PRONOFA | presentation

Sluttkonferansen

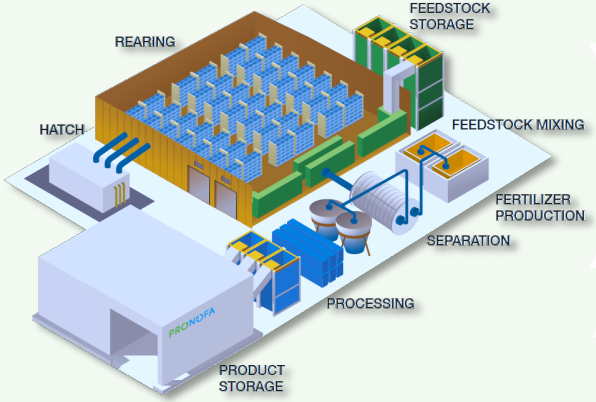
PRONOFA
ECOSYSTEMS

ESTABLISH A LEADER IN SUSTAINABLE INSECT AND MARINE BASED NUTRIENTS

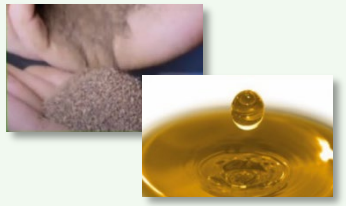
Business model at a glance

Pronofa´s vision is to become a leader in sustainable alternative insect and marine (tunicate) nutrients for feed and food

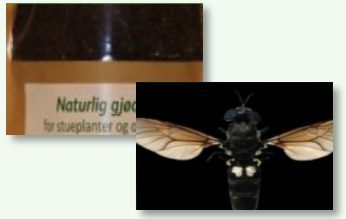
Insects



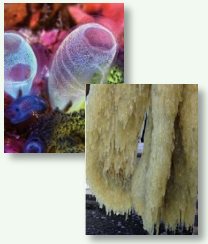
Protein meal and oil (lipids), usable for animal nutrition)



Frass and chitin usable as fertilizer and in pharma



Tunicates



Tunicate meal, sustainable alternative to marine feed ingredient. Usable for animal nutrition

Denofa

Denofa Industry	Denofa Energy	Denofa Port	Denofa Agri	Pronofa
Industrial real estate	Production and distribution of steam	Deep water port	Vertical Farming	Novel food and feed ingredients

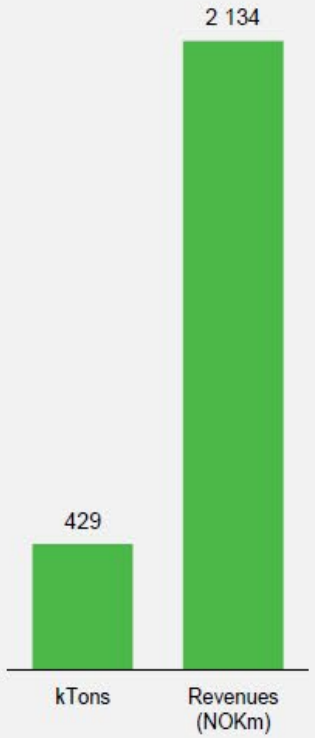
denofa

Partnership with Denofa brings a strong industrial foundation

Established feed processer backed by a global leading protein producer

Location

Tons and revenue (2020)



Platform of relevant resources to draw upon

- 100+ years of industrial development within food and feed processing
- Strong market access built since inception
- Industrial infrastructure and logistics chain in place
- Established global network of partners and customers
- 75+ highly skilled and competent employees
- 24/7 operations system will be used to monitor and operate Pronofa
- Sustainability strategically embedded
- Vast experience in quality management and food safety

VÅRT ARBEID FOR EN AVSKOGNINGSFRI VERDIKJEDE & DENOFAS FORPLIKTELSER

Vår posisjon, kommunikasjon og forpliktelser *in a nutshell*

Null avskoging (Amazonas)

Null konvertering (Cerrado)

Overholdelse av FNs
Menneskerettigheter

Implementere kravene i kontrakter og kvalitetssystemer, CoC etc., som revideres av tredjepart

Verifisering – beste standarder for sertifisert bærekraft eller verifisert lovgivning

= Soyaerklæringen fra oktober 2015

Ta i bruk Accountability Framework

= Soyaerklæring 2.0 september 2020

Denofa:
100% sporbarhet
100% non-GMO
100% ProTerra fra Brasil
100% deforestation and conversion free

Amaggi:
All Amaggi non-GMO soya er 100% sporbar, sertifisert og null avskoging

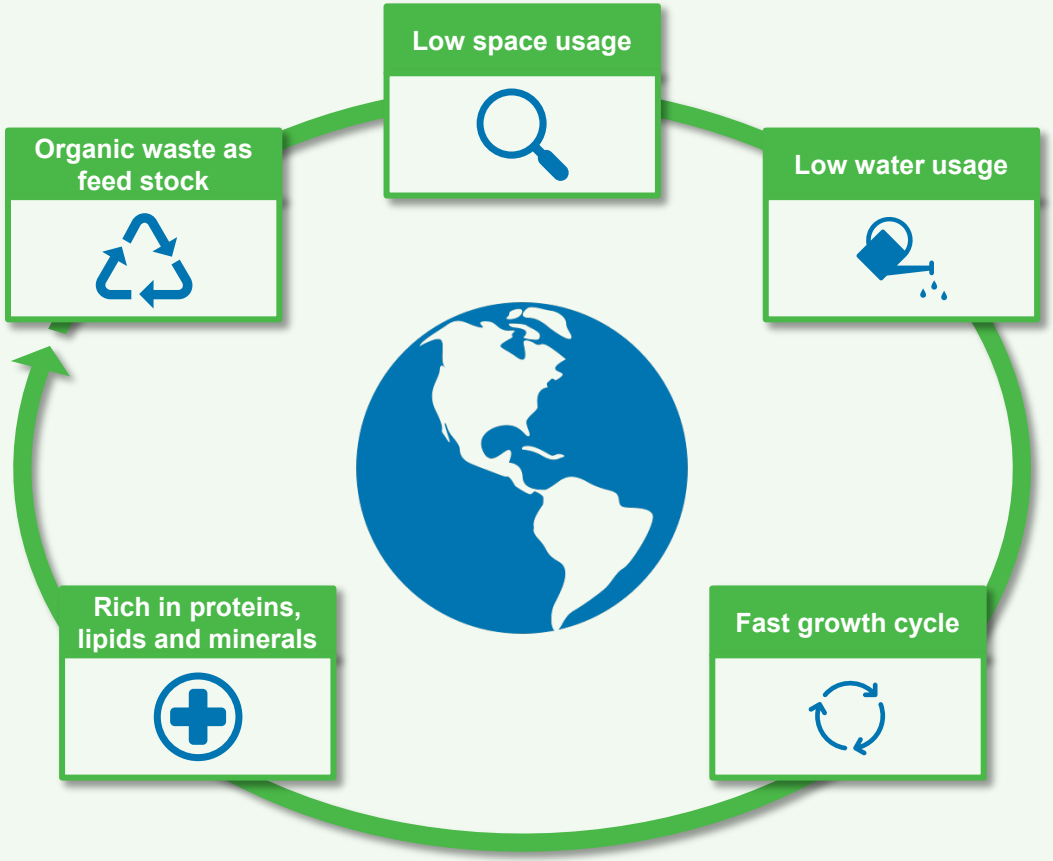
Alle Amaggi farmer (8% of total) har sporbarhet og er sertifisert avskogings-/konverteringsfri

Amaggi forventer å ha 100% sporbarhet på all soya før neste sesong


SEASTAR
denofa

SUSTAINABLE INSECT PROTEINS

From low-grade food waste to high-end feed – low pressure on ecosystems



- 5,000 - 10,000 times more efficient than beef in terms of protein produced per acre
- Organic waste as stock feed and low water usage
- Limited emission of greenhouse gases

- Less fishing for feed
- Tunicate nutrients are sustainable and cleans the oceans

INSECTS LARVAE AS SUSTAINABLE PROTEINS

Background

- Insects will play a key role in more sustainable protein value chains: organic waste as feed stock = circular economy/reduction of CO2 footprint
- One of the most efficient «conversion machines» in proteins:
  - low water usage
  - low space usage,
  - organic waste as feed stock
  - very fast growth cycle = allows efficient production
  - high nutrient accumulation = rich in proteins, lipids and minerals
- Global production of insect protein meal is today 10,000 MT, expected to reach at least 500,000 MT over the next few years
- The technical demand for sustainable protein meal is much higher, but it is limited due to production capacity and legislation.
- The conditions in the feed market is currently better than in the food market, but there is a strong political will to open for nutrients based on insects in many more applications.
- BSF (black soldier flies) larvae is approved as feed ingredients in several feed applications and mealworms the same in food applications.
- Legislation is expected to evolve fast in the EU, causing availability on substrate (insect feed) to increase.

PRONOFA UNIQUELY POSITIONED

- Efficient capex design.
- Pilot plant is in operation: populations, experience and production with both black soldier flies and mealworms
- Substrate availability in Norway mapped via COWI Consulting. Nutrient properties for various substrates analyzed
- Strong demand from feed producers
- Established business relations with the feed producers
- Support from Politicians at regional/national levels and NGOs like Rainforest Foundation, WWF, Bellona
- Next steps:
  - substrate approval & collection
  - production technology & design
  - approval process for the product towards full production capacity

UTILIZING BROAD EXPERIENCE FROM FOOD AND FEED PROCESSING

Platform for efficient business development

- Utilize Denofas more than 100 years of experience from food and feed processing
- Access to Denofa´s engineering competence, biological competence and labs, project and production resources
- Pronofa will adopt established quality and IP programs developed by Denofa
- In addition to gaining access to Denofa´s industrial infrastructure, Pronofa will be operated and monitored by the same 24/7 operations system as Denofa
- Barriers to entry: Deep industrial knowledge required to optimize capex and production methods including quality systems, lab, project development, permitting, governmental relations, access to multiple large customers and partners in value chain, etc.

Black Soldier Flies & Organic waste

An adult fly lives for 8-10 days

~ 5% (larvae for insect reproduction)

In 3 weeks, the weight is multiplied by 7000

Ready to be harvested and processed

The life cycle of Black Soldier Flies (BSF)

Each fly lays up to 900 eggs

1g of egg turns into 2.4kg of protein in 18 days

The eggs hatches to larvae after 4-5 days

Consumed by larvae

Organic waste

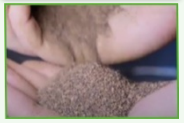
Cowi report: Mapping all available substrate resources

1/3 all produced food. Total of 385 metric tons per year

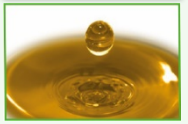
Frass

Organic fertilizer made from residues from larvae

Meal



Oil

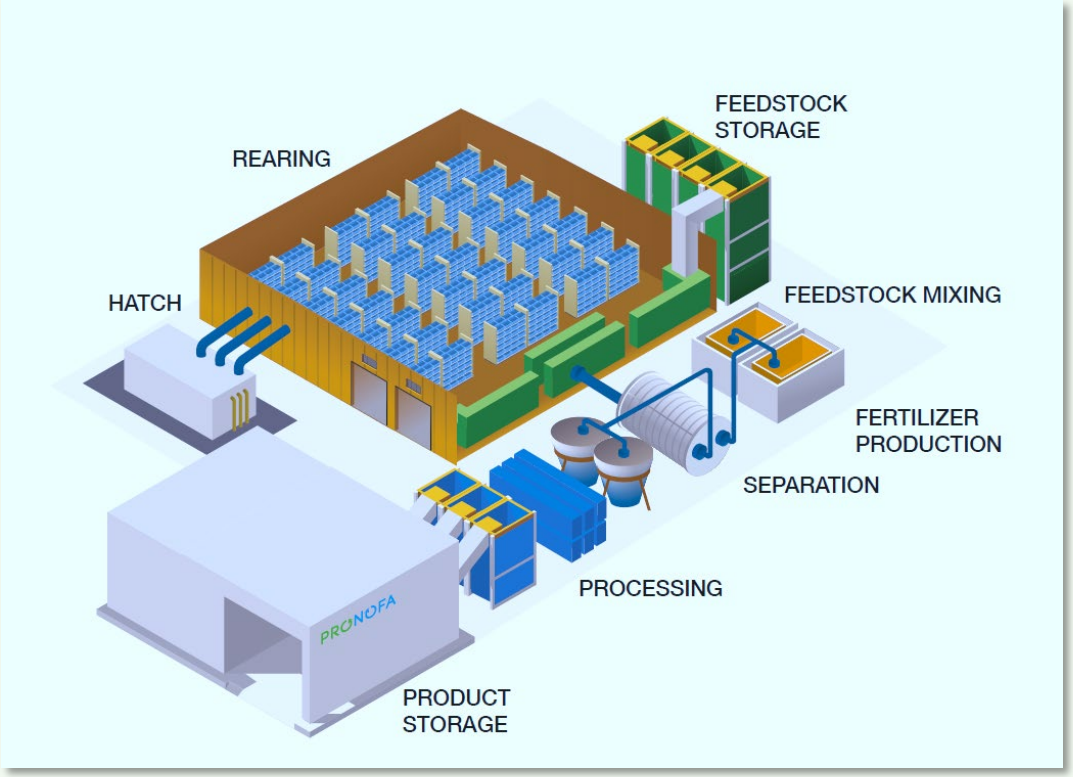


Chitin

High Protein and Oil content

PRODUCTION PLANT OVERVIEW – low capex and efficient production

Principle lay out



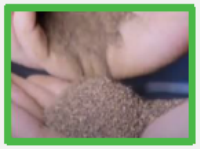
- Optimized Capex based on Denofa & Flying Feed experience
- No turn-key supply – BAT supplier integration
- High degree of automatization and robotization
- Environmental control of hatch & rearing zones in order to maximize yield and quality parameters
- **Conclusion: Reduced Capex & better performance**

Insect production yields highly attractive end-products

Numerous end-market applications and clear benefits relative to alternatives

Protein meal

~12%
Of output

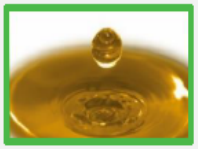


Feed ingredient for pet food, fish and poultry feed

- ✓ 50% protein content
- ✓ High content of amino acids
- ✓ Anti inflammatory effect

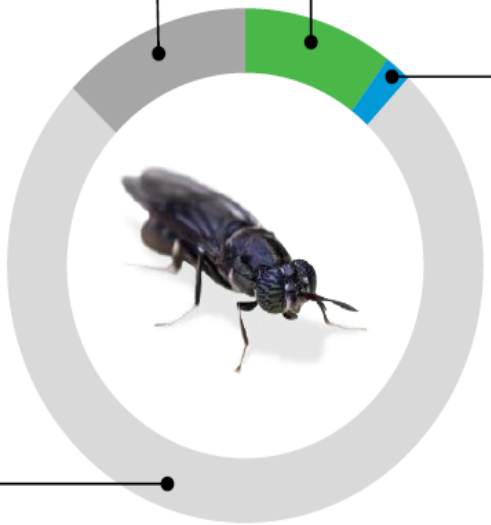
Oils

~12.5%
Of output



Potentially a good source to EPA, DHA

- ✓ Flexible composition depending on substrate
- ✓ Anti-microbiological activities against enveloped viruses and bacteria



Frass

~70%
Of output

Organic fertilizer with anti-inflammatory effect

- ✓ Improves soil health and resilience
- ✓ Anti micro biotic effect with protection against fungus and other diseases
- ✓ Applicable to organic agriculture

Chitin

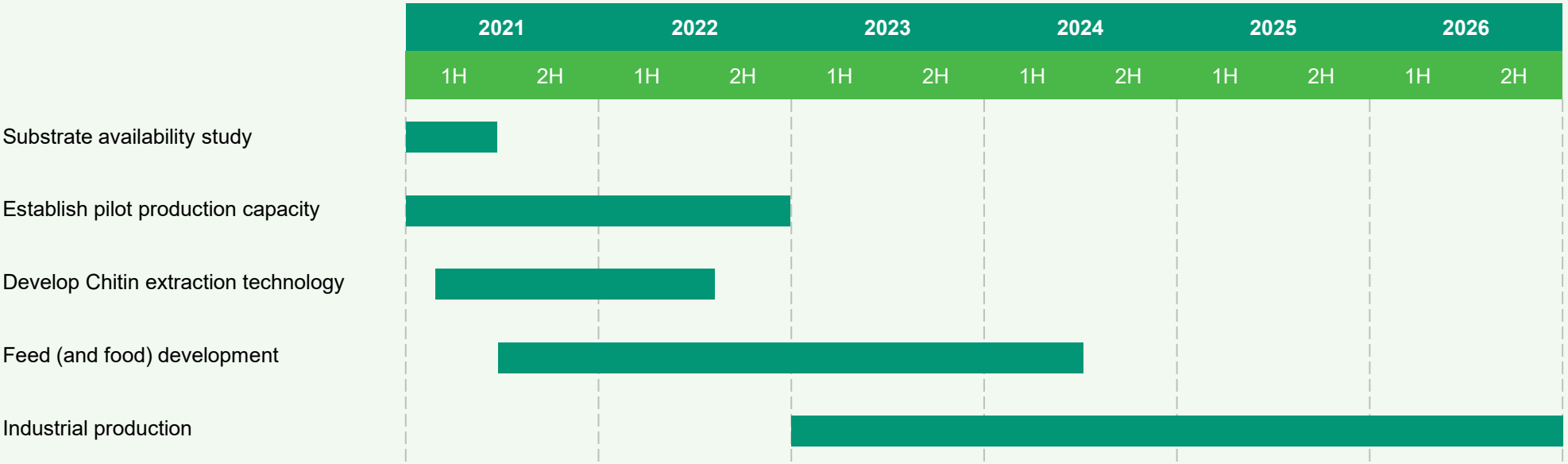
~1.7%
Of output

Multiple applications in pharma industry

- ✓ Sustainable alternative to chemical pesticides

TIMELINE INSECT PROTEIN PRODUCTION

Roll-out plan



TUNICATE (MARINE) NUTRIENTS

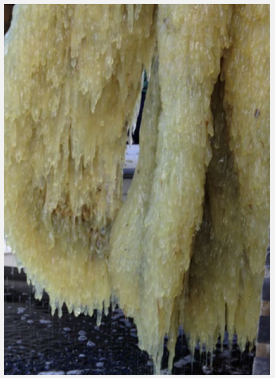
Marine sources of nutrients

Facts:

- Sustainable, cleans the oceans and no feed expenses
- Very high levels of omega-3 and protein
- The nutrient properties of tunicates are analyzed in Denofa and NOFIMA laboratories
- Can be integrated as a feed component in lots of different applications

Next steps:

- Test production of tunicate meal from partner for feed development
- In the pilot plant of the Norwegian University of Life Sciences (NMBU), we plan to make feed with a 10-15% content of tunicates. This will be tested on fish and chicken initially.
- Establish pilot plant in 2022, then start industrial production 2023

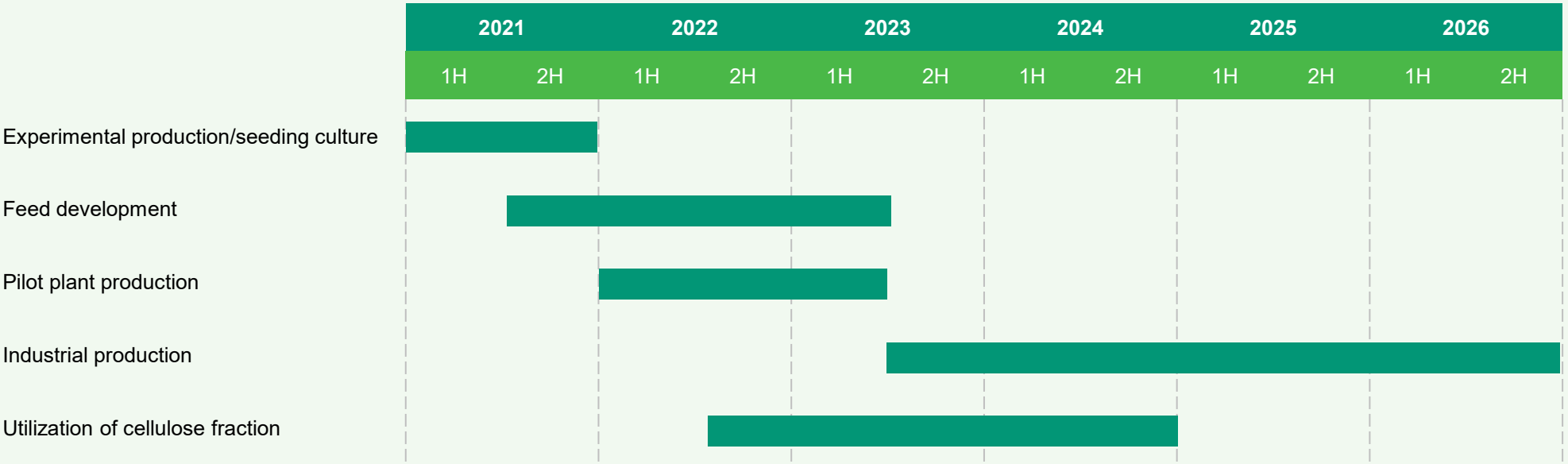


Project Manager Tunicates:
Sverre Magnus Petersen

Marine Biologist
MSc in Aquaculture biology
Master thesis on Tunicates:
Feeding response to fish feed diets in Ciona Intestinalis; Implications for IMTA (Integrated multi-trophic aquaculture)

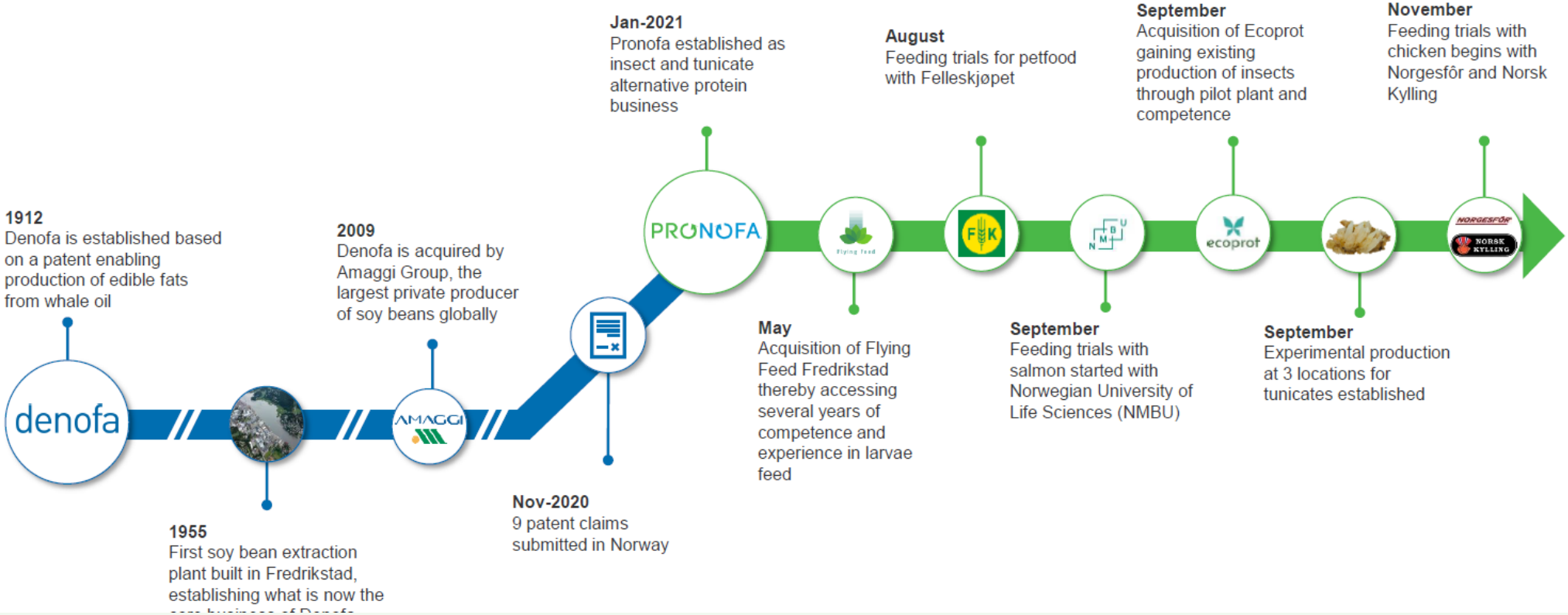
TIMELINE TUNICATE PRODUCTION

Roll-out plan



Highly active business development and R&D pipeline executed

Pronofa is actively pursuing business development through R&D-partnerships and M&A with an additional pipeline of ongoing processes

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