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The effect of fertilizing treatments on yield, yield components and seed quality parameteres in *French psyllium*

Majid Firoozabadi[1], Amin Baghizadeh[2]*

[1]Department of Horticulture, Islamic Azad University, Jiroft Branch, Jiroft, (IRAN)

[2]Department of Biotechnology, Institute of Science, High Technology & Environmental Sciences, Graduate University of Advanced Technology, Kerman, (IRAN)

E-mail: Amin_4156@yahoo.com

ABSTRACT

To study the effects of different fertilizing treatments on yield, yield component, seed quality characteristics French psyllium, a field experiment was conducted at Experiment Farm of College of Agronomy, Vali-E-Asr University of Rafsanjan.To study the effects of different fertilizing treatments on yield, yield components and seed quality parameters in *French psyllium*, a experimental field was conducted at Experiment Farm of Vali-E-Asr University of Rafsanjan.The experimental design was a randomized complete block design (RCBD) with four replications. In this research four fertilizing treatments including control (without fertilizer), chemical fertilizer, combined use of chemical fertilizer and Barvar Phosphate Biofertilizer, cattle manure and combined use of chemical fertilizer and cattle manure, were used. The experimental design was a randomized complete block design with four replications. In this research 13 fertilizing treatments including control (without fertilizer), different concentrations of kind of chemical fertilizer, combined use of chemical fertilizer and Barvar Phosphate Biofertilizer, cattle manure and combined use of chemical fertilizer and cattle manure, were used.The results showed that fertilizing treatments had significant effect on all measured traits. The results showed that fertilizing treatments had significant effect on all measured traits. The highest seed yield and yield components and mucilage yields were obtained in combined use of chemical fertilizer and cattle manure treatment.Mucilage percentage and seed swelling factor were significantly higher in cattle manure treatment. Mucilage percentage and seed swelling factor were significantly higher in cattle manure treatment. It is also concluded that combined use of chemical fertilizer and cattle manure had significantly higher 1000 seed weight, spike per plant, seed per plant and dry matter compare to other treatments.

KEYWORDS

French psyllium;
Fertilizing treatments;
Yield;
Seed quality characteristics.

INTRODUCTION

Organic planting of medicinal plants can warrant their quality, so many producing medicinal plant drug companies, prefer medicinal plant compounds produced by organic or biodynamic method. On the basis of performed researches complicating chemical fertilizers with organic and biologic supplies has had good results in increasing the agricultural products which may lead a way to organic planting and permanent agriculture at least. Plantation fertilizer management is a main factor in successful medicinal plant cultivation, and using animal manure has great effect in organic system and permanent soil management[2]. More over using animal manure and biotic manure would lead in chemical fertilizer consumption and will contribute to biotic circumstance protection and soil fertility[1,13,4] *French psyllium* is a valuable medicinal plant which has developed in desert district of Iran. So as the physiomorphological interactivity of this medicinal plant with the special biotic condition of this district had made a biochemical compatibility like appearance of special compounds such as mucilage.

MATERIAL AND METHODS

This research is done a land with the area of 800 m^2. To preparing the land, a deep plough were done on march2007, and plough repeated some days later and used tow perpendicular disks for better sloughing and then grinding the land with leveler device,make cultivation lines with 25 centimeter distance from each other. The special treatments, performed for each patch. In this experiment only the animal manure treatments was used before planting and the other treatments were done after plant greening, the seeds planted in depth of 1 cm. The seeds were irrigated after planting immediately. The length of patches were 4 meter and width were 2 meters. Tests were done in randomized complete block design with 4 repeats. In this research 13 fertilizing treatments including control (without fertilizer), different concentrations of kind of chemical fertilizer (N60P40,N90P60,N120P80) combined use of chemical fertilizer and Barvar Phosphate Biofertilizer (N60P40bio, N90P60bio,N120P80bio)cattle manure (org10,org20,org30) and combined use of chemical fertilizer and cattle manure (N60P40org25,N90P60org15,N120P80org5) were used. yield, yield components and some of seed quality parameters were measured including, number of spike, spike length, weight of 1000 seeds, total dry matter performance (yeild), harvest index, number of seed in bush,mucilage percentage and seed swelling factor. For determining the seed swelling in water,we place 1 gram of psyllium seed in a 25ml graded cylinder and increasing the volume of water to 20 ml and after 24 hours the difference of seed volume is registered and finally the swelling seed volume would be reported in milliliter[12]. The CEM method is applied for measuring seed mucilage percentage. In this method seed would be taken into Acid (HCL) in water with (PH=3.5) in the temperature of 28°c for 12 hours. The solution is filtered. remaining concentrated on heater to receive to 60 ml. 4 volume of ethanol 96% is added and allow the mucilage to deposit during the night. The concentrated material would be discrete with a centrifuge (2000 RPM,15 min)[6]. Statistical analysis were done used SPSS and SAS softwares, Firstly simple variance analysis for character were done and then mean value of characters were compared in Duncan multiple range test.

RESULTS AND DISCUSSION

Spike length

The result of variance analysis showed that length

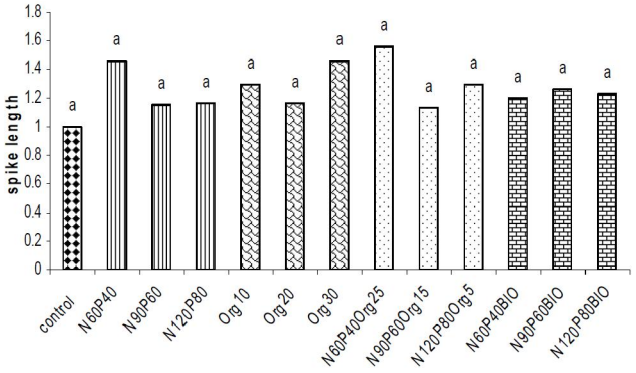

Figure 1 : Effect of different soil fertility treatments on the spike length

of spike were not affected by soil fertilizing treatment. The comparison of mean values showed that some soil fertilizing treatments had longer spike with control but

by increasing the level of manure,we didn't have any increasing in length of spike (figure 1).

Number of spikes in bush

The results showed that the number of spike in bush is affected significantly p<0.01 by soil fertilizing treatments. fertilizing treatments had more spike in bush significantly in comparison with the control and by increasing chemical manure the number of spike would increased. In organic fertilizing treatment by increasing the level of animal manure, the number of spikes in bush increased (figure 2).

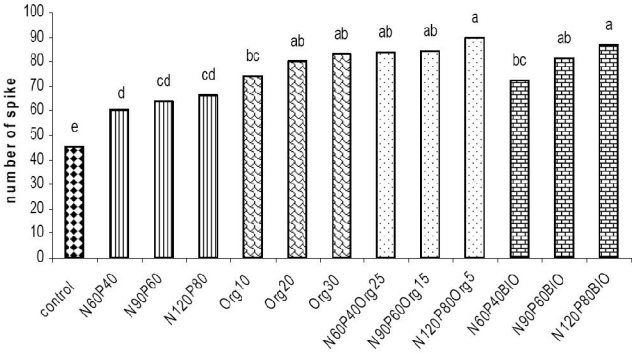

Figure 2 : Effect of different soil fertility treatments on the number of spike

Weight of 1000 seeds

The result showed that the weight of 1000 seeds was affected significantly (p<0.01) by soil fertilizing treatment. The comparison of mean values showed that all of soil fertilizing treatments had more weight of 1000 seeds than the control. by increasing manure level the weight of 1000 seeds increased. The highest weight of 1000 seeds belonged to 30 tones of animal manure per hectare which had the weight of 1.63 grams. yaw and et al. (2002) reported that applying nitrogen with animal manure would increase the number of spike in bush,length of spike and weight of 1000 seeds. This is because of used useful effect of animal manure in better photosynthesis.(figure 3)

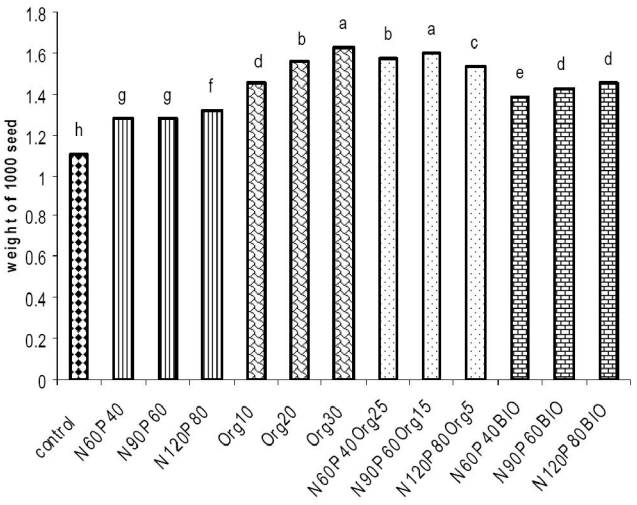

Figure 3 : Effect of different soil fertility treatments on the weight of 1000 seeds

Total dry matter performance (yeild)

Test results showed that total dry matter performance significantly ($P \leq 0.01$) affected by various Treatments which was fertilizing soil. Soil fertilizing treatment increased significantly ($P \leq 0.01$) dry matter performance were compared with control. Results showed that comparing average values of chemical fertilizers increased total dry matter performance. Fertilizing Ramash and et al, has showed that, most of function seed happened by using nitrogen consumption 75 kg per hectare. Test results also showed that by increasing the level of bio fertilizer manure, the total dry matter performance increased. Many scientists, including Panel et al,[10], Sink and et al,[13] studied effect of fertilizing nitrogen and phosphorus fertilizer and bio fertilizer on the *French psyllium*, all more or less concluded that the application of fertilizers, especially the bio fertilizer manure can increased total dry matter performance and Mucilage. (figure 4)

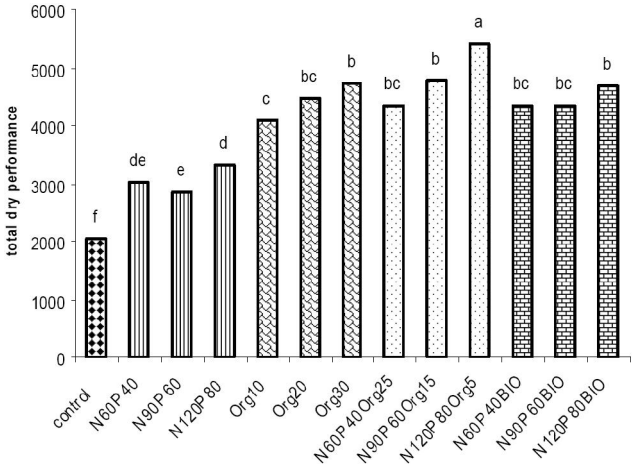

Figure 4 : Effect of different soil fertility treatments on the total dry matter performance (yeild)

Seed swelling factor

Generally swelling factor of *french psyllium* depended on the quality of seeds and seed Mucilage percent. Any Mucilage percent swelling factor, also en-

joyed higher quality. Test results showed that the effect of different Treatments on the seed swelling factor percent was significant. soil fertilizing Treatments increased significantly in the seeds swelling factor were compared with control. The results showed when treatment compared with the average increased in the levels of seed swelling factor of Fertilizing Treatments by reduction process, but this reduction does not seem significant. (figure 5).

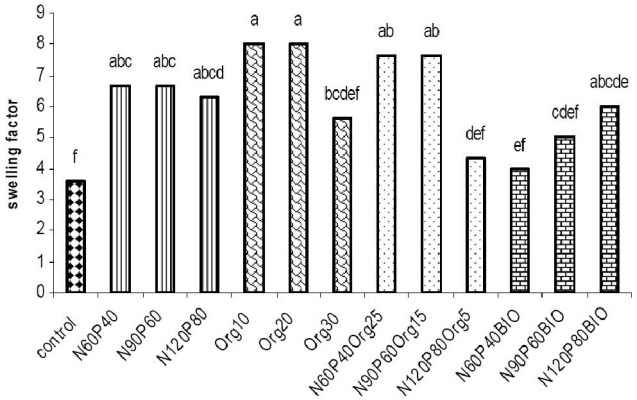

Figure 5 : Effect of different soil fertility treatments on the swelling factor

Number of seed in bush

The results showed number of seed significantly affected by different soil fertilizing Treatments. Comparison of results showed that soil fertilizing Treatments, increased the number of seeds significantly when compared by control[13] submitted in the application of Integrated bio fertilizer manure with nitrogen fertilizer, the number of spike plant, seed number and spike length and 1000 seed weight significantly increased (figure 6).

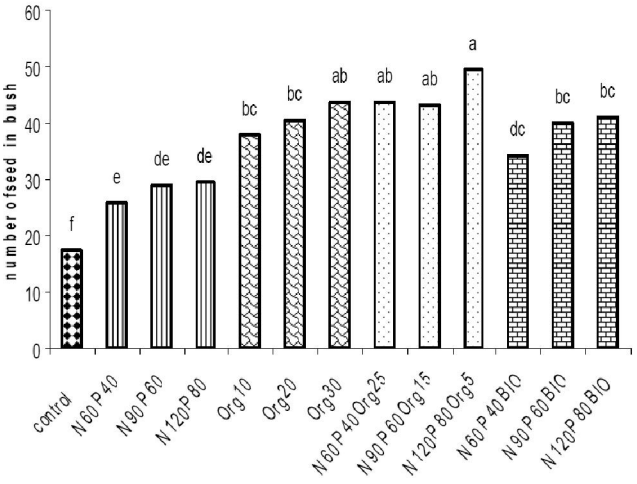

Figure 6 : Effect of different soil fertility treatments on the number of seeds in bush

Mucilage percent

Test results showed that the percentage of Mucilage Treatments significantly affected by different soil was fertile. Comparison of the results showed that all mean Treatments fertile soil, increased Mucilage percent compared with the controls. Treatments fertility with increasing amounts of chemical fertilizers, gradually increase the percentage oif Mucilage process. The research by Ramah and et al (1987) was conducted, the maximum performance level Mucilage consumption of 75 kg nitrogen per hectare. Comparing the results also mean that the fertile organic Treatments, decreased in percent level Mucilage when bio fertilizer manure increased. (figure 7)

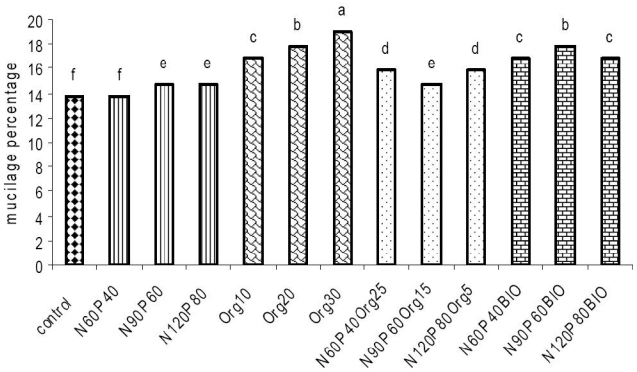

Figure 7 : Effect of different soil fertility treatments on the mucilage percentage

Harvest index (%HI)

The results of variance analysis have shown that different soil fertilizing treatments had no significantly effect on harvesting Index, more over the results of comparison of mean values showed that there is no high significant difference between different soil fertilizing treatment with the control treatments (figure 8).

The results showed that combined fertility treatment of organic manure with chemical manure have the most affect on the yield, seed dry matter performance, weight of 1000 seeds, number of seeds in the bush and number of spikes. More ever the organic fertility treatments had a better result of mucilage percentage,seed swelling factor and higher mucilage performance in unit area in comparison with the other chemical treatments. With decreasing the quantity of chemical fertilizer and substituting with animal manure we can reach to higher performance and quality by improving physical and chemical characters of soil. In general view if we consider

pollution of existence circumstance resulting from countless usage of chemical manure we would conclude that the organic manure can have a positive role for producing intact and permanent products in agriculture.

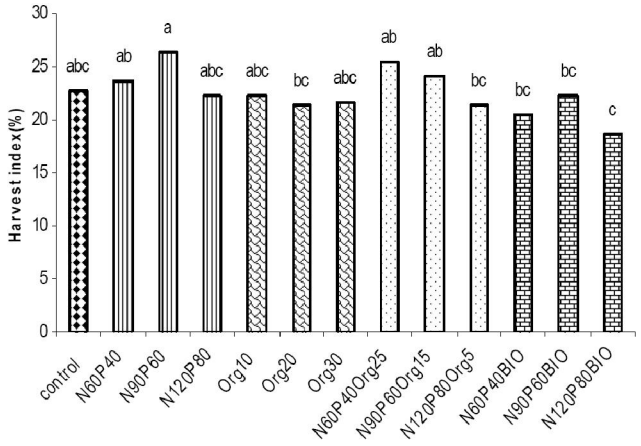

Figure 8 : Effect of different soil fertility treatments on the harvest index

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