PP-235

Studying Morphogenetic Potential and Properties of *Monarda* Secondary Metabolites

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Aim of the study:*In vitro* cultivation, studying morphogenetic potential and properties of secondary metabolites from 4 species of the genus *Monarda* L.: *M. didyma* L.*, M. citriodora* Cerv. ex Lag.*, M. punctata* L.and *M. x hybrida* Hort.

Material and Methods: In our research we used seeds of 4 different *Monarda* species. Seeds were sterilized with a 5% solution of sodium hypochlorite for 5 and 10 minutes and placed on the solid MS medium. Seedlings with a size of 5 mm were placed into tubes with medium of the same composition. For induction of callusogenesis and morphogenesis we used the plants with the 5-6 true leaves. The primary explants were stem segments (5-7 mm) and leaf segments (5 × 5 mm) that were placed on the MS medium with the addition of growth regulators (2,4-D, BAP, IAA). Antifungal effect of *M. didyma* essential oil was tested on *Fusarium culmorum* Sacc. There were two experiment variants: filter paper disks (d=5 mm) were soaked with essential oil (0.5 µl; 1 µl; 1,5 µl; 2 µl) and placed on the surface of the ½ MS medium; essential oil was added into ½ MS medium (0.5 mg/l; 1mg/l; 1.5 mg/l).

Results: 10 minutes sterilization was the best variant for *M. citriodora* and *M. punctata* seeds germination and for *M. didyma* and *M. x hybrida* seeds it was the variant with 5 minutes sterilization. We recommend to use the medium with adding 1 mg/l 2,4-D + 0.5 mg/l BAP for induction of callusogenesis on leaf explants; for induction of callusogenesis in stem explants any of the chosen media was applicable. It can be recommended to use the segments of stems as explants for the somatic organogenesis induction. The essential oil of *M. didyma* possesses an antifungal activity and can be used as a biological fungicide.

Keywords: *Monarda*, callusogenesis, morphogenesis, essential oil, secondary metabolites.