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Root Yield and Nutritional Quality of Carrot Cultivars from Myanmar and Germany as Affected by Different Nitrogen Levels of Organic and Mineral Fertilisers

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Abstract

Use of chemical fertilisers is a critical factor limiting carrot production by poor farmers in Myanmar due to their high prices and generally farmers use their own landraces by the application of organic manures. However, the knowledge of the local landraces as well as their responses to the different organic manures, e.g. certain yield and quality, is of great importance. The pot experiment was conducted at the section Quality of Plant Products of the Georg-August University Goettingen, to investigate the root yield and nutritional quality parameters of chosen carrot (*Daucus carota* L.) cultivars exposed to the different nitrogen levels of mineral and organic fertilisers. In the split-split-plot experimental design with three replicates, three kinds of fertiliser (mineral fertiliser, farmyard manure (FYM), and compost) were allocated to the main-plots, and the nitrogen levels (N1 = 60, N_2 = 120, and N3 = 180 kg ha^{-1}) to the sub-plots. Cultivars from Myanmar (Mogyo, Pawedaung, and Srup) and Germany (Fly Away and Purple Haze) were set as sub-sub-plot factors. Percentage of premature flowering as well as root yield was significantly influenced by genotype along with the kind of fertiliser. Carrot cultivars from Myanmar were bolted up to 56 %, while none of German cultivars were bolted. German cultivars were more susceptible to the kind of fertiliser and achieved higher yield by mineral fertilisation. The highest total carotenoids contents were observed in cultivars from Myanmar at N_2 and N3 levels applied in form of FYM fertilisation. The highest total antioxidant capacity was found in cv. Purple Haze regardless the nitrogen levels and kind of fertiliser. Significantly highest amounts of nitrate contents were observed in cv. Srup supplied with mineral fertilisation. Pwedaung cultivar was most sensitive to the N levels, i.e, the higher the N rate, the higher the amount of nitrate content in all types of fertilisers. Generally, higher yields as well as better nutritional quality were found in German cultivars. However, the highest total carotenoids content as a very important parameter of human nutrition was observed in Myanmar cultivars by the application of FYM at N_2 and N3 levels. These results could be part of recommendation to the farmers in Myanmar.

Keywords: Carrots, mineral fertilisers, organic fertilisers, nitrogen levels, nutritional quality

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