

Tocochromanol diversity in Spermatophytes

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Master Thesis in Plant and Microbial Biology

Tocochromanols are known to be synthesized by photosynthetic active organism, like algae, plants, and some cyanobacteria. Among tocochromanols, tocopherols and tocotrienols are better known as vitamin E, since they exhibit vitamin E activity in animal cells. In plants, tocochromanols mainly accumulate in seeds and it is currently admitted that γ -tocopherol is the predominant tocochromanol form in this tissue. In contrast, α -tocopherol is general described as a minor component of seed tocochromanols. Interestingly, few exceptions like sunflower, safflower and euphorbia seeds that primarily accumulate α -tocopherol in seeds are described in the literature. In order to assess the diversity of tocochromanol profiles in seeds of Spermatophytes, and determine which tocochromanol form primarily accumulates in this tissue, the seed tocochromanol profile of more than 1,000 plant species was analysed. Results showed that the number of plant species in which α -tocopherol or γ -tocopherol were the primary tocochromanol form was similar (41.2% each). These findings have significant consequences, notably on the expression of γ -tocopherol methyl transferase (γ -*TMT*), the enzyme catalysing the conversion of γ -tocopherol into α -tocopherol. This in turn underlines the importance of the research currently performed on the regulation of γ -*TMT* expression in plants. In addition, these results show that less than 20% of plant species accumulate primarily δ -tocopherol or β -tocopherol in seeds. This study revealed not only species accumulating $\geq 75\%$ a tocochromanol form, but also tocochromanol patterns and characteristics in plant genus and families.

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