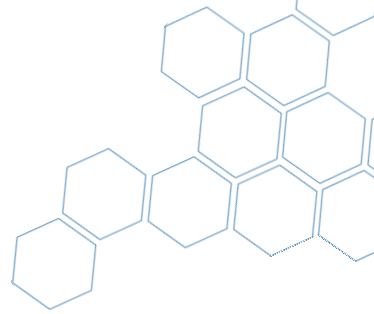


# Red Tide Detection Kit



A project by

## Kaitek Labs

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### Funding

Prize money: - USD 10 K  
(Jump Chile by EmpreundeUC)  
Seed: - USD 340 K  
(InnovaChile CORFO)

### Competitive Advantage

Unlike traditional methods such as mouse bioassays, the Red Tide Detection Kit will be used *in situ*, therefore avoiding the necessity of specialized laboratories.

This kit will also provide an immediate identification of contaminated samples, whereas the mouse bioassays and other similar methods may take from 24 to 72 hours. Lastly, the kit is devised in such way that anyone will be able to use it, without need for specific knowledge, therefore making it useful even in artisan fishing.

### Team

Kaitek labs was founded on 2013 by Emilia Díaz (CEO), student of Civil Engineering in Biotechnology from the Pontifical Catholic University of Chile. She leads the administrative and economic sector of the company, while Cristóbal Aller and Felipe Varea (CTO & COO, both students of Civil Engineering in Biotechnology as well) lead its technical area. The company aims to become a reference in R&D&I in biotechnology both at national and international level, and a pioneer in bacterial computing and environmental biosensors.

Kaitek's current project, the RTDK, won third place in the national-level college contest Jump Chile (by EmpreundeUC and Sura), second place in Entrepreneurship Afternoon (by FriendsUC), was a finalist at Bayer's Environmental contest on 2013 and was also one of the winners of IncubaUC's High Tech Program, which gave Kaitek access to said incubator. On December 2013, it was granted its main funding (USD 340K) by CORFO.

### Elevator Pitch

The Red Tide Detection Kit developed by our team will provide a fast and easy way to identify water and seafood poisoned by red tide toxins. It's based on a marine toxin biosensor - a genetically engineered cell culture capable of sensing the presence of a target toxin and changing its color accordingly. The use of our product will diminish and hopefully prevent the risk of intoxication and death derived from the consumption of contaminated seafood, while also averting the associated economic loss.

### Market Opportunity

There are at least 28 countries gravely affected by the red tide phenomena, including massive markets such as USA and Japan. Only in the USA, the economic loss associated with red tide occurrences ascends to 82 million dollars per year. There's also an average of 1600 registered cases of intoxication due to ingestion of contaminated seafood per year. At least 300 of said cases end up in death. In Europe, while the loss associated to the shellfish industry reaches 200 million dollars per year, the tourism industry suffers a loss of approximately 1 billion dollars. The cases of intoxication per year is 60.000 in average. Starting on 2015, mouse bioassays have been banned by the EU. The new official method proposed is based on MS-HPLC. It requires expensive laboratory equipment and a high level of training for the users. Its implementation cost in Chile is of at least USD 200 M.

### Problem

There are currently no methods that provide a fast and easy identification of seafood and water contaminated by red tide toxins, while remaining cost-effective. Chile's Public Health Institute has made it clear in its many reports on the matter that there are currently no other ways of testing samples but taking them to specialized laboratories distributed unevenly throughout the country. Other countries have similar difficulties, or have implemented expensive methods that have not solved the problem, for it is still necessary to invest in new equipment, laboratories and qualified scientists to perform the tests.

### Solution

The red tide detection kit our team proposes will be able to indicate by a simple color change whether or not a certain sample has been contaminated by red tide toxins. This will be accomplished by generating a genetically engineered cell culture known as a biosensor that will have the ability to measure the amount of certain toxins present in said sample. This test will be easy to apply, and will display results in no longer than an hour, time we hope to reduce to minutes. It will also be applied *in situ*, eliminating the necessity of special laboratories and also making it possible for someone with no background on biology to understand the results. The user interface will be as simple as a maternity test: a color change will indicate contamination, no further indications needed.

During the project's first stage, the team will focus on developing the H-RTDK, that is, a detection kit for the hydrophilic toxins of red tide. On the next stage, the L-RTDK will be developed (for lipophilic toxins), completing the RTDK as a whole.

### Technology

Bacteria have a natural capacity to gather and process information about its surroundings. This computer-like function has been overlooked for many years, and never before has there been an initiative that harnesses such capacity. By giving this natural functionality both a purpose and a human interface, we can turn bacteria into information gathering machines, capable of expressing their findings to human users by simple organoleptic changes.

RTDK is an example of this *bacterial computer* or *new generation biosensor* approach. Using Synthetic Biology tools, our team has been capable of devising a pathway that allows a cell culture to measure the amount of a certain targeted toxin and then display an optical change in order to inform the results to the user.

### Market Validation

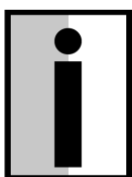
Our team has already been contacted by numerous interested parties, both at a national and international level, whom have signed letters of interest. Institutions such as the Pontifical Catholic University of Chile have shown interest in housing our lab and providing mentoring from diverse sources. Other parties have also shown interest in buying the product once it's been validated statistically.

We hope to perform an extensive research and validation on international markets during the first months of the oncoming semester.

### Why Invest

We can assure the red tide detection kit will be the most cost-effective solution in the market. It will be also the fastest test available for at least a couple of years.

The use of our technology will diminish intoxication and death cases throughout the world caused by the red tide, while also preventing the associated economic loss.



IncubaUC



Impulsa tu idea  
**JUMP**  
CHILE  
Concurso Universitario por EmpreundeUC

**CORFO**  
sueña emprende crece