

Exploitation of paper waste as a substitute growing medium component for the production of *Brassica* seedlings in nurseries

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Abstract

Significant quantities of paper waste (PW) are generated the last decades and the reuse/recycling of PW is required due to the environmental concerns. In the present study, PW was used for peat (P) replacement in growing media for *Brassica* seedling production. Cauliflower, broccoli and cabbage were seeded in growing media consisted of 0-10-30-50% PW. Addition of PW increased the substrate pH and mineral content but decreased the air-filled porosity. Seed emergence percentage decreased with high ratio of PW in cauliflower and broccoli, while the mean emergence time increased for cauliflower at $\geq 30\%$ PW. The addition of PW decreased plant height, leaf number and fresh weight in all three examined species and the effects were more pronounced at 50% PW. The PW $\geq 30\%$ decreased stomatal conductance while chlorophyll fluorescence and content of chlorophylls decreased with high PW ratio. The insertion of PW affected the mineral accumulation in plants with decreases in sodium and iron and increases in potassium and phosphorus content. The PW increased to some extent for cauliflower and cabbage or unchanged for broccoli antioxidant activity (DPPH, FRAP), while polyphenols did not vary in general. The addition of PW caused cellular damage by increasing the lipid peroxidation and the production of hydrogen peroxide, and as a consequence, affecting the antioxidant enzymes (catalase, superoxide dismutase) metabolism. The current study demonstrates low PW content can partially substitute peat for cauliflower, broccoli and cabbage seedling production.

Keywords: Shredded paper waste; peat; growth; *Brassica oleracea*; vegetables; germination; antioxidants

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