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## **A MINI-REVIEW ON PLANTS PHYTOFRAGMENT HAVING ANTI-TUBERCULAR PROPERTIES**

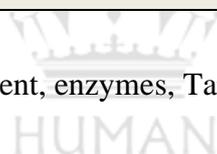
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### **ABSTRACT**

Mycobacterium tuberculosis causes tuberculosis, which is an infectious disease. After HIV, tuberculosis is the second biggest cause of death among infectious diseases. Numerous anti-TB synthetic medicines have been created over time, but the majority of resistance has been seen in these drugs. As a result, using plant Phytofragment to cure the ailment is beneficial. Furthermore, these medications have less negative effects. As a result, finding more effective and less toxic drugs to battle fatal tuberculosis is critical.

**Keywords:** Tuberculosis, Phytofragment, enzymes, Target



## INTRODUCTION

Tuberculosis is a contagious disease caused by the bacillus mycobacterium tuberculosis, slow-growing, acid-fast bacteria (*M. tuberculosis*). The only vaccine against pulmonary tuberculosis is BCG (*Bacillus Calmette-Guerin*). Despite years of immunization and antibiotic therapy, M. Tuberculosis is inhaled in the form of minute aerosol droplets carrying the bacilli and is spread to healthy people via inhalation into the lungs from an infected individual. The germs make their way through the lungs and settle in the alveoli. The infection does not lead to active disease in 90% of infected people, and is referred to as a latent infection, in which bacteria can persist in a non-replicating form for many years. The disease affects the remaining 10% of people who have an impaired immune system. . [1]

## PHYTOCHEMICALS USED IN TUBERCULOSIS THERAPY

Garlic (*Allium sativum*) is a common dietary item that has long been praised for its beneficial effects on human health. Garlic is used to treat and prevent a wide range of infectious and non-infectious disorders. 30–32 Garlic is a powerful antibacterial agent that can stop both Gram-positive and Gram-negative bacteria from growing. Allicin/garlic extract kills Mycobacteria directly and induces pro-inflammatory cytokines in macrophages, as well as restricting M. tuberculosis infection inside the cells by interacting with the cell surface receptors that allow M. tuberculosis to enter the cells. [3-6]

### Bergenin

Bergenin is a natural secondary metabolite that can be found in various areas of plants.43 Cuscutin is a trihydroxybenzoic acid glycoside that is also known as cuscutin .One of the active phytochemicals in herbal and ayurvedic preparations is FATIMA et al. 499. Bergenin has antibacterial, antiviral, antifungal, antitussive, anti-inflammatory, anticancer, antidiabetic, and wound-healing effects, among other things. Bergenin therapy activated the MAP kinase and ERK pathways in infected macrophages, resulting in the generation of TNF-, nitric oxide (NO), and interleukin-12 (IL-12). Bergenin also stimulates the production of Th1 and Th17 immune responses and limits the bacteria's multiplication in a mouse model. 47

### Curcumin

Curcumin, popularly known as "Indian Yellow Gold," is a polyphenol called diferuloylmethane that gives the Indian spice turmeric (*Curcuma longa*) its vibrant yellow-orange hue. In India, turmeric is the most widely used spice. It has been utilized in traditional remedies and as an antibiotic in India and China since time immemorial. Curcumin contains anti-inflammatory and antioxidative properties, and it inhibits numerous key

bacterial survival processes. Curcumin suppresses the transcription factor NF-B, which reduces the expression and activity of the cyclooxygenase (COX-2) gene, as well as the activity of inducible nitric oxide synthase (iNOS). This, in turn, plays a function in the prevention of tumour progression. It efficiently eradicates *M. tuberculosis* in tuberculosis patients. As a result, it would be fascinating to go deeper into the subject.

### **Piperine**

The presence of different phytoconstituents in black pepper (also known as the king of spices) confers antipathogenic qualities to it, resulting in its pharmacological activities. Piperine is the most significant alkaloid among all the phytoconstituents. Piperine is an anti-inflammatory, antibacterial, antifungal, antioxidant, and anticarcinogenic natural chemical found in the *Piper nigrum* and *Piper longum* plants. The piperine dimer chabamide is extracted from the stems of *P. chaba*. This dimer has antituberculosis properties against *Mycobacterium tuberculosis*.

### **Ginger**

Ginger is a common plant that grows throughout Asia and Africa, but is especially prolific in China and India. It has long been used to treat headaches, colds, coughs, flu, asthma, arthritis, muscular aches and pains, and any type of inflammation. A random trial of pulmonary tuberculosis patients found that combining ginger with DOTS therapy produced considerably positive results.

### **Cardamom**

Cardamom includes phytochemicals (4-terpineol, acetic acid, cinnamaldehyde, eucalyptol, 3,7-dimethyl, Santolina alcohol) that can interact with the microbe's important enzyme [histidinol dehydrogenase (H37Rv)]. [18]

### **Saponin**

The RNA polymerase of *E. coli* and *M. tuberculosis* was inhibited by saponin-polybromophenol, but not the DNA polymerase,[19]

### ***Vasica adhatoda***

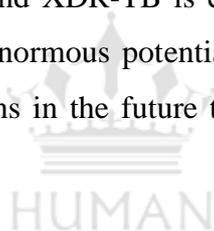
*Adhatoda vasica* is a tiny, evergreen shrub of the Acanthaceae family that can be found in many parts of India and around the world. It is generally known as 'Adosa,' and its leaves are the most essential portion because of their antispasmodic and expectorant properties. The anti-tuberculosis medication and the ethanolic extract of *A. vasica* [20].

### **Allium cepa**

*Allium cepa* is a type of onion. Onion, or *Allium cepa*, is a herbaceous biennial plant cultivated for its delicious bulb. The Liliaceae family includes this plant. On extraction, *A. cepa* contains several sulfur-containing compounds in the form of cysteine derivatives such as S-alkyl cysteine sulfoxides, which breakdown into a range of thiosulfinates and polysulfides thanks to the action of an enzyme called allinase. Water extract of *A. cepa* showed anti-tubercular efficacy against two MDR strains of *M. tuberculosis*. These MDR strains were resistant to first- and second-line TB medicines such as rifampin and isoniazid. However, this plant extract can stop *M. tuberculosis* from growing. [21]

### **CONCLUSION**

Phytochemicals generated from plant extracts are effective not only for killing bacteria, but they may also serve as potential adjunct agents to assist reduce the side effects of traditional antimycobacterial medications, as detailed in the review. Furthermore, studies on compounds with anti-MDR-TB and anti-XDR-TB activity may have a substantial impact on TB care, as medication development for MDR- and XDR-TB is critical due to its high prevalence and challenging management. Given its enormous potential, this therapy may be recommended for inclusion in anti-TB drug regimens in the future to increase the efficacy of current TB treatment techniques.



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