

Measurement of Mineral Nutrient Requirement, Growth and Oil Content of Fennel (*Foeniculum vulgare*) by using DRIS System

M.A. Al-Mosuly

Department of Soil and Water Sciences. College of Agriculture and Forestry, Mosul University, IRAQ (mothafer_mosuly@yahoo.com)

INTRODUCTION

Fennel (*Foeniculum vulgare* P. Mill, variety 'Dulcet', Apiaceae) is an important crop of considerable medicinal value due to being carminative and stomachic. Fennel fruits are used for the preparation of pickles and as a digestive adjuvant for chewing after meals. The essential oil of fennel is used to flavor different food preparations and for perfumes (Khan et al. 1992).

The Diagnosis and Recommendation Integrated System (DRIS), which uses nutrient indices as indicators of nutrient deficiency, can be used to evaluate the status of macro- and micronutrients in plants. Preliminary norms for foliar tissue can be determined with the Diagnosis and Recommendation Integrated System (DRIS) (Hundel and Arora 2001). This study was conducted to evaluate growth, yield and oil content of fennel, and to generate better norms for Zn, N, P, and K to obtain better yields in quality and quantity.

METHODS

The field soil used in Mosul city, IRAQ was a silty loam in texture with a pH of 7.4 and an organic matter content of 18 gm kg⁻¹. The available N, P, K and Zn concentrations were 38.4, 12.3, 240, 4.1 mg kg⁻¹, respectively. Four levels of Zn (0, 2.5, 5, 10 ppm) were applied as ZnSO₄ and three levels of NPK (0-0-0, 60-30-20, 120-60-40 in kg ha⁻¹) as urea superphosphate and potassium sulfate. The seeds were sown in beds in November of 2005. The experimental bed was 2x1 m². The distance between rows and plants was 25 cm (Abad El-Kader 1992). Plants were sampled at the age of 90 and 120 days and analyzed for Zn, N, P, and K. The Diagnosis and Recommendation Integrated System (DRIS) was applied.

RESULTS AND DISCUSSION

The NPK treatment of 120-30-20 kg ha⁻¹, respectively, with 5 ppm Zn gave the highest fresh weight, dry weight, number of flowers umbel/plant, and seeds yield (4420 kg ha⁻¹). The highest quantity of oil (55.44 L ha⁻¹) was obtained with the NPK treatment of 120-30-40 kg ha⁻¹, respectively, with 5 ppm Zn.

The application of DRIS was effective after 90 or 120 days of plantation, particularly in diagnosing the constituency of nutrient material and in determining the elements that affect the production.

The application of this method allowed to a certain degree to determine a shortage or surplus of elements according to their priority and to establish an index for each element. It made it possible to supply suitable standard values (norms) and to draw a specific chart for the results of this study. The norms for this study with fennel were : N / Zn = 200 , P / Zn = 25 , K / Zn = 100 and N / P = 6.82 , N / K = 1.32 , K / P= 5.16 (Fig. 1).

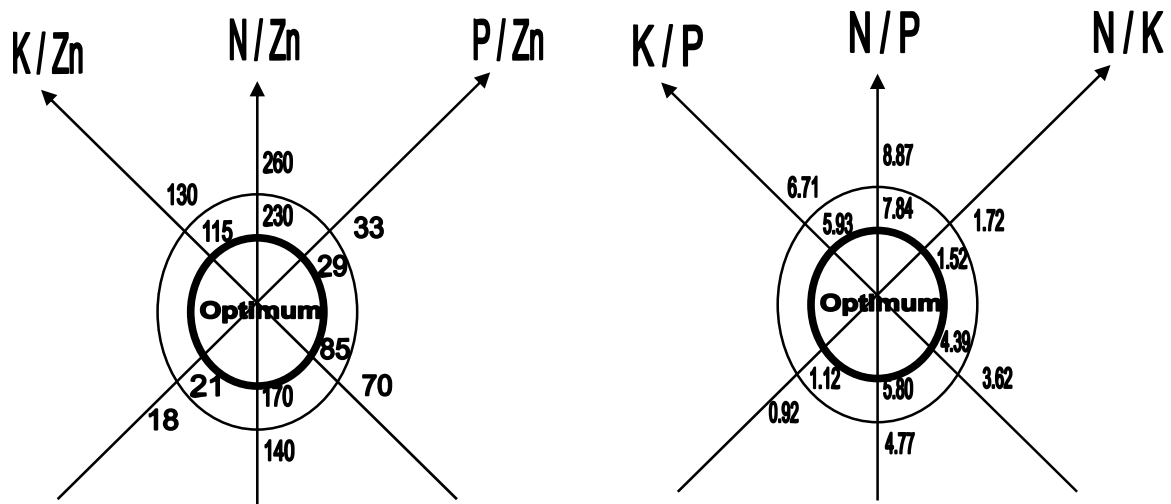


Fig. 1. DRIS chart for obtaining the qualitative order of requirements for N, P, K and Zn in fennel. The mean of significant expressions (value at origin in chart) - optimum are : N / Zn = 200 , P / Zn = 25 , K / Zn = 100 and N / P = 6.82 , N / K = 1.32 , K / P = 5.16.

CONCLUSIONS

With statistical equations, it is possible to a specific degree to determine the quantity of fertilizer needed when a shortage is found in an element index.

REFERENCES

- Abad El-Kader, M.M.E. (1992) Physiological studies on Fennel plants. M. Sc. Thesis. Fac. of Agric. Zagazig University.
- Hundel, H.S. and Arora, C.L. (2001) DRIS approach for diagnosing the nutrient status of fruit trees. J. of the Indian Soc. of Soil Sci.50: 703-709.
- Khan, M.M.A., Samiullah, S.H. and Afridi, M.M. (1992) Yield and quality of Fennel in relation to basal and foliar application of nitrogen and phosphorus. J. of Plant Nutrition. 21: 2505-2515.