



# Nano - Fungicide

## Technology Description

The present invention relates to the development of surface modified monoclinic sulfur nanoparticles of average size 20-100, their liquid synthesis using polyethylene glycol-400 as a surfactant and use as fungicide. Nanoparticles thus synthesized provide excellent fungitoxic efficacy against the fungal pathogens.

Objectives of the invention

1. An object of the invention is to prepare nanoforms of elemental sulfur under condition employing simplified liquid synthesis technique.
2. Another objective is to propose the use of the novel nanocide as fungitoxic agent against fungal pathogens

Name Of institute:  
Indian Statistical Institute, Kolkata  
Stage of development:  
Ready for commercialization  
Patent status: Filed

Scientific Experts:  
Dr. Arunava Goswami

## Background

There is a serious need for new agrochemicals because target organisms are rapidly developing resistance to fungicides in current use. A need exists, therefore, for new fungicides with low undesirable toxicity, better selectivity, low production cost, low environment hazards and better efficacy. Present invention provides novel surface modified monoclinic sulfur nanoparticles with excellent fungitoxic efficacy against the fungal pathogens. The present invention relates to the development of surface modified monoclinic sulfur nanoparticles of average size 20-100 nm, their liquid synthesis using polyethylene glycol-400 as a surfactant and use as fungicide.

## Benefits / Utility

Unique Selling Propositions: Super fungicide with extra anti-bacterial properties. Thus show combo effect in the field. Acts at very low dose and effective against a large number of fungal and bacterial pathogens. Low undesirable toxicity, better selectivity, low production cost, low environment hazards and better efficacy. Long term toxicity studies show generation of resistance is very slow.

## Country

India

## Scalability

Yes, scalable. Currently we can produce at the scale of 2000 liters in our set-up per day. We envisage that a commercial setup would like to produce 2 million liters per day.

## Potential investors to this technical innovation

Small, medium scale companies in India (both private and Govt. undertakings)



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## Financials

Project cost : Rs.30 Cr  
Fix assets (Land and Building)= 50,000 sq. ft



## Target Market / Customer

Pesticide industries (Fungicide and bacteriocides) and Green-house industries dealing with marginal, small, medium and large farmers.

## Limiting factors for large scale commercialization

If the Indian company is interested in the commercial scale production and does not import custom made production machine from companies like Techna group of USA, then other foreign companies

## Social impact of the technology

Lesser cost of production. Low price alternative for the existing fungicides and bacteriocides. Eco-friendly. Highly efficacious. Safe for handling. Development of resistance against this nano-fungicide is very slow (as determined by lab experiments already)



## Any other relevant information

CIB clearance is needed in India.