Fertigation : An efficient irrigation method

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The traditional methods adopted by farmers in application of fertilizers have many disadvantages in terms of fertilizer wastage due to leaching, fixing, volatalization or "poor efficiency". In situation when the prices of fertilizers are ever increasing the adoption to precise and efficient method of fertilization has become imperative. With technological revolution and development of hi-tech in agriculture, in most of the advanced countries like Israel, USA, Finland, etc., the new concept FERTIGATION has become a standard practice of fertilizer application to numerous crops.

Fertigation is the injection of soluble nutrients into irrigation water to enhance the crop production. In combination with micro irrigation, this technique forms an efficient method for precisely applying nutrients close to the crop root zone especially when polyethylene mulch is used. Vegetables are grown throughout the world on a wide variety of soil types and in various climates. Where water is expensive or in short supply, drip irrigation is replacing surface and sprinkler irrigation. It is generally used in combination with polyethylene mulch on high value crops, including tomato, bell pepper, egg plant and cucurbits. Because soluble nutrients move with the wetting front, precise management of irrigation quantity and rate and timing of N and K applications are critical for efficient Tomato production. Drip irrigation can be scheduled to match the water evaporation from the crop or by use of tensiometers. It is essential to avoid excessive irrigation on coarse textured soils, to apply only 30 to 40% of the N and K required for the crop at planting with the remaining 60 to 70 % applied by fertigation. For many vegetables, fertigation of N and K can be applied bi-weekly, weekly or daily. Drip fertigation systems are generally coastly and require more management than seepage or sprinkler irrigation systems. With drip irrigation, water use is reduced. Nutrient application is precise, diseases are reduced because the foliage remains dry and yields of some crops are increased. With fertigation, nutrient use efficiency is increased and the risk of loss of nutrients to the ground water is reduced.

The fertilizers used for fertigation should have the characteristics like:

– Avoid clogging of the emitter and thus be safe for field use.

– Chemicals must be completely soluble in water.

– If more than one chemical is used, they must be compatible and not react adversely with salts contained.

– Coating must be separable at the time of fertigation and must not get leached easily from soil.

– Shouldn't change the pH of water resulting in precipitation and shouldn't decrease the crop yield.

Fertigation has certain advantages like:

– Higher water and fertilizer use efficiency and Saving in quantity of fertilizers applied to an extent of 20-50 per cent.

– Water consumption is only 30 per cent of flood irrigation method and yield increases by 40-60 per cent.

– Saving in labour, energy in the application of fertilizers and reduces the cost of production.

– Fertigation ensures the fertilizer will be carried directly to the root zone. Amounts and timing of fertilizer application can be precise.

– Moving fertilizer into the root zone can be a problem in low rainfall areas. Fertigation with drip over comes this difficulty.

– Studies by scientists have shown that, compared to broadcast applications, dramatically less fertilizer needs to be used to achieve similar growth and yield due to direct application to root zones when using fertigation.

– When using fertigation combined with scheduling of irrigation there may be savings of up to 50 per cent of the amount of water is used, compared to a fixed irrigation schedule. Dependent on soil type, leaching of nutrients into the ground water can be reduced.

– Minimizes the pesticide spray and fertigated plants get resistance to insect and diseases.

Sources of water soluble fertilizers

Sr. No.	Name of fertilizer	Chemical composition	% NPK content
1.	Ammonium nitrate	NH_4NO_3	35-0-0
2.	Mono ammonium phosphate	$NH_4H_2PO_4$	12-61-0
3.	Potassium nitrate	KNO_3	13-0-45
4.	Monopotassium phosphate	KH_2PO_4	0-52-34
5.	Potassium sulphate	K_2SO_4	0-0-50
6.	Calcium nitrate	$Ca(NO_3)_2$	15-0-20
	Micronutrients		
7.	Chelated iron	Fe EDTA	12
8.	Chelated iron	Fe EDDHA	6
9.	Magnessium nitrate	$Mg(NO_3)_2\ 6H_2O$	N-11, Mg-16
10.	Zinc sulphate	$ZnSO_4.7H_2O$	23
11.	Copper sulphate	$CuSO_4.7H_2O$	25
12.	Borax	$Na_2B_4O_710H_2O$	10

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