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Metabolomic carnitine profiles and potential health benefits of pomegranate species

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Abstract

Metabolomics, unlike traditional methods for analysing the nutritional content of fruits and vegetables, enables the detection of low-molecular-weight metabolites (<1 kDa), including carnitine and its derivatives, acylcarnitines. These compounds are integral to energy metabolism, facilitating mitochondrial transport of long-chain fatty acids, cytosolic export of short-chain fatty acids, stabilisation of the mitochondrial coenzyme A to acetyl-CoA ratio, preservation of membrane integrity, and reduction of lactate production. While carnitine profiles in various fruits and vegetables have been extensively studied, data on its presence in pomegranates remains limited. This study aims to elucidate the carnitine composition in five pomegranate cultivars using LC-MS/MS analysis. Results indicate significantly higher concentrations of free carnitine and acetylcarnitine in the Suruç variety, alongside other notable acylcarnitines, including propionylcarnitine, hydroxyisovalerylcarnitine, adipoylcarnitine, and oleoylcarnitine. These findings position pomegranate as a promising dietary component with potential health benefits attributed to its carnitine content. © 2025 Akadémiai Kiadó, Budapest.

Author keywords

carnitine; metabolomics; pomegranate; pomegranate juice

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Abstract

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