FT-IR spectroscopy of Chromera velia: Biochemical composition, growth phases, and dark incubation

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The effect of culture age and light deprivation on *Chromera velia* was examined in the context of biochemical composition. Measurements on growth, photosynthetic capacity together with FT-IR spectra were taken over a period of 62 days. Three FT-IR analysis methods were compared: integral band intensities, second order differentiation, and principal component analysis (PCA). PCA provided the most detailed information on the effect of culturing conditions and culture age on chemical composition. Integrated band areas of protein, carbohydrate and lipid appeared unchanging up to the late exponential growth phase, after which there was a progressive decrease in protein with a concomitant increase in lipid and carbohydrate. PCA analysis of second-derivative spectra, however, identified an accelerated change in the biochemical composition in this phase, highlighting the superior ability of second-derivative-based PCA to emphasise small local differences in spectral features. Dark incubation transformed the cells into a dormant state with undetectable growth. Changes, albeit small, in protein and carbohydrate of the dark culture were observed only in the PCA analysis; lipid reserves were not affected. Significant modification of biochemical profiles occurred at specific times and duration in the late exponential phase.