ERASMUS WORK PLACEMENT

EMPLOYER INFORMATION	
Organization/ Institution/ Enterprise/ University	Dpt. Of Chemistry, Faculty of Experimental Sciences. University of Huelva
Website	http://www.uhu.es/algatech/

CONTACT DETAILS	
Contact people for this placement	Inés Garbayo Nores
Department	Chemistry
Direct telephone number	+34 959 21 99 53
E-mail addresses	garbayo@uhu.es

PLACEMENT INFORMATION	
Function of the Department	Laboratory of Biotechnology of Algae
Description of activities	Our lab goal is to provide students a variety of techniques in the field of bioproduction of antioxidants from microalgae. The aim of our research is to define conditions which enhance biosynthesis, promote accumulation and address full biocompatible extraction of carotenoids antioxidants from different microalgae (Chlamydomonas acidophila, Nannochloropsis gaditana, Dunaliella salina among others). We always encourage students to get involved in our projects under supervision and then focus in on ones that are the most interest to them. Laboratory equipment and techniques used : Cell microalgae cultures: Growth chamber for photosinthetic microorganisms with controlled temperature and different type and quality of light. Optic microscopy to observe cellular growth. Hoods with laminar flux. Autoclave for sterilization processes. Protein purification: Refrigerated chamber (4ºC). Purification systems (chromatographic columns, peristaltic pumps, collector of fractions). Chromatographic system for protein purification (FPLC). Separation and quantification of target compounds: Chromatography techniques (HPLC with fluorescence and UV-vis detector). UV-visible spectroscopy

	Continuous long-term cultures: 5-liters bioreactor with pH, Tª and oxygen probe. Software for an automatic continuous control of the reactor. Determination of cellular viability: Oxygen Clark
Location	Huelva, Spain
Duration	3-12 months
Working hours per week:	Depends
Start Date:	Rolling
Accommodation:	Not specified
Application Procedure:	Send CV and cover letter to Inés Garbayo

COMPETENCES, SKILLS and EXPERIENCE REQUIREMENTS	
Languages and level of competence required	Spanish, English, or French (Spanish not required)
Computer skills and level of skills required	N/A

Detailed programme of the training at **the Laboratory of Biotechnology of Algae**.
Dpt. of Chemistry. Faculty of Experimental Sciences. University of Huelva.

Training of 3 months

Week 1 Bibliographical review

Week 2 Optimization of culture medium and growth of *Chlamydomonas acidophila*, *Nannochloropsis gaditana*, *Dunaliella salin* and determination of cellular viability with Oxygen Clark electrode and PAM system for determination and quantification of chlorophyll.

Week 3 HPLC techniques for lutein and β-carotene separation. UV-visible spectroscopy

Week 4-7 Culture and accumulation of lutein in *C. acidophila/ N. gaditana/ D. salina* under different nutritional stress conditions (nitrogen, sulfur, UV radiation, pH, heavy metals). Proposal of best conditions to produce highest amounts of lutein.

Week 8-10 Proposal of long-term processes with lab scale reactors for continuous production of lutein in bioreactors. 5-liters bioreactor with pH, Tª and oxygen probe. Software for an automatic continuous control of the reactor.

Week 11-12 Final analysis and discussion of results. Proposal and final report.

Training of 6 months

Week 1 Bibliographical review

Week 2-3 Optimization of culture medium and growth of *Chlamydomonas acidophila*, *Nannochloropsis gaditana*, *Dunaliella salin* and determination of cellular viability with Oxygen Clark electrode and PAM system for determination and quantification of chlorophyll.

Week 4-5 HPLC techniques for lutein and β-carotene separation. UV-visible spectroscopy

Week 6-9 Culture and accumulation of lutein in *C. acidophila/ N. gaditana/ D. salina* under different nutritional stress conditions (nitrogen, sulfur, UV radiation, pH, heavy metals). Proposal of best conditions to produce highest amounts of lutein.

Week 10-13 Proposal of long-term processes with lab scale reactors for continuous production of lutein in bioreactors. 5-liters bioreactor with pH, Tª and oxygen probe. Software for an automatic continuous control of the reactor.

Week 14-16 Electronic Microscopic studies of ultrastructural changes induces by oxidative stress in microalgae cells od Chlamydomonas, Dunaliella and Nannochloropsis.

Week 17-21 Microalgae cultures in *outdor* reactors using best conditions obtained at lab scale reactors. Production of lutein/β-carotene using optimal conditions obtained in weeks 6-9 and 10-13.

Week 22-24 Final analysis and discussion of results. Proposal and final report.