Effect of combined 2,4-D with Kinetin or Benzylaminopurin and Salicylic acid on growth and metabolite contents of *Chlorella sorokiniana*

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Abstract

Chlorella is unicellular green alga which was used by food and medicine industries. Since present and effect of phytohormones is proved on algal growth, application of phytohormones is one way of increasing algal biomass. In this study, that was done in 2017, *Chlorella sorokiniana* was cultured at modified Bold Basal Medium. Glucose monohydrate (5g l^{-1}) and different proportions of plant hormones, 2, 4, Dichlorophenoxyacetic acid (2,4-D), Kinetin (Kin), Benzylaminopurin (BAP) and Salicylic acid (SA)were added to media. By one way analyze variance with $p \leq 0.05$, 2, 4-D (1mg.l^{-1}) +BAP (1mg.l^{-1}) treatment was the most suitable hormones for enhancement of biomass and pigments contents. Respectively, at this treatment and control were dry weight (90.6 and 64.9mg), cell numbers of one ml algal suspension (18.3×10^{-7} and 11×10^{-7}), contents of chlorophyll a (7 and 6.4), chlorophyll b (4 and 2.5), carotenoid (3.6 and 2.2) µg.ml^{-1} algal suspension, which all adjectives showed significant differences to control except cell number and chlorophyll b content. At this treatment protein percent was 9.9 percent that showed significant decrease compare to control (11percent). Adding of SA (0.138, 1.38, 13.8 mg.l^{-1} to 2, 4-D (1mg.l^{-1}) +BAP (1mg.l^{-1}) treatment, caused significant enhancement of protein and significant decrease of dry weight compare to this treatment, but did not show any significant difference to control. Results showed combination of 2, 4-D (0.5mg.l^{-1}) + Kin (1mg.l^{-1}) and 2, 4-D (1mg.l^{-1}) +BAP (1mg.l^{-1}) caused enhancement of biomass and chlorophyll a content of *Chlorella sorokiniana*.

Keywords: *Chlorella sorokiniana*, Chlorophyll a and b, Plant hormones, protein.