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EASME/EMFF/2016/1.2.1.3/02/SI2.751532

INvertebrateIT

Invertebrate-based solutions for sustainable aquaculture

CASE STUDY: Omega 3

Webinar 06/03/2019

www.invertebrateitproject.eu

1. Intro

What: Case study on opportunities derived from the capacity of invertebrates to synthesize long chain omega 3 fatty acids (n-3 LC PUFA) from scratch

What for: Assessment from a business / entrepreneurship perspective

Index:

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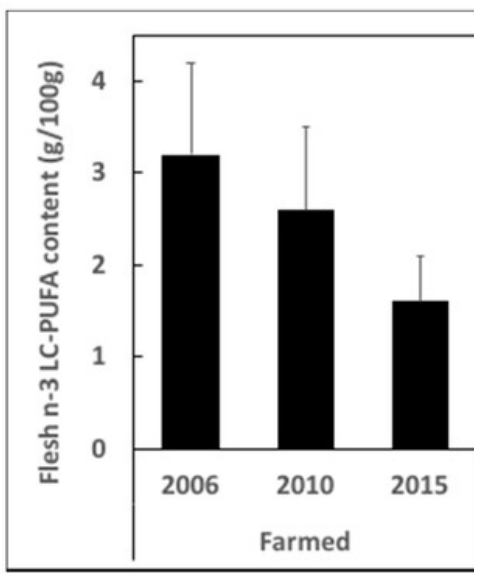
2. Starting point

1. Aquaculture is main user of LC-PUFA (>70%)
2. Aquaculture is to become the primary source of EPA/DHA for humans
   - necessary ingredient in diets
   - fish trimmings/discards = efficiency, not new sources (limited)
   - other wild sources (e.g. krill)= harvesting, not producing (SDGs)
   - land plants alternatives (n-6 Vs n-3 PUFA) require GMOs (from algae)
   - algae: cost (decreasing) but need removal of starch and proteins
3. Gap increasing
   - if 500mg/day (x 365 days x 7b people…) then 0.5-1 10^6 t/y
   - health issues for people and farmed fish
   - other markets (farming)
4. Industrial sustainability:
   efforts by large companies and investors



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2. Starting point

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Genes for de novo biosynthesis of omega-3 polyunsaturated fatty acids are widespread in animals

Ad

Article (PDF Available) *in* Science Advances 4(5):eaar6849 · May 2018 *with* 294 Reads

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3. Tasks ahead

Now (ongoing)

1. Get funding

Next 2-3 years

1. Better map capacity across invertebrate phyla
2. Choose suitable invertebrates for industrial production
3. Assess gene expression for n-3 LC-PUFA synthesis (influential variables)
4. Develop optimal growing conditions to enhance controlled production (viability)
5. Advance in domestication and enhancement (efficiency)

Then 1-2 years

1. Assess potential markets: e.g. aquafeeds, pharma (capsules)
2. Assess market expectations: product specifications, cost, volumes
3. Develop product and marketing strategy
4. Carry out trials and develop processing technology
5. Quantify financial needs: infrastructure, equipment, staff, external services.

Finally asap

1. Explore business models
2. Choose between venturing or transferring (different modalities)

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4. International network (EXAMPLE ONLY, FICTIONAL)

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Funding mechanism (pub/priv)
RDI funding

Research institute (pub)
genomics

Aquaculture farm (priv)
polychaete production and enhancement
+
Research company (priv)
amphipod production and enhancement

Tech partner (priv)
Environmental control, processing and automatisation

Feed company (priv)
Feed design and testing
+
Pharma/Biotech company (priv)
Product design and testing

Cluster (pub/priv)
market analysys and business support

New SME
Production and marketing
/
Technological park / Incubator (pub)
Transfer to SMEs

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5. Business opportunities

1. Lower cost or sustainability edge for invertebrate production of n-3 LC PUFA (EPA/DHA)
   - farmed detritivores Vs wild catches, algae, GMOs
2. Increasing efficiency and revenue by integrating systems
   - valorisation of waste while producing high-value ingredients
3. Unkown potential of understanding and controlling gene expression (for Omega3 synthesis using low cost diets)

Depending on:
- viability, real potential and efficiency
- market and resource evolution (relative costs according to source)

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6. SWOT

Strengths

- widespread capacity
- advances in genetic and productive enhancement
- edge over wild sources and algal inputs
- avoids GMOs
- funding and clients ensured
- performant and balanced consortium
- embedded in natural diet

Weaknesses

- uncertainties
- controlling metabollic expression
- time necessary for preliminary evaluation
- boom in wild harvesting (e.g. krill)
- development of plant based alternatives (e.g. GM canola)

Opportunities

- high market demand
- sustainability
- stakeholders (inc. investors) are interested
- long term competitive edge

Threats

- as research line: none (but results could disappoint)
- as business: too early to assess (production costs Vs alternative sources)
- decreasing cost of algal sources
  - now 39$/kg (dry) down to 10$/kg ?

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Contact

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