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Headline: Milk goes green!

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Milk production in the traditional dairy industry puts the ecosystem and animal welfare at huge risk with its intense demand for nutrition.

Dairy farming contributes to land and water degradation, biodiversity loss, and deforestation. It also puts the very source of nutrition (the animal) through unnecessary suffering. Animals in cattle farms do not have sufficient personal space, contact with other animals and range.



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This dilemma between milk being an essential dietary component of a vast majority of the global population and the ecological strain required to sustain it demanded outside-the-box thinking.

The greatest solutions in the history of mankind were born out of crisis. and necessity. The ability to adapt and innovate in times of need is sustainability demands. It is also what separates leaders that show the way forward from those that follow.

OpenGov Asia is always seeking to recognise and promote such leaders of innovation. This pursuit has led to a partnership with Singapore Management University (SMU) Institute of Innovation and Entrepreneurship (IIE), which provides support and a platform for budding innovators.

In our first article of this series OpenGov Asia had the opportunity to speak with the Chief Operating at Anzene.

Continuing our journey, OpenGov Asia took the opportunity to interact with another innovative team at SMU IIE trying to create a dent in this 716-billion-dollar dairy industry – TurtleTree Labs.

Wanting to be the first to produce clean milk using a laboratory process that bypasses the environmental degradation and simultaneously addresses animal welfare issues of industrial dairy, Fengru Lin – co-founder of the company and SMU alumna – shared her story with OpenGov.

It all started with a hobby to create cheese. Unfortunately, it was a challenge to find good quality milk in Asia, due to the climate, rampant contract dairy farming and hormones injected to cows.

In her journey for clean milk, Fengru met Max – a shrewd strategist and food-tech enthusiast – who shared her vision and passion. The partnership led them to create a best-in-class scientific and business team and organisation – TurtleTree Labs.



From the very beginning TurtleTree Labs had their core values laid out clearly – scientific innovation and a sustainable pragmatism.

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This clarity allowed them to create a sound go-to-market plan and to grow its team in line with these values.

Apart from having a strong business and scientific ethos, they are zealous about compliance. Their regulatory team is a crucial part of their business, both ensuring organisational adherence to as well as influencing the nutrition industry norms.

They are closely working with Singapore Food Agency on this front and are also a part of a sandbox in Singapore that is building knowledge and regulations on novel foods around the world.

Enlightening OpenGov about their sustainable process of producing milk in a lab, she explained the extensive process that allows them to produce milk from all mammals in the lab.

The process sources stem cells from actual mammal milk, then proliferated to a large enough number before transferring to a bioreactor.

In the bioreactor, they are exposed to a lactation media that contains the hormones and natural components that are present in a mammal. The cells eventually differentiate into mammary gland cells, replicating the environment and process that happen in actual mammals.

The cells then convert the lactation media into milk under specific conditions. The last step is filtering out the cells and obtaining the end product: clean milk!

Milk produced from this process has a similar composition as real milk and can be utilized for making milk products such as butter and cheese as well.

The lab processes and equipment are subject to strict standards keeping in with the Food and Drug Administration (FDA) and Singapore Food Agency (SFA).

TurtleTree labs plans to take their product to market via a B2B Model. Their Chief Strategist, Max, shared that they are focused on partnering with the existing dairy and infant nutrition companies in the industry. They are offering a far more sustainable supply source for their existing dairy production lines.

Products produced using TurtleTree Labs technology can reach a wider consumer market through the well-established supply chains of these dairy corporations. Experience of industry leaders and their deep knowledge of consumer insights will help TurtleTree Labs understand which products are in higher demand and more valuable, giving them long term focus points. Their interactions, thus far, have revealed a high interest in the infant nutrition segment.

They will initially address a propitious market opportunity in Asia, then move into other promising market areas similarly driven by increasing populations seeking better nourishment.

Turtle Tree Labs has business and regulatory teams based in US and Singapore while their research and development team is primarily based in Singapore. They are currently enrolled in SMU IIE's flagship incubation programme, Business Innovations Generator and were awarded the HSBC-SMU Sustainability & Innovation Grant. They have also received tremendous support from A*star and NUS in transforming their vision to reality.

An integral part of the company is the TurtleTree Foundation – an expression of their corporate social responsibility commitment. Set up from the inception of the company, it reflects another of their core values – to give back to society.

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The foundation is working with the Smithsonian Institute to produce snow leopard milk in their labs. Snow leopards are an endangered species. Apart from the danger posed by humans, snow leopard cubs face a threat closer home. The cubs have to be separated from their mothers because of the risk of being attacked by them. As such, an alternate source of milk is vital to their survival.

In Sumatra, the foundation is collaborating with an elephant orphanage to create elephant milk for the orphaned babies whose mothers have been captured or poached for their ivory.

TurtleTree Labs is built on the foundation and premise of caring for the society and supporting it through their business practices. Not only is it eliminating the exploitation of animals by producing milk in the lab, their technology is tackling their nutritional needs that are disrupted by human intervention.

OpenGov Asia deeply appreciates TurtleTree Labs' sustainable innovation ethos and its concern-in-action for the environment and wishes them the best in their endeavours.