo*)	Butrin, (7,3′,4′-trihydroxyflavanone-7,3′- diglucoside)	Anti-cancer activity (Liver cancer)	[47]
Bark	Hot water (70°C)	500 mg/kg	Alloxan induced diabetic mice	-	Antidiabetic activity	[48]
Flowers	Alcohol	10 mg/ml, 25 mg/ml, 50 mg/ml,	*In vitro* method	Tannins	Anthelmintic activity	[49]
Flowers	Methanol	600 mg/kg and 800 mg/kg,	Carrageenin induced paw edema and cotton pellet granuloma	Phenols	Anti-inflammatory activity	[50]
Bark	Methanol	250 mg/kg leaves extract and 500 mg/kg	Gastric ulcers were induced by aspirin	Saponins	Anti-Ulcer activity	[51]
Leaves and Flowers	Petroleum ether and alcoholic extract	200 µg / ml, 300 µg / ml	Disc diffusion method and agar dilution technique	Phenolics compounds	Antimicrobial activity	[52]

Conclusion
There is a long history of therapeutic usage for the chemicals originating from plants, and patients tolerate and accept them better. Drug development has long relied on natural products, particularly in the fight against cancer and infectious disorders, but also in the treatment of cardiovascular disease and multiple sclerosis, among other conditions. Finding out which five medicinal plants have strong anti-cancer and other therapeutic benefits was the goal of this literature review. Phytochemical compounds may be found in a wide variety of plants. These chemicals include flavonoids, alkaloids, tannins, sterols, reducing sugar, terpenoids, and phenolic acids. These substances possess anticancer, anti-Snakebite, antibacterial, pro-inflammatory, hepatoprotective, anti-ulcer, anthelmintic, antihyperglycemic, and antinociceptive properties. Research on medicinal plants has shown a greater occurrence of this phenomena when compared to other therapeutic activities. The potential uses of these intriguing traditional remedies will be revealed by these investigations. Phytochemistry, pharmacology, and clinical medicine all need immediate, in-depth research. Medicinal plants may also play an important role in a development strategy that promotes environmentally friendly lifestyles in rural regions, provided that the circumstances are favorable.

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References
1. Aung TN, Qu Z, Kortschak RD, Adelson DL. Understanding the effectiveness of natural compound mixtures in cancer through their molecular mode of action. International journal of molecular sciences. 2017;18(3):656.
2. Thakore P, Mani RK, Kavitha SJ. A brief review of plants having anti-cancer property. International Journal of Pharmaceutical Research and Development. 2012;3(1):129-136.
3. Naves VL, Rambal S, Barbosa JP, Castro EM, Pasqual M. Recruitment niches of *Enterolobium contortisiliquum* (Vell.) Morong: Functional acclimations to light. Forests. 2018;9(5):266.
4. Bhatty RS. Composition and quality of lentil (Lens culinaris Medik): a review. Canadian Institute of Food Science and Technology Journal. 1988;21(2):144-160.
5. Ehlers JD, Hall AE. Cowpea (*Vigna unguiculata* L. walp.). Field crops research. 1997;53(1-3):187-204.
6. https://www.britannica.com 1 August, 2024.
7. Sindhia VR, Bairwa R. Plant review: *Butea monosperma*. International journal of pharmaceutical and clinical research. 2010;2(2):90-94.
8. https://www.gbif.org 3 August, 2024.
9. Matloub AA, Mohammed RS, Elsouda SS, El-Hallouty SM, Gomaa EZ, Hassan AA. Phytochemical and biological studies on *Enterolobium contortisiliquum* (Vell.) Morong Pericarps. Journal of Materials and Environmental Sciences. 2018; 9:2768-2778.
10. Abdel-Mageed WM, Al-Wahaibi LH, Gouda YG, Al-Saleem MS, El-Gamal AA, Basudan OA, Alsaid MS, Al-Massarani SM, Abdel-Kader MS. Contortisiliosides H-M: Triterpenoid saponins from *Enterolobium contortisiliquum* and their biological activity. Industrial Crops and Products. 2019;139:111528.
11. Bonturi CR, Salu BR, Bonazza CN, Sinigaglia RD, Rodrigues T, Alvarez-Flores MP, Chudzinski-Tavassi AM, Oliva ML. Proliferation and invasion of melanoma are suppressed by a plant protease inhibitor, leading to downregulation of survival/death-related proteins. Molecules. 2022;27(9):2956.
12. Costa CR, Belchor MN, Roggero A, Moraes LL, Samelo R, Annunciato I, Bonturi CR, Oliva ML, Sousa SF, de Oliveira MA, Toyama MH. The First Anti-Snakebite and Hepatoprotective Characterization of a Trypsin Kunitz-like Inhibitor (EcTI) from the Plant *Enterolobium contortisiliquum*; A Case of Two Soul Mates Meeting. Pharmaceuticals. 2023;16(4):632.
13. De Sousa Silveira Z, Macêdo NS, de Freitas TS, da Silva ARP, dos Santos JFS, Morais-Braga MFB, *et al*. Antibacterial enhancement of antibiotic activity by *Enterolobium contortisiliquum* (Vell.) Morong. Asian

Pacific Journal of Tropical Biomedicine. 2017;7(10):945-949.
14. Castro-Faria-Neto HC, Martins MA, Bozza PT, Perez SA, Correa-Da-Silva AC, Lima MC, Cruz HN, Cordeiro RS, Sousa MV, Morhy L. Pro-inflammatory activity of enterolobin: A haemolytic protein purified from seeds of the Brazilian tree *Enterolobium contortisiliquum*. Toxicon. 1991;29(9):1143-1150.
15. Muehlbauer FJ, McPhee KE. Lentil (*Lens culinaris* Medik.). Genetic resources and chromosome engineering and crop improvement. Grain legumes. 2005;1:219-230.
16. Faris ME, Takruri HR, Issa AY. Role of lentils (*Lens culinaris* L.) in human health and nutrition: a review. Mediterranean Journal of Nutrition and Metabolism. 2013;6(1):3-16.
17. Roy F, Boye JI, Simpson BK. Bioactive proteins and peptides in pulse crops: Pea, chickpea and lentil. Food research international. 2010;43(2):432-442.
18. Kluska M, Juszczak M, Wysokinski D, Zuchowski J, Stochmal A, Wozniak K. Kaempferol derivatives isolated from *Lens culinaris* Medik. reduce DNA damage induced by etoposide in peripheral blood mononuclear cells. Toxicology Research. 2019;8(6):896-907.
19. Tefera MM, Altaye BM, Yimer EM, Berhe DF, Tadesse Bekele S. Antidiabetic effect of germinated *Lens culinaris* medik seed extract in streptozotocin-induced diabetic mice. Journal of experimental pharmacology. 2020:39-45.
20. Zhang B, Deng Z, Tang Y, Chen PX, Liu R, Ramdath DD, Liu Q, Hernandez M, Tsao R. Bioaccessibility, *in vitro* antioxidant and anti-inflammatory activities of phenolics in cooked green lentil (*Lens culinaris*). Journal of Functional Foods. 2017; 32:248-255.
21. Singh AK, Lodhi S, Jain AP. Preliminary pharmacological investigations on seeds for wound *Lens culinaris* healing potential in rats. Advance Pharmaceutical Journal 2019; 4(6):161-166
22. Tefera MM, Altaye BM, Yimer EM, Berhe DF, Tadesse Bekele S. Antidiabetic effect of germinated *Lens culinaris* medik seed extract in streptozotocin-induced diabetic mice. Journal of experimental pharmacology. 2020:39-45.
23. Finkina EI, Bogdanov IV, Ignatova AA, Kanushkina MD, Egorova EA, Voropaev AD, Stukacheva EA, Ovchinnikova TV. Antifungal activity, structural stability, and immunomodulatory effects on human immune cells of defensin from the lentil *lens culinaris*. Membranes. 2022;12(9):855.
24. Rolnik A, Żuchowski J, Stochmal A, Olas B. Quercetin and kaempferol derivatives isolated from aerial parts of *Lens culinaris* Medik as modulators of blood platelet functions. Industrial Crops and Products. 2020;152:112536.
25. https://www.forestryimages.org 5 September, 2024.
26. Gupta N, Shrivastava N, Singh PK, Bhagyawant SS. Phytochemical evaluation of moth bean (*Vigna aconitifolia* L.) seeds and their divergence. Biochemistry research international. 2016;2016(1):1-6.
27. Singh A, Dwivedi B, Raghaw P, Singh R, Pant P, Padhi M. Review on standardization and phytochemical of *Vigna unguiculata*. International Journal for Pharmaceutical Research Scholars. 2015;4:506-516.
28. Allah NS, Eltayeb IM, Hamad AE. Phytochemical screening and hypolipidemic activity of extracts from seeds and leaves of *Vigna unguiculata* growing in Sudan. Journal of Pharmacognosy and Phytochemistry. 2017;6(3):488-491.
29. Mohamed HI, El-Beltagi HS, Yousef HN, Fawzi EM. Biological and Pharmacological activities of cowpea (*Vigna unguiculata*) and its Bioactive Components. Protests and Riots Past: Present and Future Perspectives. 2018:47-75.
30. Gutiérrez-Uribe JA, Romo-Lopez I, Serna-Saldívar SO. Phenolic composition and mammary cancer cell inhibition of extracts of whole cowpeas (*Vigna unguiculata*) and its anatomical parts. Journal of Functional Foods. 2011;3(4):290-297.
31. Ye XY, Wang HX, Ng TB. Structurally dissimilar proteins with antiviral and antifungal potency from cowpea (*Vigna unguiculata*) seeds. Life Sciences. 2000;67(26):3199-3207.
32. Sandeep D. Evaluation of antibacterial activity of seed extracts of *Vigna unguiculata*. International journal of Pharmacy and pharmaceutical sciences. 2014;6(1):75-77.
33. Tazin TQ, Rumi JF, Rahman S, Al-Nahain A, Jahan R, Rahmatullah M. Oral glucose tolerance and antinociceptive activity evaluation of methanolic extract of *Vigna unguiculata* ssp. unguiculata beans. World Journal of Pharmacy and Pharmaceutical Sciences. 2014;3(8):28-37.
34. Saleem ZM, Ahmed S, Hasan MM. *Phaseolus vulgaris* Linn.: botany, medicinal uses, phytochemistry and pharmacology. World Journal of Pharmaceutical Research. 2016;5:1611-1616.
35. Loko LE, Toffa J, Adjatin A, Akpo AJ, Orobiyi A, Dansi A. Folk taxonomy and traditional uses of common bean (*Phaseolus vulgaris* L.) landraces by the sociolinguistic groups in the central region of the Republic of Benin. Journal of ethnobiology and ethnomedicine. 2018;14:1-5.
36. Padmavathi B, Babu AN, Naveen R, Kiranmai K, Prameel V. A phytopharmacological review on *Phaseolus vulgaris*. International Journal of Research in Ayurveda and Pharmacy. 2021;12(3):118-123.
37. Wahono CS, Syaban MF, Pratama MZ, Rahman PA, Erwan NE. Exploring the potential of phytoconstituents from *Phaseolus vulgaris* L against CXC motif chemokine receptor 4 (CXCR4): a bioinformatic and molecular dynamic simulations approach. Egyptian Journal of Medical Human Genetics. 2024;25(1):52.
38. Atchibri AL, Brou KD, Kouakou TH, Kouadio YJ, Gnakri D. Screening for antidiabetic activity and phytochemical constituents of common bean (*Phaseolus vulgaris* L.) seeds. Journal of Medicinal Plants Research. 2010;4(17):1757-1761.
39. Baig SG, ul Hasan MM, Ahmed S, Fatima SA. Analgesic and anti-inflammatory effects of *Phaseolus vulgaris* L. fixed oil in rodents. Journal of Basic & Applied Sciences. 2018;14:174-179.
40. Lopes RB, de Oliveira Costa LE, Vanetti MC, de Araújo EF, de Queiroz MV. Endophytic bacteria isolated from common bean (*Phaseolus vulgaris*) exhibiting high variability showed antimicrobial activity and quorum sensing inhibition. Current microbiology. 2015;71:509-516.
41. Ombra MN, d'Acierno A, Nazzaro F, Riccardi R, Spigno P, Zaccardelli M, Pane C, Maione M, Fratianni F. Phenolic composition and antioxidant and antiproliferative activities of the extracts of twelve common bean (*Phaseolus vulgaris* L.) endemic ecotypes

of Southern Italy before and after cooking. Oxidative medicine and cellular longevity. 2016;2016(1):1398298.
42. Burli DA, Khade AB. A comprehensive review on *Butea monosperma* (Lam.) Kuntze. Pharmacognosy Reviews. 2007;1(2):333-337.
43. Badole SL, Jadhav SB, Wagh NK, Menaa F. General Beneficial Effects of *Pongamia pinnata* (L.) Pierre on Health. Bioactive Food as Dietary Interventions for the Aging Population: Bioactive Foods in Chronic Disease States. 2012:445.
44. Katewa SS, Chaudhary BL, Jain A. Folk herbal medicines from tribal area of Rajasthan, India. Journal of ethnopharmacology. 2004;92(1):41-46.
45. Sutariya BK, Saraf MN. A comprehensive review on pharmacological profile of *Butea monosperma* (Lam.) Taub. Journal of Applied Pharmaceutical Science. 2015;5(9):159-166.
46. Chokchaisiri R, Suaisom C, Sriphota S, Chindaduang A, Chuprajob T, Suksamrarn A. Bioactive flavonoids of the flowers of *Butea monosperma*. Chemical and Pharmaceutical Bulletin. 2009;57(4):428-432.
47. Choedon T, Shukla SK, Kumar V. Chemopreventive and anti-cancer properties of the aqueous extract of flowers of *Butea monosperma*. Journal of ethnopharmacology. 2010;129(2):208-213.
48. Deore S, Khadabadi S, Daulatkar V, Deokate U, Farooqui I. Evaluation of hypoglycemic and antidiabetic activity of bark of *Butea monosperma*. Pharmacognosy magazine. 2008;4(13):134.
49. Sant A, Ingole A, Dhabarde D, Kamble M. Evaluation of anthelmintic activity of flower extract of *Butea monosperma* var. lutea. Journal of Pharmacognosy and Phytochemistry. 2014;2(6):152-153.
50. Shahavi VM, Desai SK. Anti-inflammatory activity of *Butea monosperma* flowers. Fitoterapia. 2008;79(2):82-85.
51. Patil P. Anti-Ulcer And Anti-Secretory Properties Of The *Butea Monosperma* (Lam) Bark Extracts With Relation To Anti-Oxidant Studies (Master's thesis, Rajiv Gandhi University of Health Sciences (India)) 2005.
52. Gurav SS, Gulkari VD, Duragkar NJ, Patil AT. Antimicrobial activity of *Butea monosperma* Lam. gum. Iranian Journal of Pharmacology & Therapeutics. 2008;7(1):21-24.