Abstract

In order to study the effects of chemical and biological fertilizer on the agronomic and physiological characteristics in intercropping of Carla (Momordica Charantia) with foxtail millet (Setaraia italica), an experiment has been conducted as split plot in a randomized complete block design with three replications at the Research Farm of Agriculture Center of Zabol University in Zahak during the growing season of 2015-2016. The factors studied in this study include different levels of cultivation in three levels of sole carla (I1), sole millet (I2), 50% carla+ 50% millet (I3) as the main plot; and different levels of fertilization at three levels included biomic (F1), mixed bio-fertilizer (biomic)+ chemical fertilizer (super phosphate) (F2) and non-use of fertilizer (control) (F3) as a sub plot. Means Comparison of interactions showed that the highest dry weight of the plant was obtained from 50% carla+ 50% millet and mixed f bio-fertilizer (biomic)+ chemical fertilizer (super phosphate). The highest grain yield was obtained from sole millet cropping under non-use of fertilizer (control); the highest concentrations of chlorophyll a and b and carotenoids were obtained from 50% carla+ 50% millet and non-use of fertilizer (control); the highest carbohydrate content from sole millet+ non-use of fertilizer (control); and the highest amount of potassium was obtained from 50% carla+ 50% millet with biomic fertilizer treatments. The results of the experimental data showed that the highest number of branches was obtained from sole carla planting system under application of biomic fertilizer; the highest fruit yields, chlorophyll a and b concentrations, carotenoids and carbohydrate concentrations from sole carla culture treatments and mixed bio-fertilizer (biomic)+ chemical fertilizer (super phosphate); the highest percentage of protein was obtained from 50% carla+ 50% millet and mixed fertilizer (biomic) + fertilizer (super phosphate); the highest amount of potassium was obtained from 50% carla+ 50% millet and mixed bio-fertilizer (biomic)+ chemical fertilizer (super phosphate). Means comparison of interactions showed that the highest concentration of polyphenol oxidase from sole carla and mixed bio-fertilizer (biomic)+ chemical fertilizer (super phosphate); the highest concentration of catalase was obtained from 50% carla+ 50% millet and mixed bio-fertilizer (biomic)+ chemical fertilizer (super phosphate); the highest concentration of guaiacolytic peroxidase was obtained from 50% carla+ 50% millet and biomic fertilizer treatments; the highest concentration of ascorbate peroxidase was obtained from 50% carla+ 50% millet and non-use of fertilizer (control) treatments. The land equivalent ratio in intercropping systems was higher than unit, which indicates the benefits of mixed crops compared to sole crops. the highest land equivalent ratio (1.48) was obtained from biomic fertilizer (Biomic) application in intercropping systems of 50% Carla + 50% Millet.

Key words: Land equivalent ratio, Carla, Intercropping, Biofertilizer, Medicinal plant

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Effects of chemical and biological fertilizer on agronomical and physological traits in Karela intercropping (*Setaraia italica*) and faxtail Millet (*Momordica charantia*)

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