



University of Zabol

Graduate School

Department of Agronomy

**Thesis Submitted in Partial Fulfillment of the Requirement  
for the degree of Master of Science (M. Sc) in Agroecology**

**Effects of different levels of phosphorus and humic acid on quantitative  
and qualitative yield of Sesbania (*Sesbania sesban*)**

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Winter 2021

## Abstract

To investigate the effect of different levels of phosphorus and humic acid on increasing the quantitative and qualitative yield of *Sesbania sesban*, this study was conducted in the cropping year of 2009-2010 as an experiment of split plots in a randomized complete block design with Three repetitions were performed in the Agricultural Research Institute of Zabol University (Baqiyatallah Al-Azam Research Institute). Experimental treatments included different levels of phosphorus in 4 control levels (no fertilization), 100, 150, and 200 kg/ha as the first factor and different levels of humic acid in 4 control levels (no foliar application), foliar application with concentration 2 In a thousand, 4 in a thousand and 6 in a thousand as the second factor. The results of the analysis of variance of the experimental data showed that the effect of phosphorus fertilizer and humic acid foliar application on dry forage yield was significant, but their interactions were not significant. Other results of the analysis of variance of yield and yield components of *Sesbania* were significant under the influence of phosphorus and humic acid fertilizer as well as their interactions. Comparison of the mean of simple effects showed that the highest dry forage yield was obtained from the application of 200 kg/ha of phosphorus fertilizer (15178.4 kg/ha) under foliar application of 6 per thousand humic acids (10626.6 kg/ha). Comparison of the mean of interactions showed that the highest plant height (254.67 cm), 100-seed weight (3.74 g), number of pods per square meter (249.33), and the highest grain yield (2121.3 kg) Hectare) In the treatment of the application of 200 kg/ha of phosphorus fertilizer under foliar application conditions of 6 per thousand humic acids was observed. Also, the highest number of seeds per pod (30.9) was obtained from the application of 200 kg/ha of phosphorus fertilizer under foliar application of 4 per thousand humic acids. Based on the results of the analysis of variance of the experimental data, the effect of phosphorus fertilizer and humic acid foliar application as well as their interactions on the quality traits of *Sesbania* forage were significant. But their interactions on insoluble fibers in neutral detergent (NDF) were not significant. The highest dry matter digestibility (72.3%) was obtained from the application of 200 kg/ha of phosphorus fertilizer under foliar application of 4 per thousand humic acids. Also, the highest water-soluble carbon hydrates (32.6%), crude protein content (13.57%), ash content (9.53%) in the application of 200 kg/ha of phosphorus fertilizer under foliar application 6 Was obtained in a thousand humic acids. Also, the most insoluble fibers in acidic detergent were observed in the control treatment (no fertilization) of phosphorus fertilizer and the control conditions (no foliar application) of humic acid (31.94%). Comparison of the mean of simple effects showed that the most insoluble fibers in neutral detergent were obtained in the control treatment (no fertilization) of phosphorus fertilizer (50.91%) in the control conditions (no foliar application) of humic acid (38.66%). The results of the analysis of variance of the experimental data showed that the effect of phosphorus fertilizer and humic acid foliar application, as well as their interactions on chlorophyll a, b, total and carotenoid content, were significant. Comparison of the mean of interactions showed that the highest amount of chlorophyll a, b, total, carotenoids (1.134, 0.432, 1.566, 0.646 mg / g fresh leaf weight, respectively) from the application of 200 kg in Hectares of phosphorus fertilizer were obtained under foliar application of 6 per thousand humic acids. The results of the analysis of variance of the experimental data showed that none of the effects of phosphorus fertilizer and humic acid foliar application as well as their interactions on the concentration of nitrogen, calcium, and magnesium in the forage were not significant. But the interactions of phosphorus fertilizer and humic acid foliar application on forage phosphorus and potassium concentrations were significant. Comparison of the mean of simple effects showed that the highest concentration of nitrogen from the application of 200 kg/ha of phosphorus fertilizer (1.461%) under foliar application of 6 per thousand humic acids (1.458%), the highest concentration of calcium from the application of 150 kg Per hectare of phosphorus fertilizer (4.12%) in foliar application conditions of 6 per thousand humic acids (4.13%), the highest concentration of magnesium from the application of 200 kg/ha of phosphorus fertilizer (2.87%) in foliar application conditions 4 per thousand humic acids (2.83%) was obtained. Also, comparing

the mean of interactions showed that the highest concentration of phosphorus in the application of 200 kg/ha of phosphorus fertilizer in the conditions of foliar application of 4 per thousand humic acids (0.760%) and the highest concentration of potassium in the application of 200 kg/ha of phosphorus in Foliar application conditions of 6 per thousand humic acids (0.529%) was obtained.

**Keywords:** Number of pods, Crude protein, Minerals, Humus