

A Glance at Switzerland's Innovation Ecosystem in Food and Nutrition

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Abstract: There are many reasons why Switzerland is a unique location for innovation: political stability, a stable and liberal economic system, outstanding infrastructure, excellent education, close links to foreign markets to name just a few examples. The chemical, pharma and life science industries are also a big driver of innovation. Multinationals' partnerships with small- and medium-sized businesses, research and educational institutions as well as university spin-offs make a great contribution in promoting Swiss innovation, notably also in food and nutrition.

Keywords: Food · Innovation · Industry · Life sciences · Nutrition

1. Switzerland: A Unique Location for Innovation in Food and Nutrition

Switzerland is top in the world when it comes to innovation. In 2019 according to the Global Innovation Index,^[1] our country claimed the title of world's most innovative for the ninth year in a row. Among the key elements for this success, besides a stable economic and political framework, are Swiss universities and research institutions. Yet, to produce marketable products and services, Swiss universities must have the best possible links to the economy.

The success of Chemistry, Pharma and the Life Sciences as Switzerland's biggest export industry is founded to a large extent on its ability to innovate. More than 12,000 employees and annual investments of over 7.2 CHF billion in research and development serve as the breeding ground for new, highly specialized products for the global market. With a share of some 40% of all private investments in research and development in Switzerland, this sector has for many years been the biggest research industry and thus a great promoter for Switzerland as an innovation hub.

Switzerland is home to a unique ecosystem in the area of food and nutrition. This is due to its deeply rooted agricultural tradition, an unmatched density of world leading companies and scientific institutions as well as a large number of startups in areas such as food, nutrition, life sciences or robotics.

This article covers some industry collaboration and initiatives, which show how multinationals' partnerships with small- and medium-sized businesses, research and educational institutions as well as university spin-offs make a major contribution in promoting Swiss innovation in this sector.

2. The Swiss Food & Nutrition Valley: A Multi-stakeholder Initiative to Enhance Innovation in Food and Nutrition

The Swiss Canton of Vaud, the Swiss Federal Institute of Technology in Lausanne (EPFL), the Swiss Hospitality Management School in Lausanne (EHL Group) and Nestlé have joined forces to develop and promote a global innovation ecosystem on food and nutrition. Driving forces are Switzerland's large existing food industry, with many leading global players and an emerging startup scene, as well as the untapped synergy potential in collaborating together to address future food and nutrition challenges.

The initiative was launched at the WEF in Davos in January 2020 by federal counselor Guy Parmelin as the 'Swiss Food & Nutrition Valley'. Topics are not limited and reach from sustainable agriculture to waste, from innovative products to healthy, sustainable diets and from nutrigenomics to packaging sciences. The initiative aims at establishing Switzerland as a world reference in sustainable food and nutrition innovation by applying cutting-edge science and technology.

The founding partners' objective is to further strengthen the existing innovation ecosystem by attracting international talents, startups and investment to the region and facilitating connections between the different players. The initiative is supported by an extensive network of regional innovation-focused associations and competence centers, techno-parks, incubators and accelerators, including the Lausanne-based EHL Innovation Village and the Nestlé R&D Accelerator.

Membership is open to any organization who may wish to further contribute to solutions for a sustainable future food and nutrition system.

Swiss Food & Nutrition Valley



Key Figures

Founding Year	2020
Location	Lausanne
Legal Form	Association
Founders	Canton de Vaud, Nestlé, EPFL and EHL

Contact

Contact Person	Fathi Derder (Managing Director)
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3. The Future Food Initiative: A Joint Research Program between Swiss Universities and Industrial Partners

In 2019 ETH Zurich and EPFL launched the initiative ‘Future Food – A Swiss Research Initiative’ in partnership with the companies Bühler, Givaudan and Nestlé. The goal of the Future Food Initiative is to expand research in the area of food and nutrition sciences. A fellowship program will provide funding for national and international research talent, combining the strengths of the university-based and industrial ecosystems.

The initiative aims to address some of the most challenging food supply issues. For example, major goals include the development of sustainable packaging solutions, so as to eliminate plastic, or high-quality, healthy and affordable food products, to combat malnutrition worldwide. In addition, the competitiveness and innovative capacity of the Swiss food industry is to be increased *via* knowledge transfer and new research directions.

Future Food Initiative	
	
Key Figures	
Founding Year	2019
Location	Zurich & Lausanne
Legal Form	Research Program
Founders	ETH Zürich, EPFL, Bühler, Givaudan and Nestlé
Contact	
Contact Person	Dr Martijn Sonneveld (ETH Zurich) & Christian Schwab (EPFL)
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Website	www.futurefoodinitiative.ch

4. An R&D Accelerator to Boost Innovation and Speed-to-market

In 2019 Nestlé announced the creation of an R&D Accelerator based in Lausanne. The accelerator brings together Nestlé scientists, students and startups to advance science and technology with the objective to accelerate the development of innovative products and systems. Internal, external or mixed teams are eligible to use dedicated hot desks at the accelerator over a defined period of time. They have access to Nestlé’s R&D expertise and infrastructure, including shared labs, kitchens, bench-scale and pilot-scale equipment. The first teams are already operational. The accelerator is part of Nestlé’s global R&D network and located at the company’s fundamental research entity Nestlé Research, which employs around 800 people in Lausanne. The initiative is being extended to other R&D sites and linked to specific business categories. In 2020 Nestlé launched ‘Unleashed’, its own accelerator program that focuses on pet nutrition, health and wellness. Unleashed is a spin-off from the global acceleration program. The program aims to identify and support dynamic and creative startups that integrate science and technologies into innovative products and services for pets.

The first five startups selected as winners of the program have been announced and they will start the accelerator program in July 2020. The program gives startups access to pet health and nutrition expertise, proof of concept funding, as well as established commercial networks. In addition to support, advice and funding

to prove their concept, startups will have access to a wide range of competences at Nestlé Purina, including training, learning and networking opportunities. The aim is to facilitate connections with our businesses to help the startups find synergies and inspiration. Unleashed is calling for startups with a creative mindset and promising technologies including in the areas of personalized nutrition, proactive health & wellness and sustainable solutions including packaging. The program is starting in Europe, Middle East and North Africa.

Nestlé R&D Accelerator

Key Figures

Founding Year	2019
Location	Lausanne (the initiative will be extended worldwide)
Legal Form	Industry initiative
Founders	Nestlé

Contact

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5. Veramaris: A Joint Venture to Promote Sustainable Animal Nutrition

Veramaris was established in 2017 as a joint venture between DSM and Evonik, world leaders in science and specialty chemicals. Its purpose was to develop EPA & DHA Omega-3 long-chain fatty acids from natural marine algae and then produce them on an industrial scale. These were designed for use in animal nutrition, firstly in aquaculture and then in pet food.

Following years of research and development driven by DSM Switzerland, Veramaris has now become a leader in algal technology. Its natural algal oil can be produced on an unprecedented scale.

Its appeal goes beyond its heritage or the quality of the product. It is the fact that it is helping the aquaculture industry, particularly salmon farmers to become more sustainable, which has generated genuine excitement.

It is well known that regular consumption of fish is considered healthy because the valuable omega-3 fatty acids in marine fish have a positive effect on the heart, circulatory system and cognitive development. Nutrition experts therefore recommend putting fish on the menu once or twice a week. However, the increasingly high demand for seafood contributes to the natural stocks of many types of wild fish becoming endangered. Around 30% of the world’s fish stocks are already overfished and 60% are fished to their maximum sustainable yield. Since the ocean’s fish resources are finite, aquaculture fills the demand gap. An increasing proportion of fresh fish consumed by humans comes from aquaculture – currently around half and growing. It is estimated that to meet the increasing demand for seafood, the aquaculture industry will need to produce 30–40 million tons more by 2030.

However, many fish grown in aquaculture depend on omega-3 fatty acids in their diet – they have a nutritional requirement for EPA & DHA Omega-3 in particular, because they cannot produce them themselves. In the sea, these fatty acids are naturally produced by micro-algae and then taken up by krill. These in turn are eaten by fish such as anchovies, and the fatty acids enter the food chain. On the other hand, aquaculture fish (such as salmon) obtain their omega-3 fatty acids from fish oil, which is added to

their feed. Fish oil is extracted from wild fish, so this means that in order to produce fish in aquaculture, large quantities of wild fish still have to be fished and processed into fish oil. This process is not efficient: to produce 1 kg salmon in aquaculture, around 2 kg of wild fish must be processed into fish feed. It is also unsustainable as wild fish are a finite resource. There is therefore an urgent need for a sustainable and unlimited source of omega-3 fatty acids for aquaculture, especially for salmon production. This is vitally important to enable the further growth of aquaculture in a sustainable way and help reduce pressure on the marine ecosystem.

Veramaris' innovative approach in industrial biotechnology now means it is possible to produce the valuable EPA & DHA Omega-3 without relying on wild-caught fish. The single-cell microalgae cultured by Veramaris, produce up to 50% of their own weight in EPA and DHA Omega-3, which is a highly concentrated source of these essential fatty acids. The natural marine micro-algae are grown in a zero-waste fermentation process fed with carbohydrates from agricultural biomass. 1 kg of algae oil can substitute the fish oil produced from 60 kg of wild fish and the Veramaris facility can produce a volume of EPA and DHA Omega-3 equivalent to the annual catch of the Mediterranean and Black Sea fisheries combined. The approach is particularly economical and sustainable because the omega-3 from the algae can be used directly in the feed, therefore reducing the industry's reliance on finite marine resources. In July last year Veramaris started large-scale production from its facilities in Blair, Nebraska which has an abundance of corn necessary for the fermentation process.

Major stakeholders have recognized the need for new sources of omega-3 which are independent of marine resources. Veramaris has worked with these key players along the value chain to accelerate the adoption of the technology and bring more sustainably grown salmon to consumers in several European markets. Today, salmon grown with Veramaris algal oil are sold in leading retail chains such as Tesco in the UK, Kaufland in Germany and Match in France. Soon it will also be found in many brands of pet food.

The most positive impact of this industrial biotechnology is that it provides a sustainable, large-scale supply of EPA& DHA Omega-3, making food systems less reliant on finite marine resources and protecting the biodiversity of the world's oceans.

Veramaris		
Key Figures		
Founding Year	2018	
Location(s)	Headquarter: Delft, Netherlands Production: Blair, Nebraska, USA	
Legal Form	V.O.F	
Founders	DSM Animal Nutrition & Health, Kaiseraugst, CH Evonik Nutrition & Care, Hanau, DE	
No of employees	20	
Scientific Advisors:	Dr David Nickell Vice President Sustainability & Business Solutions DSM Nutritional Products Ltd	
Awards (or other important information)		
May 2020	Swiss sustainability innovation award nominee	

October 2019	Fish Free Feed (F3) Award winner Grand Prize of \$200,000 for selling the most fish free feed ingredients and saving the most fish in aquaculture diets
July 2019	Veramaris announces the opening of their Blair, NE production facility, supported by a \$200m investment, with the capacity to supply 15% of the salmon industry's need for EPA & DHA omega-3 fatty acids
June 2019	German Brand Award "Sustainable Brand of the Year"
Contact	
Contact Person	Karim Kurmaly, CEO
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6. Food Conference Looks for Innovative Startups

Since 2015 the Brennpunkt Nahrung specialist conference provides a platform to experts from business, authorities, science and academia as well as decision-makers along the entire value chain in the Swiss agricultural and food industries to share their knowledge and experience. Since 2017 the conference is offering startups the opportunity to showcase their innovations to an audience of more than 350 people.

The next conference will be held on November 3, 2020, in Lucerne. The Start-up Innovation Corner is supported by science industries, the Swiss Association of the Chemistry, Pharma and Life Science Industry, Swiss Food Research as well as by the companies Bayer, DSM Nutritional Products and Syngenta, enabling startups to present at Brennpunkt Nahrung free of charge.

Brennpunkt Nahrung		
Key Figures		
Founding Year	2015	
Location	Lucerne	
Contact		
Contact Person	Barbara Kretz, Congress management	
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[1] Global Innovation Index 2019, www.globalinnovationindex.org.