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Chromatographic purification of photosynthetic water-soluble and membrane proteins for spectrometric analysis



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Purple non-sulphur phototrophic bacteria constitute a unique group of “photosynthetic” organisms capable of adjusting their metabolism in response to the alteration of environmental growth conditions. In the presence of light and absence of oxygen, bacterial cells develop extensive system of intracytoplasmic membranes, hosting entire “photosynthetic machinery”. It comprises different types of pigment-protein complexes involved in capturing and extremely effective conversion of light energy into chemical energy. Recently, purple bacteria have been gaining considerable attention due to their increasing potential in a range of scientific and industrial applications. In the present study two species of anoxygenically grown phototrophic bacteria were used. Following the isolation of their membranes, the components of the photosynthetic apparatus were separated and purified by the application of weak anion exchange chromatography. This chromatographic technique is characterized by relative simplicity, vast availability as well as high effectiveness of structure’s separation. Hence, it proved to be one of the most useful methods for isolation and purification of membrane as well as water-soluble proteins. Application of ion-chromatography resulted in preparation of a series of photosynthetic (pigment-) protein structures of adequate purity for

spectrometric analysis. Here, total reflection X-ray fluorescence spectrometry (TXRF), one of the well-established spectroscopic techniques applied for the precise elemental profiling of organic and inorganic samples, was used to perform comprehensive examination of the elements present in bacterial proteins.

Biography

Joanna Fiedor has received her PhD degree in Biochemistry from the Jagiellonian University, Kraków, Poland. During 1997-1999, she visited the Ludwig-Maximilians University (LMU) in Munich, Germany, and in 2002 the Kwansei Gakuin University, Sanda, Japan. Currently, she is an Assistant Professor at the AGH-University of Science and Technology, Kraków, Poland. Her research interests are focused on: natural biocompounds (carotenoids) in relation to human health, and biotechnological applications of phototrophic microorganisms.

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