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**Domain: Smart Agriculture**

**Course: Growing of Hydroponics Spinach**

**Project topic: Nutrient preparation**





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## **PREPARATION OF NUTRIENT STOCK SOLUTION:**

Plant requires total 17 essential elements for its healthy growth; these 17 essential nutrients are divided into macro nutrients and micro nutrients.

## **STEPS OF PREPARING STOCK SOLUTIONS:**

- Measure the required amount of chemical on the weighing balance.
- Place the measured chemical into the 250 ml volumetric flask.
- 100 ml of distilled water is added and crystals were dissolved by manual shaking.
- Again 100ml of distilled water is added to ensure all the crystals were dissolved.
- Then finally 250 ml stock was prepared.
- Preserve in the glass jar by proper labeling.



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## Fertigation recipes for hydroponically grown spinach

Nutrient	Concentration in nutrient solution (ppm)
Nitrogen (N)	145 - 165
Phosphorus (P)	23 - 35
Potassium (K)	230 - 250
Calcium (Ca)	95 - 110
Magnesium (Mg)	20 - 30
Sulphur (S)	30 - 45
Iron (Fe)	1.5 - 2.5
Manganese (Mn)	0.2 - 0.5
Boron (B)	0.5 - 0.8
Zinc (Zn)	0.1 - 0.2
Copper (Cu)	0.05
Molybdenum (Mo)	0.05



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## pH and EC of nutrient solution

- A pH of **5.8** is considered optimum for the described spinach growing system, however a range of **5.6- 6.0** is acceptable.
- Nutrient deficiencies may occur at ranges above or below the acceptable range.
- Higher EC will prevent nutrient absorption due to osmotic pressure and lower level severely affect plant health and yield.
- Appropriate management of EC in hydroponics technique can give effective tool for improving vegetable yield and quality
- EC(dSm<sup>-1</sup>) between **1.8 to 2.3** is advised for spinach.
- During colder periods the EC can be slightly higher but during high temperatures it is important not to let the EC go above **2.0**



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**Thank you...**