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Introduction

Plant calli cultures are ideal system to detect influence of different biologically active substances on cell growing and development (close system, where all growing conditions are under control). They were used to find out influence of different substances: phytohormones, antioxidants, extracts from plants, amino acids, AgNO₃ and others. Calli cultures could be very useful to test biological activities of humus substances, known, in general, as material, which accelerate plant growth and increase resistance to biotic and a biotic stresses.

Aim of the research

To identify influence of humus substances of *Humate Green Ok* prepare elaborated by the *Latvian Institute of the Humic Substances* on flax somatic calli cultures.

Materials and methods

Initial cultures were established from flax seeds.

Two-stage sterilisation was implemented:

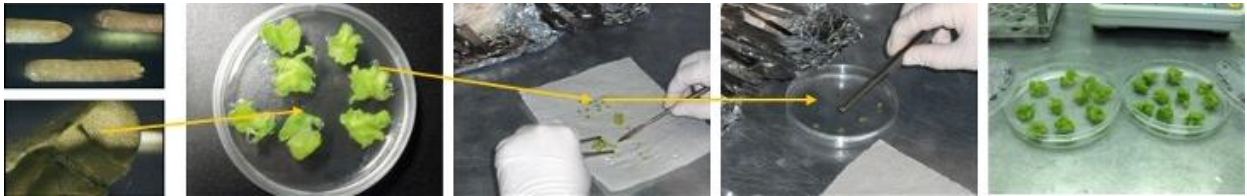
- 1) pre-treatment with KMnO₄ solution in water (concentrations and continuance depends from seeds size);
- 2) final sterilisation in 50% of bleach solution for 20 minutes.

Sterilised seeds were germinated on the MS basal medium supplemented by 10 mg/l AgNO₃.

Calli cultures

As a calli inducing media was used the MS basal medium with addition only 1 mg/l of 2.4 D or MS basal medium with addition 1 mg/l of 2.4 D and 1 mg/l of BAP.

Different parts (leaves and stem segments) of flax seedlings from initial cultures of two varieties ('Lirina' – oil flax variety, 'Blu di Riga' - Latvian landrace) were used as explants.



For detection of humus activity calli were planted whether on MS medium supplemented with 2 mg/l BAP (control) or on the MS medium supplemented with 2 mg/l BAP and different concentrations (2 mg/l, 20 mg/l, 200 mg/l) of humus. 320 calli (20 on each version of media) were grown. Calli were examined after three weeks of growing and development.

Results

Evaluated humus have rather high phytohormonal activity – after two weeks of cultivation on media with humus concentration higher than 20mg/l the shoots regeneration (more then 10 per calli) were observed. The calli of landrace Blue di Riga were more responsive to humus influence.



Calli cell growing and development on mediums supplemented with humus

Conclusions

In the flax in vitro calli system used humus substances in concentrations started from 20 mg/l showed rather high auxin activity and stimulated the rapid shoot formation. Used humus is excellent for the increasing regeneration capacity of the flax somatic calli culture, and, probably, in optimal concentrations, could be used as a substitute of synthetic auxins in plant tissue cultures of different plant species.

Because of proved high biological activity tested humus substances has a potential use as a plant growing regulator, what should be tested additionally.