

## Metabolite profiles of red and yellow watermelon (*Citrullus lanatus*) cultivars by <sup>1</sup>H-NMR metabolomics approach

### ABSTRACT

Watermelon, a widely commercialized fruit, is famous for its thirst-quenching property. The broad range of cultivars, which give rise to distinct color and taste, can be attributed to the differences in their chemical profile, especially that of the carotenoids and volatile compounds. In order to understand this distribution properly, water extracts of red and yellow watermelon pulps with predominantly polar metabolites were subjected to proton nuclear magnetic resonance (<sup>1</sup>H-NMR) analysis. Deuterium oxide (D<sub>2</sub>O) and deuterated chloroform (CDCl<sub>3</sub>) solvents were used to capture both polar and non-polar metabolites from the same sample. Thirty-six metabolites, of which six are carotenoids, were identified from the extracts. The clustering of the compounds was determined using unsupervised principal component analysis (PCA) and further grouping was achieved using supervised orthogonal partial least squares discriminant analysis (OPLS-DA). The presence of lycopene, β-carotene, lutein, and prolycopene in the red watermelon plays an important role in its differentiation from the yellow cultivar. A marked difference in metabolite distribution was observed between the NMR solvents used as evidenced from the PCA model. OPLS-DA and relative quantification of the metabolites, on the other hand, helped in uncovering the discriminating metabolites of the red and yellow watermelon cultivars from the same solvent system.

**Keyword:** <sup>1</sup>H-NMR; *Citrullus lanatus*; Varieties; Discriminants; Carotenoids