Engaging Biotechnology students: Hands-on experience with MALDI-Biotyper mass spectrometry

LB-E-01-3


I Departamento de Biología Molecular, Universidad de León, León, Spain, II Instituto de Biología Molecular, Genómica y Proteómica (INBIOMIC), Universidad de León, León, Spain, III Instituto de Investigación de la Viña y el Vino, Escuela de Ingeniería Agraria, Universidad de León, León, Spain

To address the growing need for skilled professionals in the field of mass spectrometry, as part of the Biotechnology degree at the University of León, the “Proteomics and Protein Engineering” subject has adopted an innovative hands-on learning strategy. This approach includes laboratory sessions where students actively engage in preparing and analysing microbiological samples using the MALDI-Biotyper mass spectrometer. This rapid and accurate approach is highly helpful for the microbial identification from clinical and environmental samples, as well as for antibiotic resistance detection. First, the gap between theoretical knowledge and practical skills is covered providing the students with direct experience with the mass spectrometry. Second, the sample preparation is covered. Third, the microbial identification is also performed. Finally, the effectiveness of this educational approach was assessed through a questionnaire (before and after the practical sessions). The findings indicated a significant increase in student know-how, a deeper understanding of mass spectrometry concepts, and an improved competence in the handling of trending scientific equipment. Thus, these results highlight that immersive practical experiences not only engage students but also enhance their appreciation of the subject’s relevance to their future careers. The incorporation of mass spectrometry and other methodologies as practical applications into the academic degree subjects is triggering the students academic background for a better integration in the biotechnological field.