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Is your food and water contaminated?

Bactusense from Israel will give real-time identification and analysis of bacteria in food processing plants, water systems, hospitals and more.

By Abigail Klein Leichman May 19, 2014, No Comments

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What if one product could detect bacteria in food-processing plants, hospitals and municipal water supplies — inexpensively and in real time?

Thanks to Israeli nanotechnology, that product is on the horizon and has the potential to save millions of lives lost to bacterial contamination every year.

The Bactusense optical biosensor, still in development, uses silicon-based microchips to trap bacteria from any liquid – such as water, milk or blood — flowing through the system. The optical scanner then identifies the trapped microbes.

Bactusense's technology was invented by Prof. Amir Saar of the Hebrew University of Jerusalem and Prof. Ester Segal of the Technion-Israel Institute of Technology. The IP was licensed in May to Capitalnano, Israel's leading investor and founder of startup companies based on nanotechnologies coming out of Israeli universities.

Capitalnano Managing Partner Ofer Du-nour says the system could be configured in different versions to identify specific kinds of bacteria in water, food, air, soil and body fluid samples. Each chip in the system will cost less than $1 to manufacture, while the cost of the entire optical setup is estimated to be around $10,000 depending on its intended use.

"It can be used as a continuous monitor for water systems or for food processing," Du-nour tells ISRAEL21c. "Or it can be used on an as-needed basis for analyzing blood or urine samples of patients being admitted to hospitals. Basically it's the same core system with slight variations. There would be an add-on for water systems to provide remote sensing, so it can be in the field without any need for a person to operate it."

Lots of potential customers

Access to clean water has become one of the major challenges on the planet. It's estimated that more than 780 million people worldwide can't find clean drinking water, and that 3.4 million people die each year from diseases related to contaminated water.

The picture is nearly as grim in regard to processed foods. In the United States alone, bacterial contamination developed during food processing causes 3,000 deaths and 48 million non-fatal illnesses each year.

And in hospitals, where bacterial infections are a constant concern, current technology takes two or three days to positively identify the presence of bacteria and its type. In the meantime, the patient is not receiving treatment – or possibly getting the wrong treatment — putting all surrounding patients and staff members in danger and encouraging the growth of resistant "superbugs."

Bactusense is not the first Israeli technology to attempt to address the lag in identifying hospital-borne infections. Real-time solutions on the drawing board include a bedside kit and an automated DNA analysis of PCR (polymerase chain reaction) tests, the most popular molecular diagnostic technique

However, nothing quite like Bactusense exists in the market, the company claims.

"We saw several attempts to do what we do, and it comes down to the sensitivity of the system and its ability to distinguish between live and dead bacteria," says Du-nour. "This is important in the food industry, because after you've cleaned the machinery you still have dead bacteria present and you don't want to count them."

In addition, "it's not enough to know you have bacteria; you have to know which one. Usually you're looking for a specific type, and we'll have chips to find those and ignore the other types."

No surprises in your processed food

Du-nour predicts that Bactusense will be commercialized within two or three years. "I believe the first target would be the food industry," he says.

The cost of bacterial contamination for the food industry is huge, especially when you factor in the costs of widespread recalls and public-relations damage. So it's not surprising that several potential customers from this sector have already expressed keen interest in getting a prototype of the Bactusense system installed their factories ASAP.

"The basis of Capitalnano is that we think there is a huge potential for technologies in universities, especially in the area of nanotech, and we look for those we think are the best, for which we think the investment of time and money is not that large," says Du-nour.

"We license technologies that are pretty close to being mature and we build startup companies around them. We always aim for things that are not only wise in a business sense but have some value for helping humanity."

Capitalnano was founded in 2012 by entrepreneur and investor Nir Davison, and its advisory board includes Prof. Chezi Barenholtz and Prof. Shlomo Magdassi of the Hebrew University, Prof. Arie Zaban of Bar-Ilan University, Prof. Rafi Semiat of the Technion, Prof. Alexander Blankstein of Tel-Aviv University and Yaron Kniajer of the Rhodium investment fund.

For more information, see www.capitalnano.com.

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About Abigail Klein Leichman

Abigail Klein Leichman is a writer and associate editor at ISRAEL21c. Prior to moving to Israel in 2007, she was a specialty writer and copy editor at a daily newspaper in New Jersey and has freelanced for a variety of newspapers and periodicals since 1984.

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