

FERTILIZER “JAR TEST”



With the increasing use of liquids and soluble fertilizers questions regarding what fertilizer to use and what is compatible with what have increased accordingly. With this in mind we have put together this guide.

Before you inject a new fertilizer solution into your drip system, always perform a "jar test". This will help you avoid annoying and unnecessary line or emitter clogging due to fertilizer incompatibility.

Whether you begin with water-soluble or liquid fertilizers, dissolved chemicals such as phosphates, calcium, and magnesium can react together or with the irrigation water. This can lead to insoluble chemical combinations precipitating in the water. These precipitates can clog the emitters.

The "jar test" is easy. The key is to approximate the dilution rate that you expect to be injecting through the drip system.

To get started you will need:

1. The injection rate (litres per hr)
2. The drip system delivery rate (litres per hr)
3. The stock fertilizer or fertilizer combinations that you will be using (stock solution to water applied ratio)
4. A jar with a sealing lid
5. The water that you use for irrigating (use the buffer (6.5pH) irrigation water)

For example, a fertilizer stock solution is injected at a rate of 8 litres per hour and delivered at a rate of 300 litres per minute.

Step one:

Convert system delivery rate from gallons per minute to gallons per hour.
300 litres per minute X 60 minutes = 1,800 litres per hour.

Step two:

Calculate the dilution ratio. This is ratio of the injection rate to the delivery rate.

8 litres per hour: 1,800 litres per hour = 1:225 (1,800 divided by 8 = 225)

Step three:

Add fertilizer stock solution and irrigation water into the jar at the same dilution ratio, 1:225. Do this by adding 1 mL of fertilizer stock solution to 225 mL - of the irrigation water.

Step four:

Tighten the lid and shake it up!

Step five:

Watch what happens. Does any precipitate form on the bottom of the jar? Does the water become milky or cloudy? If this happens within one or two hours after mixing, there is a chance that the fertilizer solution or combination of fertilizers could cause line or emitter plugging.

Whether you begin with liquid or dissolved water-soluble fertilizers, you need to be aware of fertilizer compatibility. So before you mix it up, give it a shake.



Fertilizer compatibility chart (B.C. Trickle Irrigation Manual, 1999)

	urea	Ammonium nitrate	Ammonium sulphate	Calcium nitrate	Potassium nitrate	Potassium chloride	Potassium sulphate
urea							
Ammonium nitrate							
Ammonium sulphate				XX			X
Calcium nitrate			XX				XX
Potassium, nitrate							
Potassium chloride							X
Potassium sulphate			X	XX		X	
Ammonium phosphate				XX			
Fe, Zn, Cu, Mn sulphate				XX			X
Fe, Zn, Cu, Mn chelate				X			
Magnesium sulphate				XX			X
Phosphoric acid				XX			
Sulphuric acid				XX			X
Nitric acid							

Fully compatible - y
 Reduced solubility - X
 Incompatible - XX

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	Ammonium phosphate	Fe, Zn, Cu, Mn sulphate	Fe, Zn, Cu, Mn chelate	Magnesium sulphate	Phosphoric acid	Sulphuric acid	Nitric acid
urea							
Ammonium nitrate							
Ammonium sulphate							
Calcium nitrate							
Potassium nitrate							
Potassium chloride							
Potassium sulphate							
Ammonium phosphate		XX	X	XX	X		XX
Iron, zinc, copper, manganese sulphate	XX						
Iron, zinc, copper, manganese chelate	X						
Magnesium sulphate	XX						
Phosphoric acid			X				
Sulphuric acid							
Nitric acid			XX				

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