DEUTERIUM DEPLETED WATER (DDW) AND SPRUCE BARK POLYPHENOLS EXTRACT IMPLICATED IN Zea mays L. PLANT GROWTH AND DEVELOPMENT

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Polyphenolic compounds are the most important classes of secondary metabolites that play an important role in the biosynthesis process. Natural bioactive compounds have a broad spectrum in both plant as whole and on tissues and organs, interfering in the metabolic processes. Through, the characteristic biological activity, natural polyphenols are essential compounds in the stimulation of plants growth and development. The stimulation or inhibition capacities on the plant growth and development is closely correlated with concentrations of polyphenolic compounds applied. The aim of this study was to evaluate the effect of spruce bark aqueous extract and deuterium depleted water (DDW) as biofertilizers on the plant growth Zea mays L.

EXPERIMENTAL

Materials
Deuterium depleted water or light water is a distilled water microbiologically pure, with an isotopic concentration of 25 ppm, obtained by isotopic distillation, in vacuum, of natural water with an isotopic concentration of 145 ppm D / (D + H) I was purchased from INCDTC Râmbaci Vilcea, Romania. To obtain an aqueous polyphenolic extract the spruce bark of industrial origin was used as raw material. The polyphenolic aqueous extract was characterized in terms of polyphenols total content. Thus, for 1 g vegetal material in 100 ml distilled water was recorded 130 mg / L total content in polyphenols.

Methods
1. Extraction. Ground spruce bark was subjected to extraction using procedure properly on aqueous extraction.
2. Pot experiment were carried out going through a standard procedure, using a number of 5 pots for each solution studied (distilled water - control, DDW, extract of spruce, and spruce bark extract in combination with deuterium depleted water / DDW).
3. Quantification of assimilating pigments. 0.65 g fresh vegetal material was extracted in 80% acetone by grinding with a spatula tip of quartz sand. Chlorophyll extract was analyzed spectrophotometrically by reading absorbance at various specific wavelengths: 436, 646, 663 nm. In order to determine the concentration of chlorophyll pigments (chlorophyll a and b) and carotenoids pigments were used formula proposed by Lichtenthaler and Wellburn (1988).
4. Determination of photosynthetic, transpiration, respiration and subtomatal CO2 content was performed using Li Photosynthesis System.

CONCLUSIONS

The obtained data shown that the deuterium depleted water, stimulates germination energy and capacity, (Fig. 1) radicle and stem elongation (Fig. 2), vegetal biomass accumulation (Fig. 3), photosynthetic pigment synthesis (Fig. 4) and all physiologic indices repressed in Table 5.

Spruce bark aqueous extract, stimulates germination energy and capacity of maize seeds (Fig. 1), stimulates accumulation of biomass in maize seedlings (Fig. 2), elongation for all vegetative organs (Fig. 3), photosynthetic pigments synthesis for maize seedlings (Fig. 4) and all physiologic indices as is indicated in figure 5.

Spruce bark aqueous extract in combination with deuterium depleted water stimulates the elongation of all vegetative organs (Fig. 3) and accumulation of biomass (Fig. 2). It was observed stimulatory effects on germination energy and capacity (Fig. 1), photosynthetic pigments synthesis, respiration, transpiration and photosynthetic rate (Fig. 5).

REFERENCES

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