



BORDEAUX MIXTURE: A CLASSIC FUNGICIDE

Elammathy K*, Giridharan R and Gowri S Kurup

Dhanalakshmi Srinivasan University, Trichy.

*Corresponding Author Mail ID: elamathy18@gmail.com

Abstract

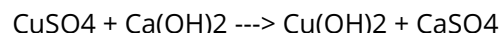
Bordeaux mixture, developed by Pierre-Marie-Alexis Millardet is a classic fungicide and bactericide which is first developed against downy mildew of grapes and later it is widely used to many other diseases. It is a combination of copper sulfate, quicklime and water. Where the copper can cause phytotoxicity to plant if it is not properly used. Nowadays it is used for various factors like plant protection and environmental consideration. From the discovery to till ongoing role in organic farming which enduring relevance in integrated disease management strategies.

Introduction

A French botanist Pierre-Marie-Alexis Millardet and professor at University of Bordeaux at France during 1860s. He invented the mixture during his investigation of a disease in vineyard. Later the disease is found to be a fungal disease called downy mildew caused by *Plasmopara viticola*. Bordeaux mixture is a combination of copper sulfate, quicklime and water. In history Bordeaux mixture is used as a protective coat. It means paint as it contains copper in the mixture. It provides antimicrobial properties and fungal protection. Its value is accidentally found. Mostly Bordeaux mixture is used in organic farming. It was the very first fungicide that developed and still the most relevant and widely used fungicide by the farmers.

Composition

Bordeaux mixture is a combination of copper sulfate, calcium hydroxide (slaked lime) and water. Active ingredient of the mixture is copper sulfate and lime helps to neutralize the acidity of the copper sulfate and the mixture is made as more stable and less harmful to plants.



Preparation

Bordeaux fungicide can be prepared in different proportions. Copper sulfate and lime solution have to be prepared separately and mixed. The ratio is 1:1:100 for 1% Bordeaux mixture, which means 1 kg CuSO₄ (pentahydrate), 1 kg hydrated lime, and 100 liters (100 kg) water.

Prepare copper sulfate solution

Dissolve the required amount of copper sulfate in a container of water. Stir until the copper sulfate is completely dissolved.

Prepare Lime Solution

In a separate container, dissolve slaked lime in water. Stir until the lime is fully dissolved.

Combine the solutions

- Slowly pour the copper sulfate solution into the lime solution while continuously stirring. This helps ensure that the mixture remains well-blended and prevents the formation of unwanted precipitates.

- Continue stirring the combined solution for several minutes to ensure thorough mixing.
- Let the mixture sit for a short period probably about 24 hours before use. Which helps to ensure that the ingredients are fully reacted and that the mixture is stable. If any undissolved particles or precipitates, then it has to be strained properly to prevent clogging.

Mode of application

- The effectiveness of Bordeaux fungicide is depended on effective application. It is sprayed through sprayer like knapsack sprayer or we can use hand sprayer.
- Bordeaux mixture is also available in premixed package and it can also prepare freshly.
- After preparation use the mixture immediately or store it in cool and dark place if it is not used and make sur it is used within the time limit for effectiveness.
- Mostly it is applied during dormant period of plant like early spring or after leaf fall in autumn.

Phytotoxicity

- The only ingredient that presents in Bordeaux mixture that is toxic to plant and pathogen is copper, which cause phytotoxicity.
- Phytotoxicity content present in this mixture can be reduced by increasing the ratio of hydrated lime to copper sulfate. Lime act as safener.
- If the fungicide is not used correctly can causes phytotoxicity like concentration, time of application, environmental factor, plant sensitivity, etc.,

- Which causes leaf burn, chlorosis, stunted growth, reduced yield and so on.

Uses:

Bordeaux mixture can be used as fungicide and as well as bactericidal which helps to control plant disease like powdery mildew, downy mildew, blight, leaf spot, bacterial canker, crown gall, etc.,

It is used for soil treatment, wood treatment and mainly it is used in disease management in vineyard, vegetable garden and fruit orchid.

Conclusion

Bordeaux mixture plays a vital as fungicide and bactericide, has played significant role in agricultural sector. It is a important mixture which is most first fungicide and still it is in practice since from 19th century.