Some Physicochemical Peculiarities of Poplar Plastocyanins *a* and *b*

Petya K. Christova[a], Anthony A. Donchev[b], Alexandra C. Shosheva[b], Vladimir I. Getov[b], and Mitko I. Dimitrov[b,*]

[a] Institute of Organic Chemistry, Bulgarian Academy of Sciences, Sofia-1113, Bulgaria
[b] Institute of Biophysics, Bulgarian Academy of Sciences, Sofia-1113, Bulgaria.
Fax: +3 59 29 71 24 93. E-mail: mitkod@bio21.bas.bg

* Author for correspondence and reprint requests

Z. Naturforsch. **64 c**, 399–404 (2009); received December 4, 2008/January 28, 2009

The redox potentials of poplar plastocyanins *a* and *b* (PC*a*, PC*b*) were determined by spectrophotometric titrations of their reduced forms with $[Fe(CN)_6]^{3-}$. It was found that the two isoforms have the following millimolar extinction coefficients $\overset{\circ}{U}_{597}$, equilibrium constants K_{eq} of one-electron exchange with $[Fe(CN)_6]^{4-}/[Fe(CN)_6]^{3-}$, and standard electron potentials $E^{0\mathfrak{R}}$:

PC*a*: $\overset{\circ}{U}_{597}$ = (4.72 ∂ 0.08) mM^{-1} cm^{-1}, K_{eq} = 0.133 ∂ 0.009, $E^{0\mathfrak{R}}$ = (354 ∂ 11) mV;
PC*b*: $\overset{\circ}{U}_{597}$ = (5.23 ∂ 0.16) mM^{-1} cm^{-1}, K_{eq} = 0.175 ∂ 0.010, $E^{0\mathfrak{R}}$ = (363 ∂ 12) mV.

The pH dependence of the redox potential of PC*b* was studied too. It was found, that the value of $E^{0\mathfrak{R}}$ for PC*b* is constant in the pH range 6.5–9.5, but decreases in the range 4.8–6.5. On the whole, the dependence resembles that of PC from some well-known plant species, including poplar PC*a*. The changes of $E^{0\mathfrak{R}}$ in the pH-dependent region for poplar PC*b*, however, are smaller and are 13 mV per pH unit, whereas in the other well-known plant species the changes are about 50–60 mV per pH unit. It has been assumed that the weaker pH dependence of $E^{0\mathfrak{R}}$ of PC*b* accounts for some structural differences between PC*a* and PC*b*.

Key words: Plastocyanin, Dimorphism, Photosynthesis