

#### "DNA-DNA Macro array for the detection of enteropathogens in environmental and clinical samples "

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# **Technology description**

The invention consists of a dot blot membrane containing all the genes responsible for causing enteric diseases in humans, cattle, poultry, fish and shrimp by duplicate. The genes fixed in the membrane were printed by a high precision robot after PCR amplification of the genes from positive control bacteria. The membrane design allows DNA-DNA hybridization with any type of DNA extracted and marked by either fluorescent dye or radiation. Once hybridization has occurred, only specific genes detected in the sample are marked. A simple read can be made by human eye using the labelled card explaining the position of each gene in the membrane. This membrane is easy to handle and the hybridization method is easy to do, it does not need sophisticated equipment or training therefore it can be set up in any place where water and food quality is a concern for public health. The membrane has proven to be highly specific and sensitive in identifying all the enteropathogens microorganisms.

### Applications, usage and benefits of the technology

This macro array is based on the idea that pathogenic genes are independent evolutionary units that can move by horizontal gene transfer in bacterial populations and cause novel diseases. Since these genes are under constant attack by the host immune system or antibacterial agents, they tend to evolve faster than other genes. Hence the DNA-DNA based dot blot accommodates for both, the moving of the genes and their evolution. Moreover, all the genes associated to human and animal enteric diseases are in the same membrane therefore by extracting the DNA of any clinical, food or environmental samples (water, soil, faeces, sediment, raw meat) it is possible to detect potential pathogens for both human and animals. This constitutes an advantage with respect to analysis conducted in hospital facilities, where DNA extracts from faeces, blood or urine of patients are analysed with one membrane for each disease. The aim of this invention is to prevent or to diagnostic the disease by finding of the source of contamination in water and food and to make a quick diagnostic in the medical practice.





### **Technology readiness Level**

The array is ready to use. It has been successfully tested in environmental samples in shrimp farms presenting early mortality syndrome, where toxins in the water were detected.

## Market information



Diarrheal diseases remain the leading cause of death in children under two years of age; Transmission of diarrheal diseases is through food and water contaminated with the different enteropathogens. The DNA DNA macro array can be used as a health marker by environmental authorities for testing niches such as water treatment plants, beaches and fountains as well as the in the food industry. It is also useful for authorities interested in epidemiological surveillance and in medical practice for the diagnosis of gastrointestinal diseases and others systemic diseases that threaten the patient's life (meningitis and septicemia) associated with enteropathogens. The use of this technology ensures a reliable and rapid diagnosis, reducing the cost and time of identification of the responsible microorganism.