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Biostimulants combination enhance the metabolites content of brassica *Oleracea* var. *Botrytis* curds cultivated in the desert region of Basrah Governorate

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Abstract

Background Among Brassica vegetables, cauliflower (*Brassica oleracea* var. *botrytis*) is widely recognized as a most consumed vegetable due to its rich and healthy content of nutrients and bioactive compounds. The enhancement of productivity and quality of preferred crops has gained highly importance in recent decades, driven by increasing customers demand for affordable and healthy food. Away from chemical materials and their risky side effects, biostimulants and biofertilizers could be a suitable alternative for traditional fertilizers under desert conditions.

Methodology In a current study the extract of Liquorice root LRE and bread yeast BYE applied both with 0, 10, and 20 g/L on Brassica plant to explore their influence in curds metabolites. The results demonstrated that while carbohydrates reduced in curds of treated plants, protein increased with both stimulants application. The non-significant increasing in phenols and flavonoids content was observed in curds of LRE and BYE-treated plants with an elevation in antioxidant activity in their methanolic extracts. Both LRE and BYE applications promoted the curds content of macronutrients and caused a notable alteration in active compounds profile. Noteworthy, the values of acquired outcomes increased or decreased according to applied concentrations of individual or combination of both biostimulants.

Conclusions Therefore, the foliar application with LRE and BYE enhanced the primary and secondary metabolites of Brassica curds. However, the combination of 10 g/L of LRE and 20 g/L of BYE is recommended due to its functions in promoting the flavonoids content, antioxidant capacity, potassium content and active compounds profile such as organosulfur, troponoid, methyl 9-cis, 11-trans-octadecadienoate, 1H-Indole-3-acetonitrile and 9,12,15-Octadecatrienoic acid. These findings demonstrate that the synergistic effect of LRE and BYE biostimulants can reprogram primary and secondary metabolism, strengthening stress resilience and improving the nutraceutical quality of cauliflower grown in saline desert environments.

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