Effects of Chemical and Organic Fertilizers on Some of Growth and Quality Indices of Tobacco (*Nicotiana tabacum* L.)

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Abstract

Background and Objectives

The yield and quality of tobaco plants depends upon several factors, such as nutritions and good cultivation practice which plays a significant role in leave pruduction and the qualitative characteristics such as nicotin content. The main purpose of fertilization is to consider quantity and quality in tobacco production. The objective of this study was to evaluate the effect of chemical and organic fertilizers on some of growth and quality indices of tobacco in field conditions.

Material and Methods

In order to study the effects of organic and chemical fertilizers on physiological, growth indices and quality of tobacco (Burley Cv.) an experiment was counducted at Shahrekord University in 2013 as a randomized complete block design with three replications.Treatments included compost based on the tobacco demand, vermicompost based on the tobacco demands, chemical fertilizer based on the tobacco demands, 50 percent compost + 50 percent chemical fertilizer, 50 percent vermicompost + 50 percent chemical fertilizer and control. Sowing in nursery was done in March 2013 and transplanted to field in May 2013. After plowing and disking and leveling by rotary, tobacco seedling was transplanted in the main field. In the current study the space between rows was 80 cm and between plants on rows was 50 cm. The area of every plot was 5×4 m^2. Traits of leaf area index (LAI), net assimilation rate (NAR), crop growth rate (CGR), cutters dry weight, nicotine content and ash leaves were evaluated. The data were analyzed by using version 9.1 SAS. Least Significant Difference test was used to compare the means at 1% of significance. Also, the figures were drawn by Excel 2010 software.

Results

The results indicated that the organic and chemical fertilizers increased leaf area index (LAI), net assimilation rate (NAR), crop growth rate (CGR) and cutters dry weight. Among the treatments, chemical fertilizer had higher values of LAI, CGR and NAR. Maximum cutters dry weight (2833 kg ha^{-1}) were obtained from chemical fertilizer (three fold increased compared to control treatment). After chemical fertilizer treatment, maximum values of LAI, CGR, NAR and cutters dry weight were obtained from the compost treatment. Vermicompost treatment had the highest nicotine content and the lowest ash leaves. The results of this study indicated chemical fertilizer and then compost treatments had the greatest effect on growth parameters and cutters dry weight, however, the qualitative characteristics of plants treated with vermicompost were better than other treatments.

Discussions

The difference in the growth indices and cutters dry weight between organic and chemical fertilizer treatments could be due to differences in the amount of mineral nitrogen available for plant. This increase in the chemical fertilizer treatments can be due to the positive effect of nitrogen on the dry matter changes and increasing the plant's leaf area. Thus, for better quality, vermicompost and for more dry matter production, chemical fertilizer or compost are recommended.

Keywords: Chemical fertilizer, Compost, Cutters, Vermicompost.