

THE PREPARATION OF TETRAPHENYLPORPHYRIN
DERIVATIVES AS MODEL COMPOUNDS OF PHOTOSYNTHESIS

Iwao Tabushi, Noboru Koga, and Akira Yazaki
Department of Synthetic Chemistry, Faculty of Engineering
Kyoto University, Yoshida, Sakyo-ku, Kyoto, Japan

As artificial model of Photosystem I and II, NAD covalently bound to TPP and benzoquinone covalently bound to two TPP rings (abbreviated as TPP-NAD 2a, 2b and (TPP)₂Q 3) were prepared. On treatment of mono-aminoTPP with nicotinic acid chloride was afforded TPP derivative 6 attached with pyridine. The methylation or benzylation of 6 with methyl iodide or benzyl chloride, respectively, gave 2a or 2b in high yield. The condensation of 2eq. of mono-aminoTPP with 1eq. of 2,5-diacetoxyterephthalic acid by 1-ethyl-3-(3-diethylaminopropyl)carbodiimide afforded TPP derivative 9. Selective hydrolysis of 9 with KOH-MeOH, followed by the oxidation with PbO₂ gave (TPP)₂Q 3.

Based on the NMR spectrum or the fluorescence quenching experiments, very strong interactions is concluded to be present between porphyrin and the such an electron acceptor as N-methyl or benzylnicotinamide or p-benzoquinone.