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Effect of Clothianidin on photosynthesis using Raman Microscopy

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Chloroplasts plays an important roles in photosynthesis of green algae. [1] In algae cells, light-dependent reactions occur in the thylakoid membranes of the chloroplasts where they drive the synthesis of ATP and NADPH. Neonicotinoids are a new class of pesticides which are more and more wild use in agriculture.[2] Based on the importance of pesticides in increasing agricultural production, their potential impact on the physiological process of chloroplast photosynthesis needs more knowledge. Raman spectroscopy is a non-destructive method that eliminates interference from water molecules and is therefore an effective way to study pigment complexes in chloroplasts at molecular level.[3] Building on previous experiments demonstrating the direct effects of pesticides on chloroplasts [4,5], this study used liquid samples of *Scenedesmus quadricauda* cells, which were mixed with two kinds of ionophores and Clothianidin (CL), and Raman spectra were recorded at different reaction times. Changes in the molecular structure of β-carotene and other pigment complexes in algae cells affected by Clothianidin were more consistent to those affected by ionophores, and significantly different from those under extracellular environmental stress.

References

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