Indian Journal of Tropical Biodiversity

COMPARATIVE STUDY ON THE EFFECT OF FERTILIZERS ON AGRONOMIC AND BIOCHEMICAL CHARACTERS IN *AMARANTHUS* SP.

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ABSTRACT: The genus *Amaranthus*, belonging to the family Amaranthaceae, is a widely cultivated taxonomic group of about 70 species. The current study is aimed at understanding the incidence of organic and inorganic fertilizers on the various growth parameters of the plant, soil used for planting and plant biochemical composition in two commonly available cultivated species of *Amaranthus* in Kerala- *A. caudatus* and *A. tricolor*. Both the species were grown separately in block design and were treated with organic and inorganic fertilizers. Growth parameters were recorded till the attainment of reproductive maturity. The plants were harvested on the completion of their vegetative phase. The samples treated with organic fertilizers, inorganic fertilizers and control were then subjected to biochemical analysis. Soil used for cultivation was sampled and tested for nutrient status before planting and after harvest. Plants treated with inorganic fertilizers produced the maximum response in growth parameters. The variations in stem height and number of leaves were seen to be statistically significant, based on the chi-square test values. The contents of dietary constituents viz. carbohydrates, reducing sugars, starch, proteins, amino acid, and vitamin C and the phytochemical constituents viz. phenolics, flavonoids and tannins were more in plants treated with organic fertilizers. Analysis on soil pH, total soil carbon, total soil phosphorus and total soil nitrogen prior to and after treatment showed variations. The soil was found to have retained the fertility after treatment. The experimental results have showed that organic fertilizers produced higher nutritional values and soil nutrient retention during the cultivation of *A. caudatus* and *A. tricolor* when compared with inorganic fertilizer. Inorganic fertilizers exhibited superior characters in market-friendly characters (Growth parameters) only. The results of this study therefore, encourage the use of organic fertilizer in the cultivation of *Amaranthus* spp. for better nutritional quality.

Keywords: *Amaranthus caudatus, Amaranthus tricolor*, *organic fertilizer, NPK, nutritional properties, biochemical constituents, agronomy.*

Citation: Arya S, Rajesh Kumar T, SanthoshKumar R (2017) Comparative study on the effect of fertilizers on agronomic and biochemical characters in *Amaranthus* sp. Indian J Trop Biodiv 25(1) : 93-97

Received on : 31 Mar 2017
Accepted on : 08 May 2017
Published on : 30 Jun. 2017

Throughout history, Amaranth (*Amaranthus sp*.) has been highly priced as a consumable. They are extensively cultivated as a green, leafy vegetable and grain crop in many temperate and tropical regions (Achigan-Dako et al., 2014). Among the weedy and cultivated forms of amaranths, about 40 are native to Americas and the rest to Australia, Africa, Asia and Europe (Costea et al., 2001). Amaranths are advantageous also because it can be cultivated at a low cost. Since it is one of the cheapest sources of dark leafy vegetables, amaranths are often called as the poor man's vegetable (Varalakshmi, 2004). The widespread use of amaranth as food and feed and their utility in producing products of economic importance has led to their increasing prospects as an important agricultural crop. The high demand for *Amaranthus* varieties as foods can also be correlated to their high nutritional values. Extensive studies have been carried out regarding the nutritional aspects of amaranths by various researchers around the globe (Abayomi et al., 2014).

A fertilizer is an organic or inorganic material of natural or synthetic origin applied to the soil or plant to supply elements essential to plant growth and development (Acquaah, 2004). Fertilizer sources may be organic or inorganic. Organic fertilizers are derived from plant and animal residues (e.g. Bone meal, blood meal, farmyard manure) whereas inorganic fertilizers are of synthetic origin (e.g. urea formaldehyde, magnesium ammonium phosphate) (Acquaah, 2004). Organic fertilizers have been used for many centuries whereas chemically synthesized inorganic fertilizers were only widely developed during the industrial revolution (Mofunanya et al., 2015). Chemical fertilizers are advantageous in that they are easy to use, quickly absorbed and utilized by crops. Also, the chemical fertilizers contain just a few minerals which dissolve quickly in damp soil and give the plants large doses of minerals (Masarirambi et al., 2010). With extensive use, inorganic fertilizers, hence has significantly supported