

The meat of tomorrow being grown in laboratories

Article by Tarja Halla (*Maaseudun Tulevaisuus*, March 16th, 2007)

If biotechnology researchers are correct, some of the world's meat production will soon move from farms into laboratories. "Finland needs to open a public dialog about the future of meat consumption," says researcher Markus Vinnari of Finland Futures Research Centre.

Laboratory-grown meat has been brought to the forefront in a research venture that examines the future of domestic consumption and the change factors affecting it. The MIRHAMI (Mitä ruoaksi huomenna, *What do we eat tomorrow?*) venture links together a broad group of researchers, all trying to ascertain what food consumption in 2030 will be like.

Pizza with artificial meat toppings or artificial meat sausages may sound like science-



fiction now, but several universities in the Netherlands and the United States are looking into the issue very seriously. Researcher **Markus Vinnari** has recently returned from the Dutch Wageningen University. These days, this highly regarded food and food production university is actively developing meat from cell cultures. Wageningen University is also conducting studies into meat-substitute protein products.

artificial meat will come onto the market at some point. The question already asked is how to bring this meat to our dinner tables."

"The meat producers in Holland seem to take for granted that

Sausage recipes renewed

Companies are keeping a close eye on a University of Utrecht study where a ground meat type of meat mass, made from pig stem cells, is being grown in a bioreactor. This substance is expected to serve as raw material for sausages, hamburgers and meat sauces. "We already know how to grow the meat mass, but a global problem at the moment is creating a texture similar to meat," Vinnari says.

Laboratory-grown meat is being researched to find a way to ease the serious environmental problems caused by Holland's meat industry. Artificial meat may,

according to Vinnari, also be of interest to consumers concerned about animal rights. After all, no animals will need to be killed when producing artificial meat.

Researchers familiar with the global development work predict that meat-producing bioreactors will be commonplace in 20-30 years.

Foreseeing global developments

Artificial meat is only one of the global trends that Vinnari believes Finland should be paying close attention to. In the MIRHAMI project, experts have highlighted dozens of change factors affecting domestic spending. These range from fragmentation of consumption to climate change. The study is expected to yield results next year.

“Up until now in Finland, we've been able to pretty much decide by ourselves what we'd like to eat here. Now the interesting question is, will this change?” Vinnari asks.

The global growth of meat consumption can be expected to affect Finnish meat prices in the future. “If the growing middle classes of China and India are ready to pay premium prices for meat, the prices will go up for us as well, eventually. People in the Western world will probably be willing to replace meat with other products if market prices start to rise considerably,” Vinnari says.

Meat valued in China

According to Vinnari, it is clear that global farmlands and water resources will not be enough to provide a European-style plentiful life for everybody. “We'll run out of clean water before every Indian and Chinese person will have access to the same amount of beef as Europeans.”

Meat consumption has already grown immensely in China. According to FAO statistics, yearly consumption at the beginning of the decade was around 15 kilos per habitant, and now the figure is more than 50 kilos. In Finland, this level was reached in the early 1970s. There's also a matter of culture to consider – a high-quality assortment of meats, after all, is just about the best thing you can bring to a Chinese home as gift when visiting.

Luxury or staple food?

In the Future, Finland will be even more susceptible to foreign influences, and traditional and ethnic foods will compete with each other. How this is going to play out will, according to Vinnari, be settled by the Finns' ability to value their own foods. “Cleanliness will not win the day if the food is not otherwise pleasant to eat.”

“It's worth considering whether meat use will continue to grow as an everyday consumer staple or if meat will acquire a new status as a delicacy for special occasions. Both scenarios are possible.”

Vinnari estimates that Finland may become a significant exporter of high-quality meats. The country has the makings for creating a good brand that captures the image of a good production environment, as there's no shortage of clean water and green pastures in Finland. However, farmers pondering their future should keep in mind that some changes will be required before cheap imported meats will disappear from the store shelves.

The Reign of the consumer

The expert opinions from the research venture would seem to point to a slowdown in the growth of meat consumption in Finland. The growth is led by broiler meat with pork trailing close behind. Consumption of beef may even decrease, unless its use is made easier through product innovation. However, surprises are possible. According to Vinnari, the consumer is turning into the true leader of the food markets and it pays to be interested in what the consumer desires.

The popularity of various special diets is also working to fragment consumers into small groups that can be challenging for the industry to handle. Through online discussion groups, these small groups are exchanging more and more information among themselves regarding good and bad products.

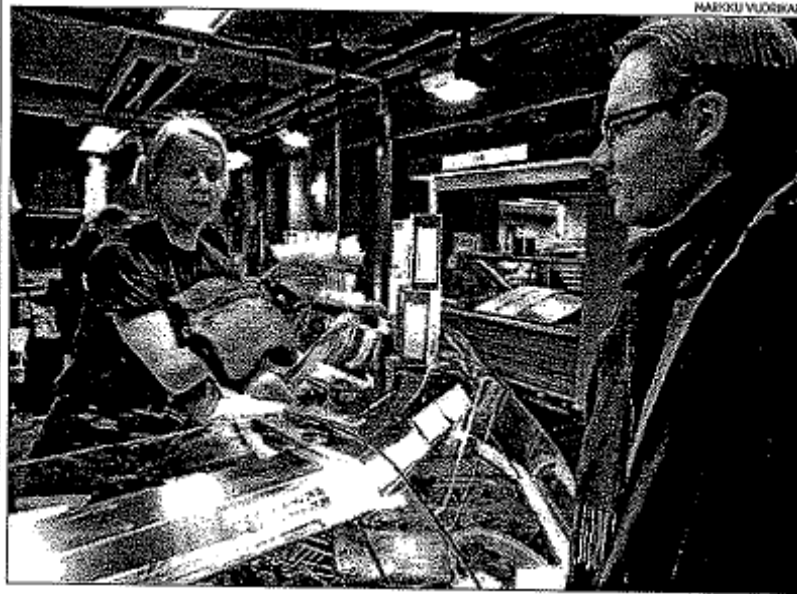
An old saying in the Finnish foodstuffs industry, “from our fields to your tables,” may not be appropriate for the future. Vinnari sees the saying's roots as production-oriented thinking, whereas in the new consumer-oriented world, the viewpoint is set at the dinner table looking outward.

Meat consumption moderate in Finland

Finnish meat consumption is moderate compared to other EU countries. The average yearly meat consumption in the EU in 2004 was 89.9 kilos per capita, compared to the Finnish consumption of 72.8 kg per capita.

In 1900, Finns consumed 32.2 kilograms of meat per capita. Exactly half a century later, with the difficult war years still hindering the advancement of prosperity, meat consumption was down to 28.8 kg/capita. After this, the consumption began to rise steadily in the 1950s. Broiler meat started gaining popularity at dinner tables in the beginning of the 1970s.

The MIRHAMI project is mainly funded by the Ministry of Agriculture and Forestry. Research is conducted by Finland Futures Research Centre, Agrifood Research Finland, the National Consumer Research Centre, and Finpro.



*Caption: High-quality meat will always hold its place, believes researcher Markus Vinnari and entrepreneur Pirjo Passinen. **Reinin Liha** is a traditional meat store in Helsinki's Hakaniemi market hall.*

No shortage of protein for Finland

Professor of Meat Science and Technology **Eero Puolanne** from the University of Helsinki estimates that Finnish researchers are not yet actively following the development of laboratory-grown meat. Finland will not be facing a protein shortage, Puolanne emphasizes.

However, global meat consumption is still a cause for concern for Puolanne. The growth of consumption cannot continue the way it has in previous decades. "As a scenario, this is impossible. The issue will have to be dealt with one way or another in a controlled manner, or the whole system will face collapse. We most likely will not be able to offer everybody the same amount of meat that people in Western countries are eating now. The planet's resources are simply not enough to provide for it."

Puolanne points out that the amount of fields and pastures is decreasing constantly as farm land is put to other uses. At the same time, population growth continues. There will be more shortages of clean water and protein in the future.

Meat production in Europe is dependant on global streams of feed and fertilizers, both of which Finland is these days nearly completely dependant on. These kinds of one-way "mega streams" will, according to Puolanne, eventually have an affect on global meat consumption.

Environmental issues, safety and ethics may also cause a downward trend to consumption.

“The Netherlands produces hundreds of millions of kilos of meat for export but the imported nutrients used by the meat industry will stay in the soil in the form of manure. This is the scenario that cannot continue forever.”

The rise of the price of meat in global markets seems inevitable. “Production costs for us will not necessarily grow significantly, and in the short term, this may improve the options of Finnish meat producers.”

Finland has an advanced meat processing industry. “The Finnish meat industry is looking very strong. We’re basically dominating the whole Baltic region.” Active research in Finland is now concentrating on the effect that animal growth enhancement has on the quality of meat. The research aims to ensure an ample supply of high-quality meat in the future, too.

The Fact Box

Meat consumption will by 2030, according to the FAO (United Nations Food and Agriculture Organization), grow in the industrial countries to one hundred kilograms per capita per year. Currently consumption is around 80 kg.

The FAO recommends that individuals worried about carbon dioxide emissions would cut back on meat consumption.

Meat production has grown globally five-fold since 1950 and more than doubled since the 1970s. In 2004, 258 million tons of meat was produced globally.

Consumption is growing most of all in the developing countries. So far, consumption is up to nearly 30 kilograms per year.

The world’s population is estimated to grow from 6.5 billion to 8.2 billion by 2030.

Meat consumption in Finland 1900–2003

Meat consumption has grown steadily in Finland since the 1950s. It is now approximately 70 kilos per capita yearly. The consumption in Finland is still moderate compared to many other EU countries. For instance, yearly consumption in Spain is already up to 130 kilos per capita.

Grocery spending as a portion of private consumption 1900–2001

Unlike a hundred years ago, the price of food does not take up a majority of private spending. In Finland it's share is nowadays only 13,2 per cent of spending, compared to 60 per cent at the turn of the 20th century.