International Journal of Phytopharmacology
Review Article

www.onlineijp.com

e- ISSN 0975 – 9328
Print ISSN 2229 – 7472

REVIEW OF AN OFFICIAL SIDDHA POLYHERBAL FORMULATION-MANCHAL NOI KUDINEER FOR HEPATITIS

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ABSTRACT

Siddha system of medicine has been proved very effective in controlling various diseases. This system is also popular in medicine for diseases such as Hepatitis, Anemia, Dropsy and the like. Siddha Pharmacopoeia describes 32 types of internal medicines, of which Kudineer is one of the most important polyherbal formulations equally referred to khashayas in Ayurveda.They are, make your own medicine type, time tested, formulations. Hepatitis B virus (HBV) infection is a severe health problem in the world. The Siddha system of medicine"Manchal Noi Kudineer" (MNK) is one used to treat hepatitis, but scientifically under explored. However, there is still not a satisfactory therapeutic strategy for the HBV infection There is a need to search for new anti-HBV agent with higher efficacy and less side effects. The inhibitory activity of traditional medicine, like MNK is very effective for treatment of hepatitis, because these polyherbal formulation contains many herbals which have been proved heaptaprotective activity. So development of scientific evidence is mandatory and need of the honor.

Key words: Manchal Noi Kudineer,Hepatitis,Sidhha polyherbal formulation.

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INTRODUCTION

Hepatitis is an inflammation of the liver caused by Viruses. The most common type of viral hepatitis are hepatitis A, hepatitis B and hepatitis C, while all three type of hepatitis can cause similar symptoms each virus is spread in different ways. Viral hepatitis is a global public health problem affecting millions of people every year, causing disability and death (Anonymous, 2017). Symptoms for both acute and chronic viral hepatitis includes fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain,dark urine and joint pain. Affordable measures, such as vaccination,safe blood supply,safe injections and safe food and water can reduce the transmission of viral hepatitis infection.(Anonymous, 2015).

Access this article online		
DOI: http://onlineijp.com/ DOI: http://dx.doi.org/10.21276/ijp.2019.10.1.3		**Quick Response code**
Received:10.01.19	**Revised**:12.02.19	**Accepted**:15.02.19

Kudineer is the one of impotance formulation in Siddha system. It is defined as the whole plant (s) or particular part of plant (s) is grinded into coarse powder. Kudineer is made into by adding water and heated that the mixture .Commonly used kudineer are Marudham patti kudineer, Avarai kudineer, Poovarasam pattai kudineer, Nilavembu kudineer, Kabha sura kudineer (Shree Devi *et al*., 2018).

Hepatitis is a condition which is called as Kamalai in the Tamil, Kamalai is also called as Manchal Noi in Siddha characterized by pallor, yellowish discoloration of conjunctiva, tongue, lips, yellow coloured urine and in later stages the colour of urine changes into red, loss of weight, nausea, vomiting, indigestion, fatigue and motional sickness. Kamalai in Siddha can be compared with acute viral hepatitis. Viral hepatitis is a great challenge to public health management in Indian scenario. Siddha system of medicine are more effective to control the hepatitis. In which kudineer is the one of the most important polyherbal formulation equally referred to khashayas in ayuveda. These are more useful to treat the hepatitis and their associated complications. Besides,

these formulation are only time tested, not scientifically proven and the ingredient are not well estastalished in their scientific terms. Keeping the above information in view, it was thought worthy to study selected hepatitis sidhha kudineer polyherbal formulation to create scientific evidence (Shailaja *et al*., 2017).

1. Keezhkai nelli

Biological source and family- It is the dried whole plant of ***Phyllanthus amarus*** belonging to the family Euphorbiaceae.

Habitat :

It is found throughout the tropics and sub-tropics such as West Africa (including Nigeria and Ghana, Europe, Asia (including China, Pakistan, India and Malaysia (Danladi *et al*., 2018)

Botanical ddescription :

Phyllanthus amarus are erect annual herbs, 10–60 cm tall; main stem simple or branched, smooth in younger parts. Cataphylls, stipules 1.5–1.9 mm long, deltoid acuminate blade 1–1.5 mm long, subulate acuminate. Leaves 3–11×1.5–6 mm elliptic oblong obovate, oblong, or even obovate, obtuse, or minutely apiculate at apex, obtuse or slightly inequilateral at base, petioles 0.3–0.5 mm long, stipules 0.8–1.1 mm long triangular accuminate. Flowers minutes, proximal 2–3 axis with unisexual cymules, each consisting of 1 male and 1 female or 2–3 males and female or 1 male and 2 females flower or combination thereof; male flowers pedicals at anthesis 1 mm long. Calyx lobe 5, subequal each ca 0.7× 0.3 mm elliptic or oblong elliptic and abruptly acute at apex hyaline with unbranched mid ribs. Disc segments 5, roundish stames 3 (rarely 2): filaments connate into a column 0.2–0.3 mm high autheros sessile a top dehiscing longitudinally. Female flowers; pedicles 0.8–1 mm long, obtusely 4-gonous, dialated above, ca 1.5 mm in fruits, calyx five lobes, subequal. Lobes sometimes toothed at apex. Styles 3, free, more or less spreading, and shallowly bifid at apex; arms divergent,The seed capsules on stalks are 1–2 mm long, round, smooth, 2 mm wide, with six seeds. When the fruits burst open the seeds are hurled away. Seeds are triangular (like an orange segment); light brown, 1 mm long, with 5–6 ribs on the back (Hakim *et al*., 2016)

Chemical cconstituents:

The important chemical constituents are Securinine, Quercetin, Giucoside, Phyllanthusin, Phenazine, Phytol, amariin ,Phyllanthin,Fatty acid,saponin, Palmitic acid, Oleic (Narendra *et al*., 2012).

Medicinal uses:

The whole plant juice and fresh roots powder is mixed with 10-20ml fresh milk and recommended three times daily for Jaundice. The leaves were crushed with salt and applied for skin diseases. The plant decoction was very effective for diabetes and chest pain . The decoction of leaves or roots is used for ulcer (Paithankar *et al*., 2011).

2. Karisalankanni

Biological source and family: It is the dried Whole plant of ***Sphagenticola calendulacea*** belonging to the family Asteraceae

Habitat:

Eclipta is thought to be native to Asia but is widely naturalized around the world. In the U.S., it is most widely distributed in southeast, southwest, mid west and east coast regions (Chris Marble *et al*., 2015).

Botanical ddescription:

Shoot: Stems are reddish to purple; covered with short, stiff hairs; and root at the lower nodes. Leaves are usually hairy and simple, opposite, dull green, ovate to lanceolate and 2 to 10 cm long and 1 to 3 cm wide. Leaf margins can be entire or slightly,Roots: Fibrous with shallow taproot. Inflorescence: Each flower head is composed of small, yellow ray-and-disc flowers 1 cm in diameter that are formed on stalks in the leaf axis and occur as singles or in pairs. Flowers from spring to early fall. Fruit and Seeds: Each flower head produces multiple achenes that turn light brown to black as they begin to mature and then fall, leaving behind small cup-like (Manik Sharma *et al*., 2012).

Chemical cconstituents:

The chief chemical constituents are Stigmasterol,Eecliptal,nicotine and ursolic acid (Love *et al*., 2013).

Medicinal uses *:*

Leaf juice is mixed with honey is a popular remedy for catarrh in infant. The juice boiled with coconut oil and used for anointing the head to render the hair black and luxuriant. It is also applied with sesamum oil in Elephantiasis.The plant juice is a power ful liver tonic (Ambika Sharma *et al*., 2011).

3. Peipudal:

Biological source and family: It is the dried whole plant of ***Trichosanthes cucumerina*** belonging to the family curcubitaceae.

Habitat :

Snake gourd is a warm season crop but, depending upon the locality, the vine thrives in rich, loamy soils, other soils with good drainage and rich in organic matter are suitable. Distributed in south and southeast Asia

including India, Bangladesh, Nepal, Pakistan, Sri Lanka, Indonesia, Malaysia, Myanmar, Southern China (Deepa *et al*., 2017).

Botanical description

The leaves are 5.8-12.5 cm long of various shapes, lobed, a little broader than long, orbicular reinform or broadly ovate, distantly denticulate, more or less deeply 5(rarely3-7) lobed, the lobes broad, acute, glabrous, less pubescent or when old sometimes scab rid beneath, base deeply cordate, the sinus often sub-rectangular, petioles 2.5-7.5 cm long, striate, pubescent.Stem very long, Slender, furrowed, sub-glabrous, tendrils 2-3 fid. Flowers Monoecious, male flowers in axillary racemes, peduncles 5-15 cm long, bearing 8-15 flowers near the apex, female flowers axillar, solitary. Fruit Sometimes up to 4 meter in length and up to 7.5cm thick, often twisted, green when young, or pale green, white changing to bright orange when ripe.(Kopperundevi *et al*., 2017).

Chemical constituents:

The chemical constituents of T*ricosanthus cucumerina* is proteins, fat, fiber, other carbohydrates, minerals matter, calcium, oxalic acid, phosphorus, iron, magnesium, sodium, potassium, copper, sulphur, chlorine, thiamine, riboflavin, nicotinic acid, vitamin c, carotene. The ripen fruits contain lycopene and β-carotene. It have more antioxidant properties due to rich in fibre content.(Sandhya *et al*., 2010).

Medicinal uses:

The fruit is usually consumed as a vegetable due to it is good nutritional value. The fruit is a good source of Vitamin A, Vitamin B and Vitamin C. It improves the appetite and acts as a tonic. The wild bitter forms are used in many ayurvedic preparations. The fruits of cultivated forms also have medicinal uses and are useful for people suffering from blood pressure, heart diseases, rheumatism and psoriasis.(Shyamsundarachary *et al*., 2013).

4. Milagu:

Biological source and family: It is the dried inner fruit part of ***Piper nigrum*** belonging to the family piperaceae.

Habitat :

Black pepper is grown in many tropical regions like Brazil, Indonesia and India. (Zoheir *et al*., 2014).

Botanical description:

P*iper nigrum* (Black pepper) plant is a flowering woody perennial climbing vine that belongs to Piperaceae family. Pepper plants easily grow in the shade on supporting trees, trellises or poles up to maximum height of 13 feets or 4 meters and roots may come out from leaf nodes if vine touch to the ground. The plants have heart shape as long as the leaves. The length of spikes goes up to 7-15 cm. The black pepper's fruits are small (3 to 4 mm in diameter) called a drupe and the dried unripe fruits of Piper nigrum are known as a peppercorn. The fully mature fruits are dark red in color and approximately 5 mm in diameter. A fruit contains a single seed. The plants bear fruits from 4th or 5th year, and continue to bear fruits up to seven years. A single stem contains 20-30 spikes of fruits. The collected spikes are sun dried to separate the peppercorns from the spikes. The fresh harvested unripe green fruits may freeze-dry to make green pepper. The fresh harvested unripe green fruits may sun-dried to make black pepper. The red skin of the ripen fruits is removed and the stony seeds are sun-dried to make white pepper (Majeed , 2000).

Chemical constituents:

The chemical constituents are Piperine, Piperamine, Piperamide,Pipercide, Sarmentosine, and Sarmentine.(Sunita Singh , 2013)

Medicinal uses:

Piper species have been used in traditional medicine for intermittent fevers and to promote the secretion of bile. They are also recommended for neurological, broncho-pulmonary and gastrointestinal disorder .Pepper has been used for the treatment of epilepsy. (Sunita Singh *et al*., 2013).

5. Soambu:

Biological source and family: It is the dried fruit part of ***Foeniculam vulgare*** belonging to the family Apiaceae**.**

Habitat :

Fennel is an ancient seasonal herb cultivated in Argentina, America, Germany, China, Indonesia, Russia, Japan and Pakistan, Indian. It is cultivated in fields and also grows wild. (Shamkant *et al*., 2014).

Botanical description:

It is an annual, biennial or perennial aromatic herb, depending on the varity. It is a hardy, perennial, umbelliferous herb, with yellow flowers and feathery leaves . It is erect, glaucous green and grows to heights of up to 2.5 m, with hollow stems. The leaves grow up to 40 cm long, they are finely dissected, with the ultimate segments filiform, about 0.5 mm wide. Its leaves are similar to those of dill, but thinner. The flowers are produced in terminal compound umbels 5–15 cm wide, each umbel section having 20–50 tiny yellow flowers on short pedicels. The fruit is a dry seed from 4–10 mm long, half as wide or less, and grooved. The fruits are aromatic, stimulant and carminative. (Wesam Kooti *et al*., 2014).

Chemical constituents:

The active chemical constituents are Carotene, α-terpineol, Minerals (iron, calcium, zinc, potassium) and Serine ,Aspartic acid, Cinnamic acid, Umbelliferone, Vitamins A,C,E,B1,B6 (Hong Liu , 2013)

Medicinal uses:

Fennel fruits are used to treat diseases like Cholera, Bile disturbances, Nervous disorder, dysentery and diarrhea .It is also used in cough syrups and honeys. Additionally, fennel seeds are widely used in the preparation of various dishes like soaups, sauces, pastries, confectioneries, pickles, meat curries, etc. The digestive functions are streamlined by taking fennel regularly and it also act as a remedy for gastralgia, stomachache, swollen stomach and diarrhea. It is believed that taking Fennel on daily bases prevents obesity (Shodhganga *et al*., 2017)

Vilvam:

Biological source and family: It is the dried root part of ***Aegle marmelos*** belonging to the family Rutaceae.

Habitat :

A marmelos is a subtropical plant and grows up to an altitude of 1,200 m altitude from sea level. It grows well in the dry forests on hilly and plain areas, is a widely distributed plant and found in India, Ceylon, China, Nepal, Sri Lanka, Myanmar, Pakistan, Bangladesh, Nepal, Vietnam, Laos, Cambodia, Thailand, Indonesia, Malaysia, Tibet, Sri Lanka, Java, Philippines and Fiji. In India it found in Sub-Himalayan. (Pushpendra *et al*., 2012).

Botanical description:

A marmelos is a slow-growing, medium sized tree, 25 to 30 feet tall. The stem is short, thick, soft, flaking bark, and spreading, sometimes spiny branches, the lower ones drooping. Young suckers bear many stiff, straight spines. There are sharp, axial one inch long spikes on this tree. The leaflets are oval or lancet shaped, 4-10 cm long, 2-5 cm wide. Leaves composed of 3 to 5 leaflets in it. The lateral leaflets are without petiole and the terminal one has a long one. The petiole is 1 to 2.5 inch long. Mature leaves emit a peculiar fragrance when bruised. Flowers occurs in clusters of 4 to 7 along the young branchlets, have 4 recurved, fleshy petals. The flowers are greenish white in color with a peculiar fragrant. Flowering occurs during the month of May and June. Fruit is spherical or oval in shape with a diameter of 2 to 4 inch. Shell is thin, hard and woody in nature. It is greenish when unripe and upon ripening it turns into yellowish color. The pulp of the fruit has 8 to 15 segments. The pulp is yellow, soft, pasty, sweet, resinous and fragrant. Fruition occurs in the month of May and June. The seeds are embedded in the pulp. The seeds are small (nearly 1 cm in length), hard, flattened-oblong, bearing woolly hairs and each enclosed in a sac of adhesive.(Dinesh Kumar *et al*., 2011).

Chemical constituents:

The chemical constituents are Aegelin, Lupeol, Eugenol, Citral and Marmelosin. (Sharad Sankhe, 2017, Dinesh Kumar, 2011).

Medicinal uses:

A*egle marmelos* is traditionally used to treat jaundice, constipation, chronic diarrhea, dysentery, stomachache, stomachic, fever, asthma, inflammations, febrile delirium, acute bronchitis, snakebite, abdominal discomfort, acidity, burning sensation, epilepsy, indigestion, smallpox, eye disorder sand ulcer .

Roots and the bark of the tree are used in the treatment of fever. The leaves are made into a poultice and used in the treatment of opthalmia, Sweet drink prepared from the pulp of fruits produce a soothing effect on the patients who have just recovered from bacillary dysentery. The pulp of unripe fruit is soaked in gingelly oil for a week and this oil is smeared over the body before bathing. This oil is said to be useful in removing the peculiar burning sensation in the soles (Yoygita choundhary *et al*., 2017).

Fig: 1. Aerial parts of *Phyllanthus amarus*

Fig: 2. Aerial parts of *Sphagenticola calendulacea*

Fig: 3. Stem, leaves and fruits of *Trichosanthes cucumerina*

Fig: 4. Inner fruit of *Piper nigrum*

Fig: 5. Fruit of *Foeniculam vulgare*

Fig: 6. leaf,fruits of *Aegle marmelos*

Table 1. Composition of Manchal Noi Kudineer: (Anonymous,1922**)**

S. No	Common Name	Biological source and family	Parts used	Quantity required for 650 ml
1	Keezhkai nelli	*Phyllanthus amarus* (Phyllanthaceae)	Whole plant	10g
2	Karisalankanni	*Sphagenticola calendulacea* (Asteraceae)	Whole plant	10g
3	Peipudal	*Trichosanthes cucumerina* (Cucurbitaceae)	Whole plant	10g
4	Milagu	*Piper nigrum* (Piperaceae)	Inner fruit	10g
5	Soambu	*Foeniculam vulgare* (Umbelliferae)	Fruit	10g
6	Vilvam	*Aegle marmelos* (Rutaceae)	Root	10g
7.	Neer	Water	-----	650 ml

* The following review article will highlights the information of the ingredients of Manchal Noi Kudineer (MNK).

CONCLUSION

Siddha medicine is one of the ancient medical systems which is practiced in India, Srilanka, Malaysia and other Tamil speaking countries. Manchal noi kudineer (MNK) is a polyherbal formulation consists of *Phyllanthus amarus, Sphagenticola calendulacea*, *Trichosanthes cucumerina, Piper nigram*, *Foeniculam vulgar*, *Aaegle marmelos*. This drug is indicated for liver diseases, anaemia and jaundice, Although this drug is claimed as a hepatoprotective agent, there is no supportive scientific data available, This review highlighted the importance of MNK in order to create scientific evidence.

ACKNOWLEDGMENT

The authors are very much thankful to the Dean, MTPG & RIHS for his support and encouragement in bringing this review work successful.

REFERENCES

Ambika Sharma, Mittal Arun, Aggarwal Sushma, Gupta Anil Kumar, Sardana satish. Pharmacognostic and Phytochemical Evaluation of Roots of Eclipta prostrata. *Journal of Pharmacy Research,* 4(6), 2011, 1673-167.

Anonymous World health organization, Global hepatitis report, 2017, 1-2.

Anonymous, Siddha Formulary of India, Part-II, AYUSH, Ministry of Health &Family Welfare.

Arawwawala, Thabrew R. A Review of the Pharmacology properties of Ttrichosanthus cucumerina linn of sri lankan origin. *Unique Journal of Pharmaceutical and Biological Science*, 01(01), 2013, 3-6.

Arzoo, Milind Parle. fennel: a brief review. *European Journal of Pharmaceutical Research*, 2017, 4(2), 668-675.

Chris Marble, Shawn steed, Nathan S. Biology and Management of Eclipta (Eclipta prostrata) in Ornamental Crop Production1.University of Florida. 2015, 1-4.

Danladi S, Idris MA, Umar. A Review on Pharmacological activities and Phytochemical constituents of *Phyllanthus niruri* (Amarus). *The Journal of Phytopharmacology*, 7(3), 2018, 341-348.

Deepa N. Medicinal Values of Trichosanthus cucumerina L. (Snake Gourd). A Review. *British Journal of Pharmaceutical Research*, 16(5), 2017, 1-10.

Dinesh Kumar Sekar, Gaurav Kumar, Karthik L, Bhaskara Rao K. A Review on Pharmacological and Phytochemical properties of Aegle marmelos (L.) Corr. Serr. (Rutaceae) .Asian Journal of Plant Science and Research, 1 (2), 2011, 8-17.

Dr. Hakim Md, Dr. Obydul Hoq Md. A Review on Ethnomedicinal Phytochemical and Pharmacological properties of *Phyllanthus niruri. Journal of Medicinal Plants Studies*, 4(6), 2016, 173-180.

Hong Liu, Fan Kui Zeng, Qing Huang Wang . Studies on the Chemical and Favor Qualities of white pepper (Piper nigrum L.). *Europe Food Research Technology*, 2013, 245–251.

Kopperundevi R, Radha R. A Review on Trichosanthu cucumerina var. *World Journal of Pharmacy and Pharmaceutical Science*, 6(1), 2017, 1431-1438.

Love S, Chokotia, Pranav Vashistha, Rajkumar Sironiya, Harsha Matoli. Pharmacological actyivity of eclipta alba. *International Journal of research and Development in Pharmacy and Life Science*, 2(4), 2013, 499-502.

Majeed, Prakash, L. The Medicinal Uses of Pepper. *International Pepper News*,19010, 2000, 23-31.

Manik Sharma, Muhammod yusuf. Phytochemical consitutnts and Pharmacological Activityes of Eclipta alba linn. *International Research Journal of Pharmacy*, 3(12), 2012, 51-53.

Mehrzad Kocheki Shahmokhtar, Samira Armand. Phytochemical and Biological Studies of Fennel (Foeniculum vulgare Mill .) from the South West Region of Iran (Yasouj). *Natural product Chemistry and Research*, 5(4), 2017, 1-4

Narendra J, Swathi K, Sowjanya A, Krishna S. *Phyllanthus niruri :* A Review on its Ethano Botanical Phytochemical and Pharmacological profile. *Journal of Pharmacy Research*, 5(9), 2012, 4681-4691.

Paithankar V, Raut K , Charde M, Vyas J. Phyllanthus Niruri: A Magic Herb. Research in Pharmacy ,2011, 1(4) , 1-9.

Prakash Yoganandam G, Gopal VA. Avarai Kudineer a potent Polyherbal Siddha formulation for Management of Diabetes Mellitus. *Internal Journal of Pharmaceutical deveplement and Technology*, 4(2), 2014, 98-103.

Pushpendra K. Patel, Jyoti Sahu, Lokesh Sahu , Narendra K, Prajapati. Aegle marmelos:A Review on its Medicinal Properties. *International Journal of Pharmaceutical and Phytopharmacological Research*, 1(5), 2012, 332-341.

Sandhya S, Vinod K.R, Chandra Sekhar J, Aradhana R. An Updates Review on *Trichosanthus cucunerinal*. *International Journal of Pharmaceutical Sciences Review and Research*, 1, 2010, 56-60.

Shailaja S,Sugunthanand M, Pitchiah Kumar . A review on poly herbal formulation- vishasura kudineer chooranam a clasical anti- viral drug uesd in siddha system of medicine. *European Journal of Pharmaceutical and Medicinal research*, 4(9), 2017, 184-192.

Shamkant B, Badgujar Vainav V, Patel, Atmaram H. Bandivdekar Foeniculum vulgare Mill. A Review of Its Botany, Phytochemistry, Pharmacology, Contemporary Application, and Toxicology. *Biomed Research International*, 2014, 1-32.

Sharad Sankhe, Madhuri Jangda. A Review of Active Chemical Constituents and Anticancer Activity of Aegle marmelos. *International Journal for Research in Applied Science & Engineering Technology*, 45(98), 2017, 364-367.3

Shodhganga. A Review of Literature Fennel . 2017, chapter -2, 8-34.

Shree Devi M, Parameswaran. Review of Kudineer used in Siddha system of medicine. *Journal of indian medicine and homoeopathy*, 2018, 34-40.

Shyamsundarachary R, Samatha T, Rajinikanth Marka, Srinivas Penchala, Rama Swamy.Phytochemical analysis of Trichosanthus cucumerina. *Indo American Journal of Pharmaceutical Research*, 3(4), 2013, 3359-3372.

Sunita Singh, Kapoor I.P.S, Gurdip Singh, Carola Schuff. Chemistry, Antioxidant and Antimicrobial Potentials of White Pepper (Piper nigrum L.) Essential Oil and Oleoresins . Proceedings of the National Academy of Sciences, India Section B: Biological Sciences, 2013, 83(3), 357-366.

Wesam Kooti, Maryam Moradi1, Sara Ali-Akbar, Naim Sharafi-Ahvazi, Majid Asadi Samani. Therapeutic and pharmacological potential of Foeniculum vulgare Mill: a review. *Journal of HerbMed Pharmacology*, 4(1), 2014, 1-9.

World health organization Guidelines for the prevention, care and treatment of persons with chronic hepatitis infection, 2015, 1-166.

Yan Sun, Li-jun L, Jing L. Inhibition of Hepatitis B Virus Replication by Rheum palmatum L. Ethanol Extract in a Stable HBV-producing Cell Line, *Virologica Sinica*, 22(1), 2007, 14-20.

Yoygita choundhary, Abhishek saxena, Yatendra kumar. Phytochemistry,pharmacology and Tradfitional use of aegle marmelos. *Pharmaceutical and bioscience Journal*, 2017.

Zoheir A, Aftab Ahmad. A Review on Therapeutic Potential of *Piper nigrum* L. (Black Peppe). *Medicinal and Aromatic plant*, 3(3), 2014, 2-6.