Tocopherol And Tocotrienol Content Of Greek Barley Varieties Under Conventional And Organic Cultivation

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Tocotrienols and tocopherols are important phytochemical compounds with antioxidant activity and potential benefits for human health. Barley, is considered a good source of tocoptrienols and tocopherols (tocols). In the present work, we studied the effect of cultivation method (organic and conventional) on tocols content. A Randomised Complete Block design was applied, with four replications of each variety. Nine Greek barley varieties were examined for their tocols content. A Reversed Phase High Performance Liquid Chromatography method (RP-HPLC) with fluorescence detection (exc.292 nm, em. 335 nm) has been employed with direct solvent extraction with acetonitrile in a 1:30 sample to solvent ratio for tocols quantification. The results showed statistically significant differences between the two cultivation methods for all vitamers of tocotrienol (α, β+γ and δ) and for α and β+γ vitamers of tocopherol. Significant differences were observed also among varieties. The interaction between type of cultivation and variety revealed statistical differences for all tocopherols and δ-tocotrienol. In the case of organic cultivation, the studied homologues of tocotrienols (α, β+γ, δ-) are favorably increased, with the percentage of increase ranging from 9.37-25.01% for α-tocotrienol, 15.51-41.09% for (β+γ)-tocotrienols and 51.93-196.61% for δ-tocotrienol. On the contrary, the α- and (β+γ)-tocopherols decrease substantially with % decrease varying from 8.94 to 36.38 % for the α homologue and 2.84-46.49 % for the β+γ homologues. No significant difference was observed for δ-tocopherol between the two cultivation techniques. Variety Cyprus had the higher total tocols content in both conventional and organic cultivation. In terms of tocotrienols-to-tocopherols (T3/T) ratio there is a significant increase (p<0.01) in organic cultivation from 5.83% for Athinaida to 77,40% for Cyprus revealing that organic cultivation favors the formation of tocotrienols. Total tocols content did not vary significantly in the two cultivation systems, though statistical differences among varieties were recorded.

References