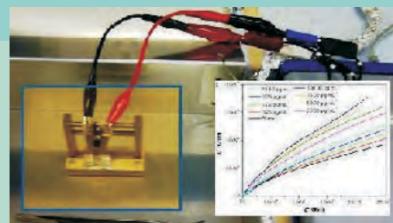


Salt Tolerant Bio - Growth Enhancer for Increasing Productivity of Agri - Horti Crops

A biochip based high throughput milk screening platform for chemical and biological contaminant analysis (Pesticide residues, aflatoxin, heavy metals and bacteria).

Technology Description

A chip based optical biosensor technology is developed to achieve screening of a large number of milk samples (up to 200 samples per hour) at the milk collection/processing centre for organophosphate pesticide residues (meeting the stringent European Union Standards for total residual concentrations). The technology requires a read out device and biochip consumables. Low sample volume (few micro litres), short analysis time (up to 50 samples/chip /15 minutes) and low cost are the key features. The biochip can be stored at 40C. The lowest detection limit achieved for total organophosphates using this technology is 10ng/L in milk. This chip based platform can be



Name Of institute: BITS, Goa & IIT Delhi
 Stage of development: Ready for Commercialization
 Patent status: Filed
 Scientific Experts:
 Prof. Sunil Bhand
 Prof. Sudhir Chandra

Background

The current repertoire of standard techniques for pesticide residue analysis in milk such as HPLC, LC-MS/MS, GC-MS/MS methods are very expensive (few crore Rs), need highly trained man power. The analysis time is very long and is practically difficult to routinely analyze large number of samples which cannot be used in the field. Electrochemical methods are seen as complementary to the aforementioned techniques, and are especially attractive because they allow the possibility of creating inexpensive and portable instrumentation (Ron & Rishpon, 2010; Raja &

Benefits / Utility

Platform technology with high sensitivity, significantly reduced cost per sample, rapid analysis, reduced sample preparation, significantly reduced in waste. Feasible for supply chain monitoring. Can be tuned to other matrix such as water, juices etc. Other analytes such as toxins,

Country Context

Nonspecific to country

Scalability

Scalable (Currently operated on a lab scale) The process used in fabricating the analyte sensor chips are all production worthy process used in IC manufacturing. The biochip preparation is also scalable as per business

Business and Commercial Potential

Very high potential technology for value addition to milk, water and food processing industries. Business opportunities for both entrepreneurs, small and medium enterprises as well as existing biotech companies. Opportunity for manufacturing Industry and biotech industry. A low cost PROTOTYPE equipment to be ready by

Potential investors to this technical innovation

(users): Large scale analytical/bio-analytical equipment manufacturers. Entrepreneurs. Referral labs., regulatory agencies such as FSSAI, etc. Organized large and medium dairy enterprises.



Prof. Sunil Bhand
 918322580332
 sgbhand@gmail.com;
 sunil17_bhand@yahoo.com

Financials

₹ Total Capital Investment (excluding Land and licensing fees) : Rs 3 Crore approx for a new company. (Moderate level of capital investment). Technology can also be outsourced to a standard IC lab, CEERI Pilani/BEL). Batch production possible through various SMEs. ₹ The equipment manufacturing and chip manufacturing can be outsourced to different companies or entrepreneurs. ₹ The bio chip development is feasible at the diagnostic company as per requirement. Rs. 50 lakh investment is sufficient for biochip development. ₹ Break of capital investment: Infrastructure of two types is needed. 1. An IC manufacturing type of company experienced in handling silicon wafer, etching and sputtering and packaging facility. 2. An infrastructure for a small biochemistry lab is needed for making reagent kits and biochip as per the batch requirement. Approx Rs. 50 lakh beginning investment. ₹ Variable cost (per month/unit):

Target Market / Customer

₹ Milk Processing industry ₹ Milk collection units/centres ₹ Milk/milk product exporters ₹ Food safety monitoring labs (regulators) ₹ Milk referral labs, analytical testing laboratories

Limiting factors for large scale commercialization

Field trials for the prototype by Nov 2013

Social impact of the technology

The developed biosensor will help people to determine presence of low level of toxic residues of organophosphate pesticides in milk, water thereby increasing the quality of life of the people in the society. The technology can do large scale screening of few hundred samples in a short time thereby can facilitate screening of low quality of milk and thus help milk processing industry to improve quality of products in supply and production chain. This in turn will significantly help improve the quality of export products which otherwise are at times being rejected due to presence of residues.

Any other relevant information

This is a platform technology which will utilize one single machine of approx Rs. 20 lakh or less as one time investment against conventional LC-MS/MS machines. This biochip platform can support quick screening to identify the bad samples as well as good samples. By merely changing the biochip, other analytes can also be detected such as heavy metals, aflatoxin and bacteria. This will be a major cost