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The Original Mycoprotein

1 Why mycoprotein

We’re tackling the problems of future

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Global protein demand set to double 2020–2050*

Traditionally, humans source a large share of their protein intake from beef, pork, poultry, fish, eggs and dairy.

The demand for animal-based protein is expected to double in the coming decades, due to an increasing global population and higher disposable incomes.

The planet cannot cope with the burden of existing forms of animal agriculture, let alone the doubling of them.

We need to decouple protein supply from high CO_2 emissions, land use, water use & nutrient runoff.

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* World Economic Forum https://www3.weforum.org/docs/WEF_White_Paper_Roadmap_Protein.

What are the options to conventional proteins?

Existing options

Novel plant-based solutions

- More sustainable than animal proteins.
- Limited by arable land and water.
- Compromises in palatability and nutritional quality

Insects

Crickets / Mealworms

- Insects are animals – do not create new protein but only transform the plant protein they eat.
- Cultural perceptions have hindered acceptance in many regions.
- Questions remain on scalability.

Next to scale

Biomass fermentation

Cultivating microorganisms instead of plants or animals

- Demonstrated technical and economic viability (think Quorn, Marmite etc).
- Microbes produce completely new protein from mineral nitrogen.
- Resource efficient.
- High nutritional value.

Future

Precision fermentation

Animal proteins from GM-microbes

- Core technologies known and optimized in the enzyme industry.
- Process fundamentals mean that price points are in the 10s of €/kg.
- Viable for replacing high-value functional proteins – not for providing basic nutrition.

Lab-grown meat

Animal muscle cells grown in reactors

- Unproven tech, very high CAPEX and OPEX.
- Meat is much more than muscle cells. – cannot deliver on consumer expectations?

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Fungi – the third protein source

- Not plant, nor animal – better than both.
- Fungi can build all amino acids, the building blocks of protein, from simple organic molecules.
- Production requires far less land and water than plant proteins.
- Protein quality closer to animal protein.

Creating new high-quality protein while recycling carbon

PEKILO® – The story of the original mycoprotein

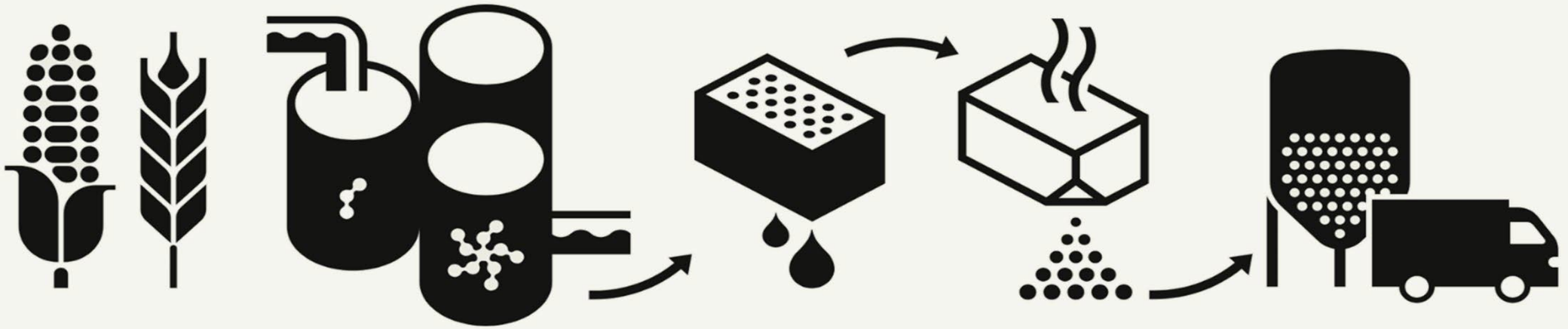
The PEKILO® mycoprotein production process was developed in Finland in 1963–1975.

As the world’s first commercial mycoprotein, it was produced from forest industry by-products at industrial scale in 1975–1991 at two factories.

Commercialized as feed ingredient for pigs and poultry until the lack of raw materials ended production.

● PEKILO® plant in Mänttä, Finland, with capacity of 8.000 tons of mycoprotein (1982–1991).

How is PEKILO® made?



Sidestreams from bio/agri/food industries

Fast continuous fermentation

Dewatering

Drying and milling

PEKILO® shipped to our B2B partners

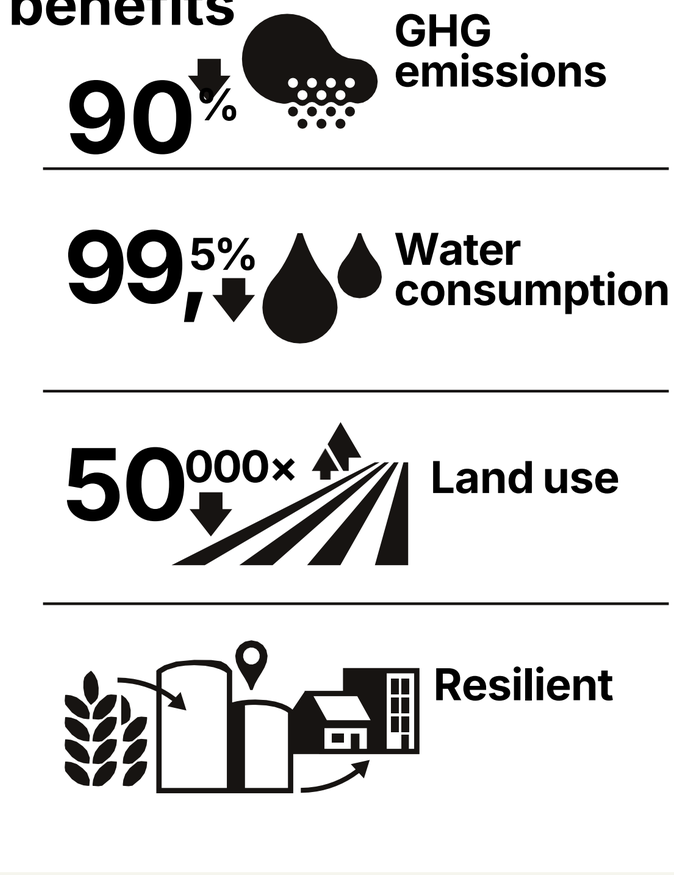
Why PEKILO® mycoprotein

1. **Sustainability** – Producing mycoprotein, especially from side stream raw materials, comes with a low environmental footprint compared to animal- and even plant-based proteins.

2. **Health** – Highly digestible good quality protein, combined with dietary fiber (β-glucan) promoting health in humans and animals alike.

3. **Resilience** – Distributed production from a variety of different feedstocks allows for more resilient supply chains.

4. **Ready to scale** – The previous history of PEKILO® production and other benchmarks demonstrate the technical and economical readiness of our approach to scale.

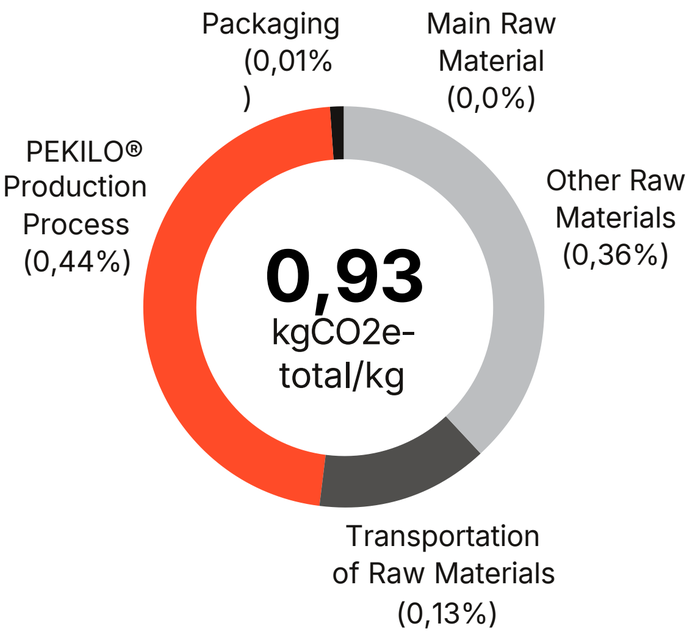


PEKILO®
and sustainability

- **No new land needed**
- **Circular economy approach to production**
- **Low water use in process**
- **Driven by renewable energy**

The Life Cycle Assessment method defined in ISO 14040/44 as well as the ISO 14067 standard regarding the calculation of carbon footprint of a product (CFP) were applied by third party to calculate the carbon footprint of Enifer's PEKILO® product.

Cradle-to-gate Total Carbon Footprint of PEKILO®



PEKILO® Pet

Ingredient for petfood industry

Proven health benefits for pet nutrition

Pets are increasingly “humanized” as important members of the family. Pet parents’ consumer habits are reflected in what they buy for their pets, with myriad brands and products catering to high-value specialty categories like “sustainable”, “hypoallergenic”, “grain-free” etc.

The petfood industry has relied heavily on by-products from animal production (meat and bone meals). The supply of these traditional ingredients is not keeping up with petfood demand, driving a use of actual meat and a search for alternative protein ingredients.

PEKILO® offers a novel source of high-quality protein that is animal- and grain-free and comes with β-glucan fiber, which has been shown to promote gut microbial diversity in dogs.

Key benefits

Premium source of carbohydrate-free protein packed with health-boosting compounds for use in petfood. Highly digestible and palatable to both cats and dogs.

- **A highly digestible ingredient** rich in protein and fiber – a unique combination not currently available on the market.
- **60–65% protein, 25% dietary fibre**, mostly fungal β-glucan.
- **Promotes gut-health** driven by dietary fiber.
- **Suitable for hypo-allergenic** diets.
- **No compromises** on end-product formulation or palatability.
- **Research is underway** to uncover further healt-promoting effects.

3 Scaling up

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Laboratory and pilot established 2021

Enifer’s laboratory and pilot originally built 2021–2022 and expanded several times.

Unique capacity to run many continuous fungal fermentations in parallel to e.g. screen raw materials, optimize conditions and strain variants.

Pilot line capable of producing ~5 kg/d of PEKILO® food ingredient.

External piloting campaigns run from time to time e.g. at VTT to produce larger batches.

PEKILO® pilot line at the Enifer laboratory.

Ambition – a world of PEKILO®

Raw materials tested for PEKILO® production by Enifer.

- Sugar-based (beet, cane)
- Lignocellulose-derived (wood,straw etc.)
- Starch-based (corn, wheat, cassava..)

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A growing, diverse team of 32 people

Founding team & key contacts

Simo Ellilä
CEO

10+ years of developing and scaling biorefining processes in Finland and Latin America.

Ville Pihlajaniemi
CTO

DSc in biorefining processes. Ville has been in charge of developing the new food PEKILO® production process.

Heikki Keskitalo
BDM

Heikki is the person behind the original idea of Enifer, and keeps searching for novel ways to produce and use PEKILO®.

Joosu Kuivanen
CIO

DSc in industrial biotech. Having secured <€14M in public funding, Joosu heads Enifer's IP & R&D funding.

Anssi Rantasalo
CSO

DSc in industrial biotech. Anssi has previously developed patented biotech tools used by leading companies in the field.

Sami Laine
CFO

Sami is a seasoned executive having worked as CFO/CEO in several public and private companies.

Elisa Arte
Head of Food R&D

PhD in Food Science, Elisa has a strong food R&D background in academia and industry.

Noora Vilkki
CMO

Strong background in food ingredient sales, business development & marketing from Valio, Raisio & plant protein start-up.

Mia Horttanainen
COO

10 years in production mgmt, process scaling, operational devs, & leadership – from start-ups to global operations.

Jeroen Schweitz
CCO

Long career in petfood, most recently at Ynsect, Jeroen is ensuring that PEKILO® is the most desirable novel protein for pets.

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Brewing
the original
mycoprotein

Thank you – let's talk

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