



# Review on Extraction Methods Used for Assessment of Medicinal Plants against plant Fungal Pathogens

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## Abstract:

In recent era we have seen that there is increase in fungal infections rate in plants and crops as well as further to animals and humans so all over the globe excessive chemical controls been used as fungicides, the excessive use of these chemicals having adverse effect on nature, so need is to use plant extract by using most effective extraction methods. So it had become the demand to develop most effectual methods for the extraction and segregation bioactive contents from antifungal medicinal plants. Present review focused upon the methods used in the extraction and separation of natural content. Here some results obtained serve as best examples of traditional and latest techniques concerned in extraction of effective contents from medicinal plants.

**Key words:** Anti fungal, Medicinal Plant Extraction, Aqueous Extract, Ethanol, Acetone, Methanol

## Introduction:

In recent era we have seen that there is increase in fungal infections rate diagonally the world due to the manifestation of antifungal efficacy to diverse fungicidal used in medicinal practice. It is usually documented that several types of fungal pathogens can be a reason for loss in cereal yield. Furthermore fungal pathogens can have an effect on cereal grains during the storage period, which is out of standard for human use by, worsen the safety & quality of food product. Mycotoxins present in that fungi cause serious loss as well as unfit for taking it as food [1].

Further it cause rancid flavor in the grains [2,3] the fungal species like *Aspergillus*, *Penicillium* & *Fusarium* distressing the production of grain, cereal further it leads in degradation of food. The variety of strategies used for the check out for fungal infection, like acceptance of specific agronomic application for the expansion of anti fungal varieties [4].

Most of the plant diseases controlled by using various chemical additives available in market. Viz. Imazalil-Sulphate ( $C_{14}H_{16}Cl_2N_2O_5S$ ), Benzimidazoles ( $C_7H_6N_2$ ), Organic, & Inorganic Sulfur Contents & oxidizing stuffs have been pioneered to managing various plant disease. The recent focus point is that the widespread use of such chemical components which are responsible for the serious environmental problems, toxic effects upon animals & humans, organization of fungal resistant races, is having elevated costs. So now a days to protect environment & to reduce coast of fungicides more than two hundred species work as plant pathogens become defiant to chemical pesticides further, various side effects cause by pesticides have been noted [5]. For these reasons, incisive impending antifungal & antimicrobial means for crop defense, food Preservation & better quality is principal so gets a lot concentration since the consciousness of innate & natural food products [6].

Even with the facts that utilization of innate products for defense in crops it's not a novel it's been practiced since humans learns to farming, [7]. The primary group of metabolites comprises phenols viz. Flavonoid, alkaloid & tannin these contents are abundant in essential oils extracted from medicinal plants. [8]. In contrast with various researches, here in this review attempts had been focused upon various types of medicinal plant extracts used for formulation of antifungal component.

### 1. Leaf Extracts:

In this investigation 22 plant species for their antifungal. Only the folio extracts of 14 species viz., *Annona squamosa*, *Cannabis sativa*, *Citrus aurantifolia*, *Erigeron bonariensis*, *Eupatorium spp.*, *E. geniculata*, *H. indicum L. indica*, *T. erecta*, *m.koenighii*, *O. sanctum*, *Partenium sp.*, *S. nigrum* were shown strong antifungal effects .here the check of of myciliial growth which founded on *Rhizotonia solani* reduced up to 85 -95 %. [9]

### 2. Essential Oils:

The antifungal role of essential oils from 12 foreign collections belonging to nine *Ocimum spp.* in clean state & four dilutions which contain Dimethyl Sulfoxide. Pure oil with greatest antifungal effect against *Aspergillus niger* *Fusarium oxysporum*, *Aspergillus flavus* & *Penicillium sp.* On diluting 1:10 oil: dimethyl sulphoxide, the antifungal was reduced by approx. 50%. Here the study shows that Dilution of oil to 1:100 abridged the antifungal to <25%. In sure cases antifungal finished at 1:1000 ratios. [10]

A research attempts investigate the antifungal impact of necessary oil & solvent extracts of dehydrated leaves of tulasi *Ocimum gratissimum* L. *Bipolaris oryzae* & *Alternaria padwickii* fundamental mediator of brown-spot & stack-burn diseases of rice, correspondingly. a relative in-vitro revise shows the antifungal result of *Ocimum gratissimum* dried foliage extracts & a local artificial fungicide (Chlorothalonil 550 & 100 g L-1 Carbendazim referred to as Banko-plus) alongside these two phytopathogens by means of the complemented medium method was arranged.

Necessary oil find through hydro-distillation placed at pars from ethanolic extract, glacial water extract, hot water extract & shows the finest antifungal action on *Bipolaris oryzae* & *Alternaria padwickii* at (150 ppm), marked by 86.17 & 100% growth inhibition, in that orders.

The artificial fungicide sturdily reduced *B. oryzae* & *A. padwickii* at 10,000 ppm with 69.11 & 100% growth inhibition, in that order. Ethanol & cold water shows some usable antifungal activity. Hot water extract showed no inhibitory activity at all tested concentrations, but paradoxically activated growth at all tested concentrations. [11]

### 3. Sterilized Extracts by Millipore Filter

Antifungal actions of extracts of 16 plants aligned amid *Calotropis paradoxa* which effects spongy rot of pineapples. *Xanthium strumarium* (family Asteraceae ) extract was majority effectual in decreasing manner with *A. sativum* (Garlic) extract.

The capability of additional extracts against *C. paradoxa* occurred in the decreasing order; *Mentha piperita*, *Curcuma longa*, *Phlogacanthus thyrsoiflorus*, *Toona ciliata*, *Vitex negundo*, *Azadirachta indica*, *Eupatorium birmanicum*, *Ocimum sanctum* & *Leucas aspera*. Extracts of *Cassia tora*, *Gynura cusimba*, *Calotropis gigantea* & *Ocimum canum* showed reduced antifungal.

Ethanol was appropriate for extracting the inhibitory substance from *X. strumarium*. Acetonitrile was highly toxic to *C. paradoxa*. Millipore filter-sterilized extracts shows larger inhibitory results on *C. paradoxa* with comparison of autoclaved model. Treatment of pineapple fruits infected with *C. paradoxa* by *X. strumarium* extract reduced disease severity. [12]

### 4. Cold & Hot Water Extracts:

Screened 13 plant species under in-vitro condition for antifungal against *R. solani*, the causal agent of sheath blight of paddy rice. Fresh leaf samples of *Allium cepa*, *Neem Azadirachta indica*, *Caesalpinia pulcherrima*, *E. globulus*, *C. gigantea*, *I. carnia* *Lawsonia inermis*, *O. sanctum*, *P. hysterothorus*, *P. betel*, *P. glabra*, *p. juliflora* & *T. peruviana* were collected & cold & hot water extracts were prepared.

Utmost growth of the mycelial were recorded with the utilization of cold water extract of *P. juliflora* and *Thevetia peruviana*. All the plant extracts tested maintained their antifungal following thermal treatment at 70<sup>0</sup> C for 10 minutes. [13]

### 5. Ethanol Extracts:

The experiments carried out on ethanol extracts of 10 plant species viz., *Allium sativum*, *Allium cepa*, *Azadirachta indica*, *Calotropis procera*, *Tagetes erecta*, *Datura stramonium*, *Ocimum sanctum* (*O. tenuiflorum*), *Polyalthia longifolia*, *Vinca rosea* (*Catharanthus roseus*) & *Withania somnifera* which showed antifungal properties against five pathogenic fungi under laboratory condition by using di concentrations (500 & 1000 micro g/ml.). Leaf extracts of *A. indica*, *D. stramonium*, *O. sanctum*, *P. longifolia* & *C. roseas* were the most antifungal against all the test fungi, their potential was more pronounced at 1000 micro g/ml. [14]

## 6. Aqueous Leaf Extracts:

The research carried out upon of medicinal plants (*C. procera*, , *L. camara* , *A. indica* & *O. basilicum*) here out of 10 plant species selected in-vitro test shows anti fungal features in aqueous extracts of leaf part aligned with *C. tuberculata* & *A. alternata* segregate which named as A acquired from fruits of pear & *A. alternata* segregate which named as B secluded pomegranate (*p. granatum*).

An in vivo study revealed 64 to 85 percent organize fruit rot observed in pears & pomegranate. [15]. Examined the effects of the aqueous leaf extracts of 5 medicinal plants (*Strychnos nux-vomica*, *Calotropis procera*, *Azadirachta indica*, *Ocimum sanctum* [*O. tenuiflorum*] & *Allium sativum*) on the spore germination of five species. Spore germination of all the fungi tested was completely inhibited by 100% aqueous extract of *Azadirachta indica* while only 20% germination of *F. equiseti* spores was observed with treatment with 100% aqueous extract of *Allium sativum*. [16].

The effectiveness of extracts of leaf parts obtained from *A. indica*, *E. amygdalina* , *C. procera*, *A. belladonna* *O. basilicum*, *A. excelsa* & *L. camara* in opposition to the fenugreek wither pathogen *F. oxysporum* was checked in-vitro by Bansal [17].

Each extract was tested at variable grading (20%, 40%, 60%, 80% & 100%) by implementation of poisoned food method. along with the seven extracts of leaves *A. indica* show great inhibition upon *F. oxysporum*. Tulasi (*O. sanctum*) leaf part extract (100%) shows antifungal activity, with spores of *F. solani*, *F. equiseti* & *F. oxysporum* which shows 30, 16 & 40% rate of germination. [18].

Research carried out upon banana affected with anthracnose pathogen *Gloeosporium musarium* which been tested by using medicinal plants (*A. indica* , *A. sativum*, *A.squamosa* , *C. procera*, *C. annum*,*O. sanctum*, *M. arvensis*) . Mukhtar deliberate features of antifungal result of aqueous extracts of four plant species (*A.indica* *A. Juss.*, *D.metel* ,*O.sanctum* & *P. hysterophorus* ) .

The Results shows that all the plant extracts OF concentration 40 % shows effectual in dropping the growth of mycelia. *A. indica* & *D. metel* effective at concentration 80 % . Even that there is inhibition at concentration 10 % [19].

## 7. Ethanol, Acetone and Water, Extracts

The experiments carried out on effectiveness of medicinal plant extract to check the activity of *Fusarium solani* at in-vitro examination by disc -paper method, Garlic (*Allium sativum*) extract shows inhibition up to 4.75 mm, other plants showed minor inhibition. Sterilized extract of medicinal plants did not cause any inhibition on fungal growth. [20]

Antifungal action of 11 dissimilar medicinal plants (*S.trilobatum* *A.vera*, *A.calcarata*, *A.indica*, *C.copticum*, *L. aspera*, *O.sanctum*, *P.niruri* , *P.betle* *M.umbellatum* & *T. procumbens*) alongside plant pathogene *F. oxysporum* utilizing the method of agar well-diffusion. Ironwood plant ( *Memycelon umbellatum*) had shwn inhibition up to 21 mm.[21]

The antifungal activity of eight different medicinal plants (*A.vera*,*Cenetella asiatica*, *O.sanctum*, *P. betle*, *C. gigantea*, *V. negundo*, *O.basilicum* & *A. indica*) were examined against red rot disease causing agent *C. falcatum*. The the medicinal contents from leaf extracted by using solvents chloroform, & ethanol. [22]. aqueous & alcoholic extracts of medicinal plants out of which the concentration used as 15% (alcoholic extract) of tulasi *o. santum* & *C. innermis* shows inbition to *C. gloeosporioides*. Here the alcoholic medicinal plant extract shows noteworthy result as compare to aqueous extracts. [23]

## 8. Methanolic Extracts

Methanolic extracts of 40 medicinal plant species alongside *Sclerospora graminicola*. The medicinal plant species extracts of 11 species) exhibited remarkable effect even after 10-fold intensity of medicinal plant species crude extracts rest of the fifteen plants the medicinal plant species crude extract show lesser activity [24]

Antifungal action of Parthenium sp. Eucalyptus sp., Datura sp, Calotropis sp, Azadirachta sp, Lantana sp, used against plant disease causing fungi *Alternaria brassicae*, here they had been applied applied methonolic spray of Datura at the rate of 1:10 dl & Azadirachta sp. At the rate of 1:10 dl its noted that significantly effectual in plummeting disease strength of *Alternaria blight* . [25].

## 9. Aqueous autoclaved leaf extract

Research work carried out upon the using aqueous extracts of different plant species alongside significant plant pathogens. Extracts made from Datura metal, *A.indica*, *O.gratissimum*, *C. domestica*, *L.camara*, *Parthenium sp.* & *S.nigrum* shows reduction in mycelial growth & germination of spores of the fungi like *Acrocylindrium oryzae* , *Alternaria alternata*, *Fusarium*, *H.sativum*, *P.vexans*, *B. cinerea* & *Rhizopus sp.* Extracts made by using medicinal plants viz. *A. indica*, *Parthenium sp.* & *D. stramonium* were found to inhibit mycelial growth (26) Chohan (27) carried out the study and shows that , 5 medicinal plants extract of showed utmost mycelial growth inhibition both at 8% concentration (83.5%) & 2% concentration (34.5%) .

## Conclusion

Studies which were conducted upon antifungal medicinal plants to check out the growth of fungal pathogens. It is concluded that :- All the four forms i.e., crude ,powdered ,boiled , & ethanol (1%) extract of significantly inhibited the growth of the test fungus finally concluded that whatever may the type of extract used it shows the better results. but more technically the alcoholic and methanol extract are having effective use. If we can analyze these extract by using molecular techniques then definitely have the best results.

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