

Effect of SiO₂ on yield and phenolic profile of Tartary buckwheat

Jong In Park¹, Azad Obyedul Kalam¹, Mateja Germ²,

Ivan Kreft², and Cheol Ho Park¹

¹Department of Biohealth Technology, Kangwon National University, Chuncheon, 24341, Korea

²Department of Biology, University of Ljblejana, Slovenia

Abstract:

The aim of this study was to enhance the Tartary buckwheat growth and phenolic profile by the application of SiO₂ on pots in the glasshouse. The liquid of SiO₂ were applied at three times after three weeks of sowing at ten days interval. The doses of the SiO₂ was low (2.5 ml/5 L water), high (10 ml in 5 L water) and control experiment was done without SiO₂. In this study, it is clearly shown that high dose of SiO₂ increased the buckwheat plant growth including, plant height, leaf length and width, stem diameter, fresh weight and number of seed per plant compared to control treatment. In the same way, the total phenolic compound (1421 mg/100 g), total flavonoid (35.1 mg/100g), rutin (3,130 mg/100g) and DPPH (82%) in plant were also increased high dose of SiO₂ compared to control (1,175 mg/100g, 31.9mg/100g, 860 mg/100g, 59%, respectively). Moreover, higher phenolic compound (1,421 mg/100g) and DPPH (82%) was observed in plant compared to seed (196 mg/100mg, 72 %, respectively). In the contrary, total flavonoid (36.2 mg/100g) and rutin (1,400 mg/100g) was higher in buckwheat seed compared to plant (35.1 mg/100g, 3,130 mg/100g, respectively). Finally, it is concluded that higher dose of SiO₂ enhance buckwheat growth and phenolic profile. Further investigation is needed to evaluate the optimum dose of SiO₂ according to soil conditions in the field.

Key Words: Tartary buckwheat, liquid SiO₂, phenolic compound, flavonoid, rutin, antioxidant activity.