Allelopathic effects of spruce bark extractives on seed germination and development of Lycopersicon esculentum plantlets

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The allelophatic effects of spruce bark extract on seed germination and development of Lycopersicon esculentum plantlets were examined. Spruce bark, provided by a Romanian pulp and paper company, was air-dried and ground in a mill. The phenolic compounds were separated with NaOH 1.5%, for three hours at 90°C, at a liquor-to-wood ratio of 10, with a preliminary extraction of lipophilic compounds with ethyl ether. After treatment with ion-exchange resins and filtration, the neutralized extract was dried, obtaining a brown colored powder. The experimental work included seed germination in Petri dishes with various concentrations of bioactive compounds. The biotests used aqueous solution of polyphenolic extract in concentrations of 0.12, 0.16, 0.2, 0.24, 0.28, 0.32 and 0.36 mg/L. The influence of the extractives was expressed through germination percentage, elongations of roots and shoots. The effects of spruce bark on plantlets growth were evaluated in laboratory conditions using vegetations pots with sand. In the experiments a global extract was used at the concentrations of 0.04, 0.08, 0.16 and 0.32 g/L. The tomato plantlets were treated with different additions in bioactive compounds: initial treatment with aqueous solutions of spruce extract, then every 5 days with distilled water and repeated treatment with aqueous solutions of spruce extracts every 5 days. The influence of phenolic compounds on L. esculentum plantlets was expressed through the number of established plants, their height and leaf area. The natural phenolic compounds influenced the growth of L. esculentum plantlets depending on the concentrations used and the experimental design.