

Dediazonation with sodium dimethylphosphate in aqueous solutions: towards a direct determination of interfacial water in membranes

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INTRODUCTION AND AIMS. Arenediazonium salts are currently being used to probe interfacial compositions of micelles, microemulsions, reverse micelles and cyclodextrins. Phosphate is a membrane-prevalent low nucleophilicity anion and only the analysis of the reaction of phosphates with arenediazonium ions will permit the global determination of interfacial composition in biological membranes. Here we described the reaction of sodium dimethylphosphate, DMPi, an anion of low nucleophilicity, with 2,4,6-trimethylbenzenediazonium tetrafluoroborate, 1-ArN₂⁺. **RESULTS.** The reaction of 1-ArN₂⁺ with sodium dimethylphosphate was studied in water and the products detected by HPLC. The % of 2,4,6-trimethylphenol, 1-ArOH, decreased proportionally as the concentration of DMPi increased leading to the supposition that 1-ArN₂⁺ reacted with DMPi. The product 2,4,6-trimethylphenyl dimethylphosphate, 1-ArOPO₃Me, was isolated from HPLC and identified by mass spectrometry. Standard curves using the 1-ArOPO₃Me and 1-ArOH, allowed to determine the relationship between the concentration of DMPi and the products ratio 1-ArOH/1-ArOPO₃Me. The long chain analogous of DMPi, the sodium dodecyl methylphosphate, SDMP, which forms micelles, was also synthesized, its micellar concentration, cmc, and dissociation degree, α , were determined (cmc= 10.7 mM, α =0.5 at 25 °C and 12.05 mM, α =0.6, at 50 °C). The next step will be to determine the local monomer concentration at the micellar surface using the long chain diazonium salt, 2,6-dimethyl,4-hexadecylbenzene diazonium, 16-ArN₂⁺, incorporated in the micelle. **CONCLUSION.** We demonstrated the reaction of a phosphate diester and, therefore, proved that even with a low reactivity nucleophile we may be able to measure directly global interfacial membrane composition.

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