WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 1, 1019-1031. Review Article ISSN 2277– 7105

A REVIEW ON TREATMENT OF TUBERCULOSIS BY USING PHYTOMEDICINE

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Article Received on
11 November 2022,
Revised on 01 Dec. 2022,
Accepted on 22 Dec. 2022
DOI: 10.20959/wjpr20231-26754

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ABSTRACT

Tuberculosis is a bacterial infectious disease caused by Mycobacterium tuberculosis. It is highly infectious and timeserving disease. The synthetic drugs is used for anti- tuberculosis effect have been prescribed for symptomatic control of disease but produce more adverse effect. Medicinal plant is optioned for natural source that is incomparable resources of Siddha. From thousands of years, medicinal plants provide a great hope to curing diseases. This paper provides the plant description, chemical constituents, evidence based pharmacological activity. This will motivate and provide a way for further researches on medicinal plants, possesspotent anti- tuberculosis activity.

KEYWORDS: Tuberculosis, symptoms, Anti-tubercular activity, Medicinal plants, Siddha.

INTRODUCTION

Tuberculosis is defined as a case of tuberculosis excreting bacilli resistant to oneor more anti-tubercular drugs. Multi-drug resistant tuberculosis is defined as disease due to M.Tuberculosis which is resistant to Ionized (H) and Refampin (R) with or without resistance to other drugs. Tuberculosis is undergoes distinction between.[1]

Stage of Tuberculosis

1. Latent Tuberculosis / Inactive Tuberculosis :- In this condition ,here is Tuberculosis

infection but bacteria present in our body in an active stage and cause no symptoms it is not contagious. It may be turn into active Tuberculosis, so treatment is important for the person with latent Tuberculosis and to control the spread of Tuberculosis. 2billion person have latent Tuberculosis.

2. Active Tuberculosis: - In this condition makes people sick and can spread to others. It can occur in the first few weeks after infection with the Tuberculosis bacteria, or it may occur few year later.

- Loss of appetite
- Night sweats
- Fatigue
- Fever
- Unintentional weight loss
- Chest pain, or pain with breathing or coughing
- Coughing up blood
- Coughing that lasts three or more weeks

Signs and symptoms of Tuberculosis[1,2]

Tuberculosis affects our other parts of body, including kidneys, spine or brain. When Tuberculosis occurs outside lungs, signs and symptoms vary according to the organs involved. For example, tuberculosis of the spine may give back pain, and tuberculosis in kidneys might cause blood in urine.

Causes of Tuberculosis: - Tuberculosis is caused by bacteria that spread from person to person through microscopic droplets released into the air. This can happen when someone with the untreated, active form of tuberculosis coughs, speaks, sneezes, spits, laughs or sings.

Risk factor of Tuberculosis[2,3]

1. **Weakened immune system: -** A strong immune system successfully fights Tuberculosis bacteria, but body cannot make an effective defense if resistance is low. Many diseases and his medication weaken the immune system like that HIV/AIDS, Diabetes, severe kidney disease certain cancer treatment.
2. **Traveling or living in certain areas:**-The risk of contracting tuberculosis is higher for person who lives in or travels to other countries that have high rates of tuberculosis and drug-resistant tuberculosis, including Africa, Eastern Europe, Asia, Russia, Latin

America, and Caribbean Islands.

3. **Poverty and substance abuse**

- **Lack of medical care** :- If receive a low or fixed income, live in a remote area, have recently immigrated to the United States, or are homeless, lack the access to the medical care needed to diagnose and treat Tuberculosis.
- **Substance abuse:**-If intravenous drug use or alcohol abuse weakens immune system and makes more helpless to Tuberculosis.

Tobacco use: - Using tobacco greatly increases the risk of gettingTuberculosis.

Complication[4,5]

- Spinal pain
- Joints damage
- Heart disorder
- Liver or kidney problem

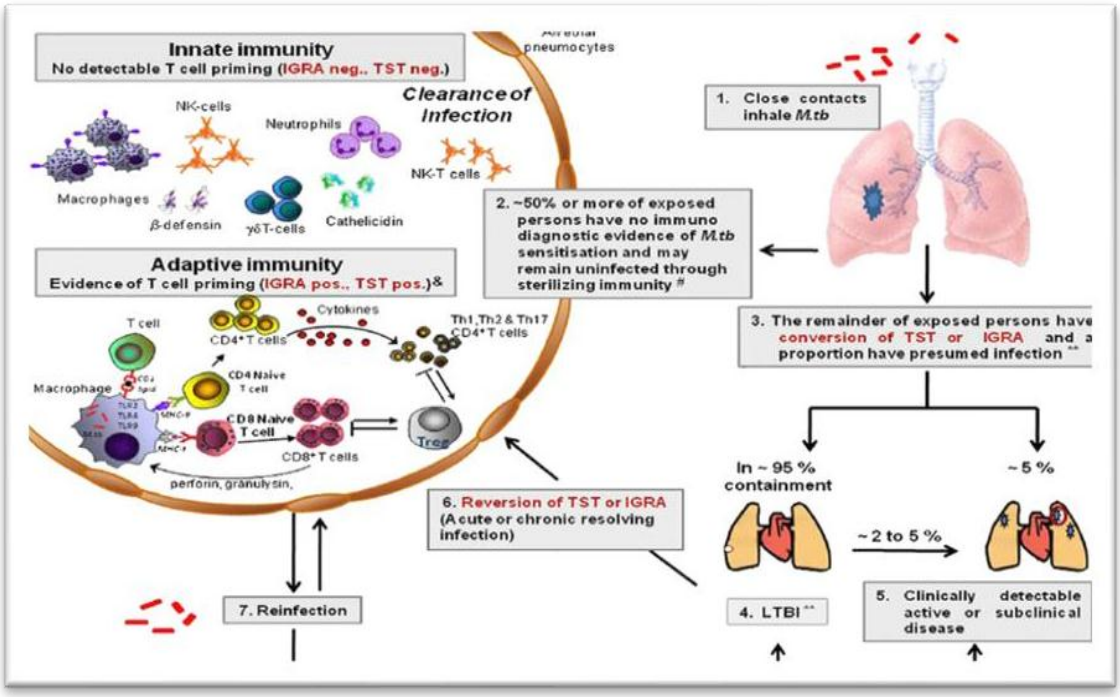

Fig no 1: Spectrum of Tuberculosis (TB) infection life cycle.

Adverse effects associated with anti TB therapy[6,7]

Table no-1.

Hepatitis	Isoniazid
Pain nausea vomiting hepatitis thrombocytopenia	Rifampicin
Convulsions Dizziness headache depression psychotic reactions	Cycloserine
Arthralgia hepatitis	Pyrazinamide
Vestibular and auditory nerve damage renal damage	Streptomycin
Skin rash Exfoliative dermatitis	Thioacetazone
Vertigo auditory nerve damage nephrotoxicity	Kanamycin
Diarrhoea abdominal pain hepatotoxicity	Ethinamide
Eye problems neuritis	Ethambutol

Phytomedicine

Plant-derived phytomedicine are in great demand in developed countries due to their ability to cure many infections. These herbal medicines have contributed significantly to the modern treatment of. Naturopathy is receiving renewed attention from both a practical and scientific perspective, but the mechanisms of action of naturally derived folk herbal medicines and relatedproducts are much more complex than the mechanistic elucidation of single bioactive factors. Its efficacy in primary care has been proven due to its safety and low side effects. They also offer treatments for age-related disorders such as memory loss, osteoporosis, and immune disorders. Its newfound popularity is due to its almost miraculous success in cases that allopathic physicians have abandoned as a hopeless treatment without side effects. Harmony between standard healthcare systems and modern healthcare systems should be developed in such a way that harmonization is achieved with minimal mutual risk. A current overview deals with the impact and current scenario of his herbal medicines in society.

A brief description of anti-tubercular plants in Siddha:-1Piper nigrum

Taxonomical classification.

Kingdom	Planate
Class	Equisetopsidab
Sub class	Magnoliidae
Super order	Magnolianae
Order	Piperales
Family	Piperaceae
Genus	Piper
Species	P .nigrum

Fig no-2: Piper Nigrum.

1.1 Plant Description

Piper nigrum (Black Pepper) plant is a flowering, woody, perennial climbing plant belonging to the Piperaceae family. Pepper plants grow easily in the shade of supportive trees, trellises, and pillars, and can reach up to 13 feet or 4 meters tall, if the vine touchesthe ground and roots protrude from the leaf nodes. there is. The plant has heart-shaped alternating leaves and is usually large in size, 5-10 cm long and 3-6 cm in diameter, with 5-7 prominent palmate veins. The flowers are small, monoecious with separate male and female flowers, but may be polygamous with both male and female flowers. Small flowers are borne on pendulous spikes at leaf nodes that are about as long as the leaves. The spikes are 7-15 cm long. The fruits of blackpepper are small (3 to 4 mm in diameter) called drupes, and the dried immature fruits of Piper nigrum are known as peppercorns. Ripe fruits are dark red and about 5 mm in diameter. The fruitcontains one seed. The plant bears fruit from the 4th or 5th year and bears fruit for up to 7 years. There are 20-30 inflorescences per stem. The collected thorns are dried in the sun and the peppercorns and thorns are separated. Freshly harvested, unripe green berries can be freeze-driedto make bell peppers.[8]

1.2 Chemical composition

Phytochemical studies of P. nigrum have revealed that it contains various phytochemicals. Piperine was the first pharmacologically active compound isolated fromvarious members of the pepper family. Many researchers have isolated various types of compounds such as phenols, flavonoids, alkaloids, amides and steroids, lignins, neolignans, trepanes, chalcone, and many others. Some of the compounds are blacamide B, dihydropiperiside, (2E,4E)-N-eicosadienoylperrilysine, N-trans-feruloyltriamine, N-formylpiperidine, ginensine, pentadienoyl as piperidine, (2E,4E) isobutyl-1-decadienamide, isobutyl-eicosadienamide,

tricholein, trichostaquin. isobutyleicosatrienamide, isobutyloctadienamide, piperamide, piperamine, piperetine, piperiside, piperine, piperolein B, salmentin, salmentin, retrofructamide. Various pharmacological activities have been reported due to the presence of these phytochemicals. Piperine is reported to have four isomers. Piperine, Isopiperine, Chavicine, Isochavicin. among all compounds isolated from P. nigrum. Piperine, pipen, piperamide,and piperamine have been found to have different pharmacological activities.

1.3 Pharmacological activities

Anti-tuberculosis activity of Piper nigrum against Mycobacterium tuberculosis in H37Rv using Microplate Alomar Blue Assay possess activity against organism has proved.[10]

2. Glycyrrhizaglabra

Taxonomical classification

Kingdom	Plantae
Division	Magnoliophyta
Order	Fables
Family	Fabaceae
Genus	Glycyrrhiza
Species	G glabra
Kingdom	Plantae
Division	Magnoliophyta
Order	Fables
Family	Fabaceae
Genus	Glycyrrhiza
Species	G glabra

Fig no 2: Plant Of Glycyrrhizaglabra.

2.1 Plant Description

Licorice belongs to the legume family and grows 1.20 to 1.50 m tall in subtropical climates on fertile soils, with oval leaflets, white to purple flower clusters and flat pods. Underground, licorice plants have an extensive root system with a main taproot and numerous stolons. Harvested for medicinal purposes, the main taproot is soft, fibrous, and bright yellow inside. Glycyrrhizin is derived from the ancient Greek words glycos, meaning sweet, and rhyza, meaning root.[11] Kanzo Glabra Rin (Fam. legumes) consist of dry, unpeeled stolons and roots. It is a large perennial herb that grows up to 2m in height and is cultivated in Europe.

Too few in Persia, Afghanistan, and some parts of India.[12] In India, the plant is grown in the Punjab and Himalaya regions.[13] The main components of plants are said to be glycyrrhizin, glycyrrhizic acid, glycyrrhetinic acid, asparagine, sugar, resin, and starch. G. glabra or licorice has been knownin pharmacies for thousands of years. In ancient Chinese apothecaries, it was considered a first- class medicine and long believed to rejuvenate those who used it. It has been used to relieve thirst,fever, pain, cough and shortness of breath. rice field. China has used licorice in large quantities for centuries, and many preparations of it can still be found in Chinese pharmacies. Glycyrrhizin was also widely used in ancient Egypt, Greece, and Rome. Licorice is mentioned by Theophrastus. It is interesting to note that licorice has maintained its place in medicine and pharmacy to this day.[14]

Licorice is used both as a pharmacological agent and as an ingredient in East and West Indian tobacco and confectionery. is still used as Research over the past 50 years has yielded information that has sparked renewed interest in the pharmacological and physiological effects of this plant. This study revealed that the chemical structure of the main active compound in licorice root is a triterpene glycoside called glycyrrhetinic acid. Because licorice intake mimics hyperaldosteronismand was proposed as a treatment for Addison's disease, it was originally thought that its structure and activity resembled adrenal steroid hormones such as aldosterone and cortisol.[15]

2.2 Chemical Constituents

Many components are isolated from licorice, including water- soluble and biologically active complexes that account for 40-50% of total dry weight. This complex consists of triterpenes, saponins, flavonoids, polysaccharides, pectins, monosaccharides, amino acids, mineral salts, and various other substances. Glycyrrhizin, a triterpenoid compound, is responsible for the sweetness of licorice root. This compound is a mixture of potassium-calcium-magnesium salts

of glycyrrhizic acid, varying from 2 to 25%. Among natural saponins, glycyrrhizic acid is a molecule consisting of a hydrophilic portion, two molecules of glucuronic acid, and a hydrophobic segment, glycyrrhetinic acid. The yellow color of licorice is due to the flavonoid content of the plant, including liquiritin, isoliquiritin (chalcone), and other compounds. both have estrogenic activity.[16,17]

2.3 Pharmacological activities

Anti-tuberculosis activity of Glycyrrhizaglabra against Mycobacterium tuberculosis in H37Rvusing Microplate Alomar Blue Assay possess activityagainst organism has proved.[10]

3. Withania somnifera

Taxonomical classification

Kingdom	Plantae
Division	Angiosperms
Class	Eudicots
Order	Solanales
Family	Solanaceae
Genus	Withania
Species	sominifer

Fig no-3: Plant Of Withania Somnifer.

3.1 Plant Description

Withania somnifera is an evergreen, erect, branched tomentose shrub 30- 150 cm tall. The leaves are simple, ovate, glabrous, and up to 10 cm long. The flowers are greenish or bright yellow, small, about 1 cm long. A few flowers (usually about 5) are clustered in axillary umbels (short axillary racemes). The fruit is a globose fruit, 6 mm in diameter, orange-red when ripe, enclosed in a swollen membranous calyx. The seeds are yellow, deformed and 2.5 mm in diameter.[18]

3.2 Chemical constituent

Roots contain alkaloids, amino acids, steroids, essential oils, starches, reducing sugars, glycosides, hentriacontane, darcetri, withaniol, acids (mp 280-2830 decomposition), and neutral compounds (mp 294-2960). reported to be included. The total alkaloid content of Indian roots has been reported to vary between 0.13 and 0.31%, while much higher yields (up to 4.3%) have been recorded elsewhere.[19] Many biochemically heterogeneous alkaloids have been described in roots.

Basic alkaloids include cuscohygrin, anahygrin, tropine, pseudotropine, ferrine, isopelletierine, withaninine, with ananinin, pseudo-with nine, somnine, somniferine, somniferinine. Neutral alkaloids include 3-tropyl tigloate and unidentified alkaloids. Other alkaloids are asomnin and visamines, numbered 9. It has a calming and hypnotic effect at 9 o'clock. Withasomnine was isolated from the roots of a plant grown in West Germany. Visamine is a new alkaloid isolated from the roots of a plant grown in the USSR. It prolonged hexanal- induced sleep time and showed hypothermic and nicotine-suppressive effects in mice.[20] Free amino acids identified in roots include aspartic acid, glycine, tyrosine, alanine, proline, tryptophan,glutamic acid, and cysteine.[21]

3.3 .Pharmacological Activity

A percent inhibition view of aqueous extracts showed that W. somnifera showed a significant reduction in proliferation of Mycobacterium activity, representing the prospects for future curative interventions. We can see that W. somnifera shows considerable activity against M. tuberculosis. Aqueous extract of W. Somnifera (0.01-1.0 mg/ml) showed significant activity against Mycobacterium tuberculosis.[22]

4. Aloe Vera

Taxonomical classification.

Kingdom	Plantae.
Division	Magnoliophyta
Class	Monocotyledons
Subclass	Liliidae
Order	Liliales
Family	Liliaceae
Genus	Aloe
Species	Avera

Fig no -5: Aloe Vera.

4.1 Plant Description

The aloe vera plant has triangular fleshy leaves with serrated edges, yellow tubular flowers, and numerous seed-bearing fruits.The leaves are mainly composed of three layers. The inner layer is a clear gel, 99% water, the rest being glucomannan, amino acids, sterols, lipids and vitamins. The middle layer contains latex, a bitter yellow sap that contains anthraquinones, glycosides, and other plant components. The bark is the thickest outer layer of the aloe vera leaf, has protective functions and also synthesizes carbohydrates and proteins. Within the bark are responsible for the transport of substances such as water (xylem) and starch (phloem). There are vascular bundles.[23]

4.2 Chemical Constituent

Aloe vera contains more than 75 potentially active ingredients, including anthraquinones glycosides, vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acid and amino acids.[24]

a. Anthraquinones: Aloe vera contains 12 anthraquinones, which are phenolic compounds. These anthraquinones act as laxatives. Alboin and Emodin act as analgesics, antibacterial agents, and antiviral agents. Aloe vera also contains aloetic acid, mucopolysaccharides, glucosamine, saponins, choline and chrysamic acid.
b. Vitamins: Aloevera contains vitamin A (beta-carotene), vitamin C and vitamin E, which are having antioxidant property. It also contains vitamin B12, folic acid and choline. Antioxidant neutralizes free radicals.
c. Enzymes: Aloevera contains eight enzymes: aliiase, alkaline phosphates, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. Bradykinase helps to reduce excessive inflammation when applied topically, while others help in the breakdown of sugars and fats.

d. Others: It contains 20 of the 22 human required amino acids and 7 of the 8 essential amino acids. It also contains salicylic acid that possesses anti-inflammatory and antibacterial properties. Lignin, an inert substance, when included in topical preparations, enhances penetrative effect of the other ingredients into the skin.

4.3 Pharmacological Activities

Aloe vera anti-tuberculosis activity in susceptible strain M. tuberculosis H37Rv using Lowenstein-Jensen medium was calculated as the average reduction inthe number of colonies with extract compared to controls without extract and expressed as percent inhibition. Evaluated by Aqueous extracts of Aloe vera leaves at concentrations of 2%, 4% and 6% were tested in vitro for activity against the isolated MDR reference. The inhibition rate for thisplant is 51%. These plant extracts showed promising quantifiable antibacterial activity against MDR-M. Tuberculosis.[25]

CONCLUSION

Tuberculosis remains a major cause of death worldwide. In all over the world, requirement of phytopharmaceuticals is increased, because of side effect and many unwanted adverse effects of synthetic drugs. This review about anti-tubercular medicinal plant makes an effort to compile of some scientific account of anti-tubercular plants. Many phyto constituent are intent in anti-tubercular activity like alkaloids, flavonoids, tannins, triterpene, Quinone and etc., the inhibitory effect of some plant extracts provide their medicinal use. The investigation provides enlightenment for further research.

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