

## **R&D COLLABORATIVE PROPOSAL /** **COMPANY PARTNER SEARCH**

The information you are about to provide in this form will be distributed among Spanish companies matching your company profile and that might be interested in the proposal of collaborative R&D project that you will be describing in this form. (Please use English language for filling in the document)

In the case that your company will establish a R&D project in collaboration with a Spanish company, you could present a Joint Project Proposal to the CHINEKA Program.

### **YOUR ENTITY PROFILE**

**Name:** Yuanda Song

**Number of employees:**

**Annual turnover:**

**Balance Total:**

**Year of latest financial report:**

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## COLLABORATIVE R&D PROJECT PROPOSAL

(Describe as precisely as possible the technology cooperation proposal. Describe what you have to offer and what you expect from your potential partner) Include: Sector Group; Abstract of Project; Innovations Offered; and Current State of Development

<b>Title</b>	(Do not exceed 120 characters) Research and development of key technologies for the production of EPA and DHA in the <i>Mucor circinelloides</i> cell factory		
<b>Duration (YM- YM)</b>	2020/12-2022/12		
<b>Budget(1,000 Euro)</b>	SPAIN	CHINA	TOTAL
	250000	250000	500000
<b>Technology Field</b> (Click a box)	<input type="checkbox"/> Smart Cities <input type="checkbox"/> Production Technologies, <input checked="" type="checkbox"/> Biomedicine and Technologies for Health, <input type="checkbox"/> Environment technologies <input type="checkbox"/> Clean Technologies <input type="checkbox"/> Modern Agriculture <input type="checkbox"/> Advanced Materials. <input type="checkbox"/> Others		
<b>Summary</b>	<p>In the microbial biotechnology major challenges for PUFAs production are to improve the yield to meet the demand of individual industries under cost-competitiveness. From basic research to industrial applications, the benefits of research on the PUFAs in oleaginous fungi, <i>M. circinelloides</i> can be overwhelming. <i>M. circinelloides</i> is regarded as a crucial model organism for the study of lipid accumulation research. Its fatty acid composition has shown that it mostly contains C18 fatty acids. However, it lacks native pathways for many long fatty acids that make it less attractive for versatile industrial applications. A high lipid-producing strain <i>M. circinelloides</i> WJ11, however, has been isolated by researchers that have collaboration to our laboratory that produced up to 36% (w/w) lipid. The genome of strain WJ11, had been sequenced and Comparative genomic approaches now provide a powerful ability to identify multiple genes that are expressed differentially, especially between distinct microbial strains in same species. In our on-going research on WJ11 various genes involved in fatty acid biosynthesis have been targeted. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) have been shown to be of major importance in human health. Therefore, these essential polyunsaturated fatty acids have received considerable attention in both human and farm animal nutrition. Currently, fish and fish oils are the main dietary sources of EPA/DHA , which enriched from microalgae. Both <i>Schizochytrium</i> and <i>Nannochloropsis oceanica</i> can produce EPA and DHA directly via the PKS pathway. EPA/DHA synthesis gene cluster from <i>Schizochytrium</i> and <i>N. oceanica</i> will be cloned in <i>M. circinelloides</i> WJ11 with the aim of producing commercially important novel Source. The</p>		

	<p>genome of <i>Schizochytrium</i> and <i>N. oceanica</i> had been sequenced, while the uridine and leucine auxotroph strains of <i>M. circinelloides</i> have been constructed, and the genetic engineering technology has been developed. The production of EPA/DHA from this fungus for industrial applications, by manipulating FA biosynthetic pathways, should be considered as a great achievement in the field. Our major challenges would be to achieve increased lipid content concurrently with essential PUFAs synthesis, and improved cell growth, in order to make large-scale applications economically feasible. This study will promote the further development of basic and applied research in the field of microbial lipids and contribute to the literature (metabolic pathway and their mechanism) of microbial lipids. Metabolomic and transcriptomic analyses will be performed on cells at the stage of lipid accumulation to investigate the effects of the PKS metabolic pathway (EPA/DHA) on cell growth and lipid accumulation. A yeast two-hybrid system will be used to screen for proteins in WJ11 that could interact with PKSs proteins and identify key enzymes in WJ11 that cooperated with the PKS metabolic pathway to regulate EPA and DHA synthesis. The key technology and molecular mechanism of EPA and DHA synthesis in <i>Mucor circinelloides</i> cell factory will be analysed in a comprehensive manner. Selected recombinant strains of <i>M. circinelloides</i> that may accumulate high functional lipids EPA and DHA that may have industrial importance will be grown on large scale and their product will be processed and manufactured in Spain and China.</p>
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#### **SPANISH PARTNERS**

**(When you know a potential Spanish company, write its name and contact details in this section) Please, make a description of the desire type of Spanish Technology Partner.**

1. Equipment and technology for fermentation experiment
2. Technology and equipment for lipid extraction
3. Capacity for manufacturing
4. Capacity for product quality inspection
5. Products comply with existing Chinese and EU standards.

**YOUR ENTITY DESCRIPTION**

**(Entity Website, Research and development guidelines, strategic alliances, competitive position, etc)**

(The minimum information to show the potential of your company)

**Website:** [www.seawit.cn](http://www.seawit.cn)

Seawit was founded in 2014 by academicians and well-known professors in the marine field. As a high-tech enterprise, it has two municipal-level scientific research and technology centers and provincial academician workstation, and has also undertaken the research work of the key laboratory of lipid refined and deep processing in Shandong. It has a highly qualified research and development team, which is appraised as Qingdao high-level scientific and technological innovation talent team, with academician Zhu Beiwei and professor Wang Xingguo as the scientific research leaders, and has undertaken more than 10 scientific and technological projects, applied for/acquired more than 30 patents, participated in/chaired the formulation of 10 national/industrial standards..

**YOUR ENTITY PRODUCTS**  
**(Technologies, applications, services, etc)**

(The minimum information to show the potential of your company)

Based on the scientific research, development, production and sales of new materials of marine-derived for food and medicine, and taking the functional lipid products as a breakthrough, Seawit focuses on solving the outstanding problems in the application of highly active nutritional substances, focusing on the customer-oriented, systematic development of application technology and products. Strive to become the best supplier and application technology service provider of marine functional lipids in the field of health care products and special dietary formula food.