

EFFECTS OF THE REDUCTION OF THE RUBISCO CONTENT IN *RbcS* ANTISENSE DNA MUTANTS OF TOBACCO (*NICOTIANA TABACUM*) ON THE PHOTOSYNTHETIC PIGMENT COMPOSITION ANALYSED BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY

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It has been established that carotenoids (Car) and the chlorophyll (Chl) phytol moiety are synthesized from photosynthetically fixed CO₂ (Heinze *et al.*, 1990). Chl and Car synthesis appear to be coordinated during greening. Whether the synthesis of both is also coregulated in green leaves remains undetermined. Such an analysis appear difficult since pigment turnover is rather slow in normal conditions. The use of genetically modified plants can help in this task.

In this communication, we report results concerning the modification of the pigment content of the WT and two *RbcS* antisense DNA mutants of tobacco by HPLC. The Rubisco activity of mutants M1 and M2 are 35 and 25 % of that measured in WT, respectively (Jiang and Rodermel 1995). The plants were grown in a greenhouse and the HPLC analyses were done on the fourth leaves according to Schoefs *et al.* (1995).

Qualitatively, the pigment composition was the same in the WT and in the mutants. The leaves contain the pigments usually observed in green leaves *i.e.* neoxanthin, violaxanthin, lutein, antheraxanthin and zeaxanthin, Chl *a* and Chl *b*, α - and β -carotene and pheophytin *a*. No Chl and Car precursors were observed.

Quantitative differences were however observed: 1) The comparison of the absolute amounts of pigments in the three plant types indicate that the total Chl and Car contents in the mutants are 91 (M1) and 48 % (M2) of the WT values, respectively; 2) the percentage of Chl *a* slightly increased in the mutant plants. In contrast, that of lutein and β -carotene contents were diminished; 3) if the pigment contents per Chl *a* molecule are compared, it is clear that a significant difference in the β -carotene content is observed.

The variations in the pigment content reported here definitely confirm that Chl and Car synthesis in green plants require CO₂ fixation since the reduction in the Rubisco activity correlates with the decrease in the amount of each pigment. However the decrease was not proportional to the decrease of the Rubisco activity.

References

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