

# International Agri Insights

with Professor Bill Bailey

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## It's milk Jim, but not as we know it

In this latest edition of *International Agri Insights*, our US-based expert, Prof. Bill Bailey, gives his insider's take on the development and potential threat of "cow-free" dairy alternatives.

- Major US agricultural giant partners with California dairy biotechnology company.
- Company's technology will produce whey and casein without dairy cows.
- Company's products contain proteins identical to those from dairy cows.
- Current dairy industry could face significant challenges from laboratory-produced dairy products.
- Products not yet on the market, but expected sometime 2019.

## The battle over the right to use the name "milk" is heating up

When I was growing up in the United States – a long, long time ago – a local dairy company used the slogan that the fluid milk it sold came "from contented cows." Recently, at my local US grocery store, when reviewing milk containers, I saw no mention the milk sold came 'from contented cows' but I did see milk containers referencing milk coming from cows that were considered family members. The central message for both promotional efforts was cows were an essential part of dairy production and were all well treated.

Looking further along the store's dairy area, I also saw an array of products which were not from either contented or even indifferent cows. These new product additions to the store's dairy section were made from a variety of products - almond, cashews, soybeans, oats and rice. And these products were sold as 'milk'. But they did not come from dairy cows. A similar situation, an array of plant-based milk and dairy products in the dairy sector, is also easily seen in grocery stores in New Zealand.

In today's world milk is still commonly assumed to originate from animals - cows, sheep, goats or camels. That is changing. According to the United States Department of Agriculture (USDA), in 2017, daily fluid dairy milk sales in the US reached their lowest level since the USDA began keeping records. In contrast, over the past five years, sales of non-dairy fluid milk have increased more than 60%. The percent of total US dairy milk production devoted to fluid milk production has declined, steadily. While fluid milk consumption in New Zealand continues to grow, dairy shelves in grocery stores in both countries have a growing number of plant-based 'milk' products, all reaching for the consumers' food pocketbook.

In response to the growing competitive challenge of non-dairy fluid milk alternatives, the US Government is thinking about not letting plant-based products use the name 'milk'. So in lieu of milk, such plant-based dairy products might be called, well, 'plant-based dairy products.' Such regulatory name changes have not yet been forced on the US industry. A similar effort, also directed at the proliferation of plant-based dairy products, is underway in the European

Union (EU), where EU judges have ruled vegan dairy-alternative products cannot be sold within the EU under names such as 'milk', 'butter' and 'cheese'.

### While, the US dairy industry is facing up to the challenge of “cow-free dairy”...

But the real challenge facing the US dairy industry, and possibly the world's, is the emerging use of technology to create milk proteins from sugars and nitrogen – with the creation of whey and casein first on the technology creation list. And these new products clearly point toward the reality those products will be created without a dairy cow in sight.

This means the competition faced by the fluid milk sector will soon be joined by competition for the dairy sector's production of whey and casein. Technology to create an array of brand-new competitive dairy products other than fluid milk is both available and growing. And all of those evolving new dairy products come not from dairy cows but from the laboratory. This technology has been developed using technology and techniques now funded, in part, by a major US-based agriculture company.

### ...and its lower environmental footprint

A San Francisco company, named Perfect Day, has teamed with Decatur, Illinois agriculture giant Archer-Daniels-Midland (ADM) to begin marketing what Perfect Day refers to, on their website, as “animal-free dairy products that taste like the real thing”. What Perfect Day recognizes, as do many dairy analysts, is the strong possibility of significant growth in the plant-based dairy market as the animal-based dairy market stagnates. Perfect Day and ADM wish to be part of today's, and the future's, changing and growing dairy market. To help position Perfect Day's business mission, several quotes from their website (<http://perfectdayfoods.com>) are very instructive. The quotes below directly relate to concerns expressed by a growing number of affluent and urban consumers.

- We're creating a better way to make dairy protein – the same nutritious protein found in cow's milk. And we're doing it without the help of a single cow.
- How do we do it? Instead of having cows do all the work, we use microflora and age-old fermentation techniques to make the very same dairy protein that cows make.
- We wanted to enjoy the dairy foods we love without compromising on how they taste or our commitment to the environment. Perfect Day dairy protein is as nutritious and delicious as traditional dairy – with less impact on the earth.
- A Smaller Hoofprint: Crafting dairy protein without cows means we can do more with less -
  - o Less energy consumption
  - o Less greenhouse gas emissions
  - o Less land used
  - o Less water consumed

Perfect Day uses a blend of traditional and well-established biotechnologies to convert sugars and nitrogen into milk proteins. The proteins it produces are identical to dairy proteins, from both a functional and a nutritional point of view. But those dairy proteins are produced without the dairy cow.

Perfect Day's biotechnology process appears to produce dairy products much faster than conventional dairy cows produce them. In addition, Perfect Day's technology uses significantly fewer natural resources than traditional milk protein production.

Currently, their product line is limited to whey and casein. Further, according to those who have tasted its fluid milk, Perfect Day's milk tastes like traditional milk – and much better than plant-based milk products. A selling point, according to its supporters, is Perfect Day's milk protein products are produced without affecting the environment through methane release, water degradation and, a big deal to some, animal stress is completely eliminated.

### Though it's not clear yet how fast this technology can be scaled

Perfect Day's products are not yet available to either other businesses or consumers. Their technology is evolving, albeit evolving more quickly than previously with the potential for substantial funding assistance from ADM.

Further, there is a considerable difference between having the technological knowledge to create dairy proteins and having the ability (production scale) to produce enough product to meet significant industry and consumer demand. Currently, it is not clear if Perfect Day is able to scale its technologies to become a major dairy industry participant.

### Nonetheless, the technology has the potential to disrupt the US dairy industry

However, as non-dairy cow dairy alternatives become more widely available, what changes might this mean to the dairy industry? Just as cropping patterns have changed for agriculture as markets and new technology appears, perhaps changes might be coming to other parts of world agriculture, including dairy.

### About the author

William C Bailey was Chair of Agribusiness at Massey University for 13 years. He has written weekly world dairy market columns for ASB Bank for almost 15 years. He currently is President of Topker Consulting, specializing in agricultural market research and supply chain issues relevant to agriculture. He retired as Dean, College of Business and Technology, at Western Illinois University, in Macomb, Illinois, in July, 2017. Bill spent 5 years in the US Marine Corps and received his PhD in Agricultural Economics from the University of Missouri. Before shifting to New Zealand, Bill was Chief Economist for the US Senate Committee on Agriculture, Nutrition and Forestry, served as Deputy Undersecretary of Agriculture and was Vice President and Director of Research for World Perspectives in Washington, DC. His beer of choice is Tui. Contact Bill: [topkerconsulting@gmail.com](mailto:topkerconsulting@gmail.com) Phone: +1 309 333 5117



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