

INFLUENCE OF ABIOTIC FACTORS ON THE CONTENT OF PHENOLIC COMPOUNDS AND FLAVONOIDS IN *DESCHAMPSIA ANTARCTICA* TISSUE CULTURE

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Introduction. *D. antarctica* is an extremophile plant of Antarctica and may be promising in terms of studying the biological activity of its secondary metabolites. Previously, we introduced this species to *in vitro* culture and obtained callus culture. It is known that abiotic factors can change and in a certain way significantly increase the content of biologically active substances (BAS) in plant cellular biomass. The aim of the work was to study the influence of growth conditions (darkness/light and temperature 18°/26°C) on the content of phenolic compounds and flavonoids in *D. antarctica* morphogenic tissue culture.

Methods. *In vitro* tissue culture, Folin-Ciocalteu method, spectrophotometry, HPLC analysis.

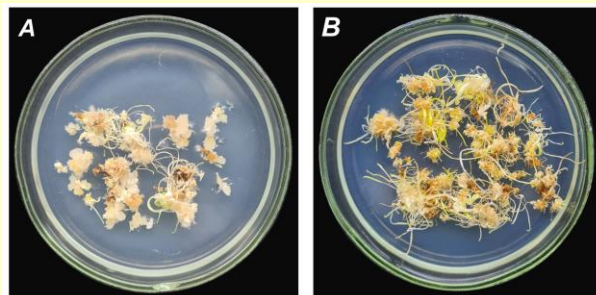


Fig. 1. Morphogenic tissue cultures of *D. antarctica*, obtained from *in vitro* plants of genotypes DAR12 (A) and G/D11-1/3 (B).

There were four variant groups of tissue cultures (Fig. 1) in experiment with different cultivation conditions: I – on the light intensity of 6500 lux and at a temperature 18°C; II – on the light intensity of 6500 lux and at a temperature 26°C; III – in the darkness and at a temperature 18°C; IV – in the darkness and at a temperature 26°C.

Results. The total content of phenolic compounds and flavonoids in the biomass of the tissue culture of *D. antarctica*, when growing in light at an intensity of 6500 lux and increased temperature up to 26°C, decreased in 1,1–2 times. In calli, culturing in the darkness, regardless of temperature, the level of phenolic compounds (from 21.4 to 10.5 mg/g of dry weight for DAR12 and 20.8 to 6.8–7.4 mg/g of dry weight for G/D11-1/3) as well as flavonoids (from 8.6 to 3.6–3.8 mg/g of dry weight for DAR12 and 11.9 to 2.4–2.6 mg/g for G/D11-1/3) decreased (Fig. 2, 3).

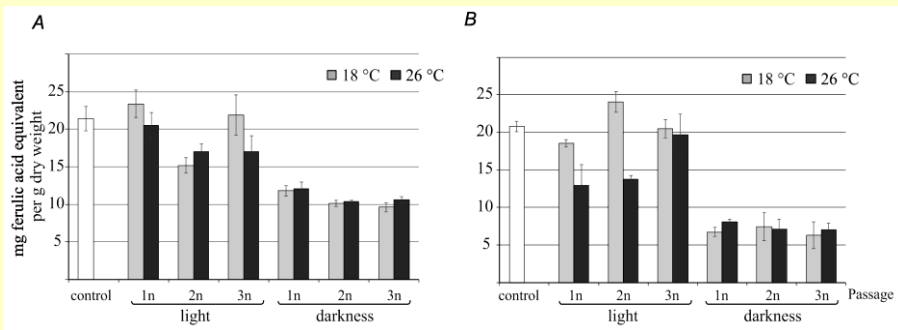


Fig. 2. The total content of phenolic compounds in *D. antarctica* tissue cultures obtained from *in vitro* plants DAR12 (A) and G/D11-1/3 (B) under different growth conditions.

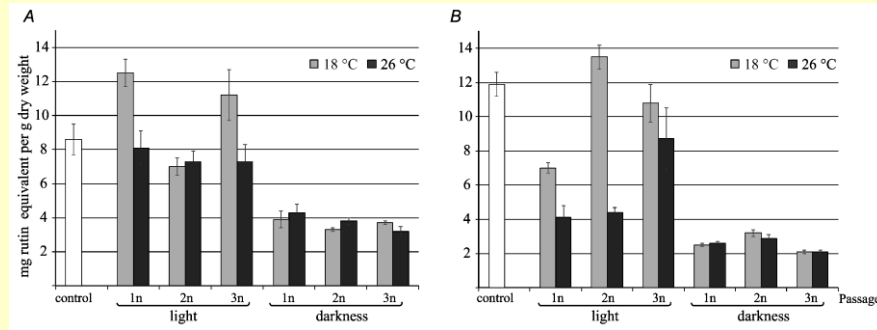


Fig. 3. The total content of flavonoids in *D. antarctica* tissue cultures obtained from *in vitro* plants DAR12 (A) and G/D11-1/3 (B) under different growth conditions.

Qualitative analysis showed that compound triclin was detected in most of the examined calli, as well as in the *in vitro* initial plants. Its content in plants DAR12 was 0.15 mg/g of dry weight, while in plants G/D11-1/3 it was three times lower – 0.05 mg/g of dry weight. The content of triclin in the calli was lower than that in the initial plants (Fig. 4).

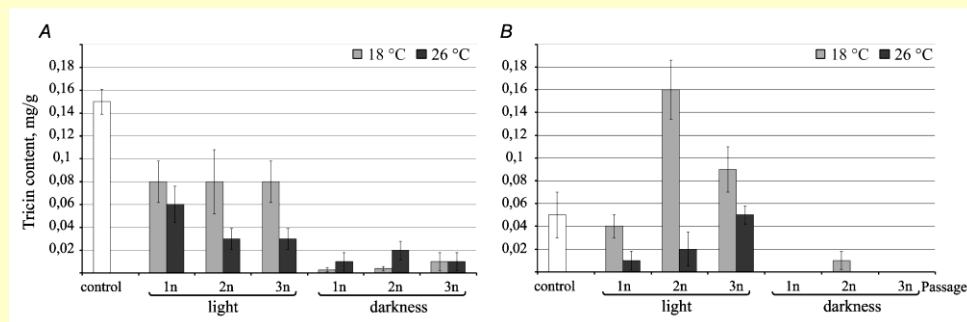


Fig. 4. Tricin content in tissue cultures obtained from *D. antarctica* plants of genotypes DAR 12 (A) and G/D11-1/3 (B) under exposure to light and temperature.

Conclusions. Thus, it was found that the highest level of phenolic compounds and flavonoids accumulation in the morphogenic tissue culture of *D. antarctica* were observed when it has been grown in the light intensity of 6500 lux and at the temperature of 18°C. The triclin found in the samples of *D. antarctica* provides a basis for its further biochemical studies as a potential source of BAS for the purpose of their possible applying in pharmacy as antioxidant and antitumor agent.