

RISK CHARACTERIZATION OF CIGUATERA FOOD POISONING IN EUROPE

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BACKGROUND

Ciguatera Food Poisoning (CFP) is the most common type of marine biotoxin food poisoning worldwide. In Europe, autochthonous ciguatera food poisoning (CFP) outbreaks have been reported in Spain (Canary Islands) and in Portugal (Madeira). In Spain an outbreak occurred in 2004 associated with consumption of amberjack fish (*Seriola* spp.) captured in Canarian waters. The epidemiological Surveillance System for Ciguatera poisoning in the Canary Islands recorded 11 indigenous outbreaks of ciguatera food poisoning between 2008 and 2014, accounting for 96 cases. In the case of Madeira, an outbreak of ciguatera was reported in 2008, due to consumption of amberjack fish caught in local waters. Furthermore, some studies have identified the presence of *Gambierdiscus* spp. in waters surrounding the Canary Islands and Madeira, but there are still many gaps in knowledge regarding their prevalence, the type of toxin they produce, among others. These new findings suggest the ciguatera is becoming an increasing risk for European countries.

WHAT IS EUROCIQUA?

EuroCigua Project is implemented through a Framework Partnership Agreement (FPA) and four Specific Agreements (SA), co-funded by the European Food Safety Authority (EFSA). It establishes a long-term cooperation between the European Food Safety Authority (EFSA) and fourteen partners from six Member States with the common general objective of characterizing the risk of ciguatera food poisoning in Europe. It is composed of four independently managed subprojects. The main objectives of this project are to determine the incidence and epidemiological characteristics of ciguatera cases in Europe, to investigate the spatial and temporal distribution of *Gambierdiscus* spp. in European waters, to evaluate the CTX-like toxicity of *Gambierdiscus* spp. populations, to evaluate possible presence of CTXs in fish in EU waters, to establish a reliable methodological approach in order to identify and quantify ciguatoxins (CTXs) in fish and microalgae, as well as to develop standards and reference material. This project started on June 1st 2016 and has a foreseen length of four years.

Specific Agreement no.1. “Management and Scientific Coordination”. Spanish Agency for Consumer Affairs, Food Safety and Nutrition (AECOSAN). The main goals are to facilitate cooperation and scientific advancement of all Specific Agreements, to favor scientific cooperation among partners, and to ensure scientific coherence and data integration in order to provide EFSA with a comprehensive final delivery in terms of the risk characterization of the CFP in the EU.

Specific Agreement no.2 “Epidemiology”. Institute of Health Carlos III (ISCIII). The main objective is to determine the incidence and epidemiological characteristics of ciguatera cases in Europe. Specifically, the establishment of a ciguatera case definition, the identification of data sources for outbreaks and cases of this illness, and the design of a surveillance protocol for CFP, including a questionnaire to collect the information from EU Member States. All the information gathered will be assessed using statistical analysis software in order to generate a report on the ciguatera incidence and the epidemiological characteristics.

Specific Agreement no.3 “Evaluation of ciguatoxins in seafood and environment”. Institute for Research and Technology in Food and Agriculture (IRTA) . The main goal is to evaluate the presence of ciguatoxins (CTXs) in fish and also the presence of the potential toxin-producing microalgae of the genus *Gambierdiscus* in the environment, in strategic hotspots in Macaronesian and Mediterranean waters. Specific tasks: Isolation of *Gambierdiscus* spp. from EU waters, species identification, isolation and culturing of microalgae for toxicity evaluation (by cell-based assay, CBA) and large-scale culture of the most interesting toxicogenic strains will be conducted. In addition this sub-project will include the evaluation of CTXs in fish for human consumption, the collection of fish samples from EU waters and from the market (muscle and liver if available), the toxicity evaluation by CBA, the identification of toxin profiles and the quantification of toxins in reference material. Positive samples will be confirmed with LC-MS/MS by Specific Grant no. 4. In addition environmental data literature and data search for the future development of models to understand the ecology of ciguatera will be collected.

Specific Agreement no.4 “Characterization of ciguatoxins”. University of Vigo. The main goal is to characterize the risk associated with Ciguatera poisoning, by developing an efficient analytical methodology with ability to confirm the identity of the toxins involved in the contamination of phytoplankton and fish samples. Also standards and reference materials will be generated. Specific tasks include: development of a Standard Operating Procedure (SOP) for the Liquid Chromatography coupled with tandem Mass Spectrometry (LC-MS/MS),analysis of ciguatoxins present in different matrices (phytoplankton and fish), application of the LC-MS/MS to all the samples previously identified as positive in the Specific Grant no.3, and confirmation by High Resolution Mass Spectrometry (HRMS). Performance of interlaboratory testing to evaluate the methodologies developed in this project, and carry out an intercomparative evaluation of the CTXs profiles of the samples included in this study, as well as testing materials (standards and secondary reference materials) developed in the project through the collaboration with the EU Reference laboratory for marine biotoxins.

THE TEAM

PARTNERS: INSTITUTE OF HEALTH CARLOS III (ISCIII) , INSTITUTE FOR RESEARCH AND TECHNOLOGY IN FOOD AND AGRICULTURE (IRTA), UNIVERSITY OF VIGO (UVIGO), PORTUGUESE AUTHORITY FOR FOOD AND ECONOMIC SAFETY (ASAE), INSTITUTO NACIONAL DE SAÚDE DOCTOR RICARDO JORGE, I.P., UNIVERSITY OF THESSALY, FEDERAL INSTITUTE FOR RISK ASSESSMENT (BfR), CANARY HEALTH SERVICE , UNIVERSITY OF LAS PALMAS DE GRAN CANARIA (ULPGC), PORTUGUESE INSTITUTE FOR THE OCEAN AND ATMOSPHERE (IPMA), STATE GENERAL LABORATORY (SGL), FRENCH RESEARCH INSTITUTE FOR EXPLOITATION OF THE SEA(IFREMER), ARISTOTLE UNIVERSITY OF THESSALONIKI.

COLLABORATORS: MINISTRY OF HEALTH, NICOSIA CYPRUS, REGIONAL MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES AND WATER THE CANARY ISLANDS GOVERNMENT, NATURAL PARK OF MADEIRA, DIREÇÃO REGIONAL DAS PESCAS OF MADEIRA.

THE ADVISORY BOARD: EUROPEAN FOOD SAFETY AUTHORITY (EFSA), EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL (ECDC), EUROPEAN COMMISSION (EC), JOINT RESEARCH CENTRE (JRC), DR. ROBERT DICKEY, DR. RONALD MANGER, DR. TAKESHI YASUMOTO.

