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CIPROMED
CIRCULAR AND INCLUSIVE UTILISATION OF ALTERNATIVE PROTEINS IN THE MEDITERRANEAN VALUE CHAINS

Regulatory Readiness in Aquafeed Innovation: Bridging Nutrition, Policy & Practice

Tatiana Poletto & Jorge Dias

Aquaculture Europe. Valencia, September 2025

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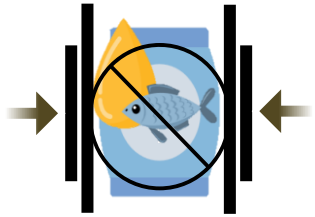
your feeds

Aquafeed Innovation & the Sustainability Shift

- Aquafeed innovation - sustainability

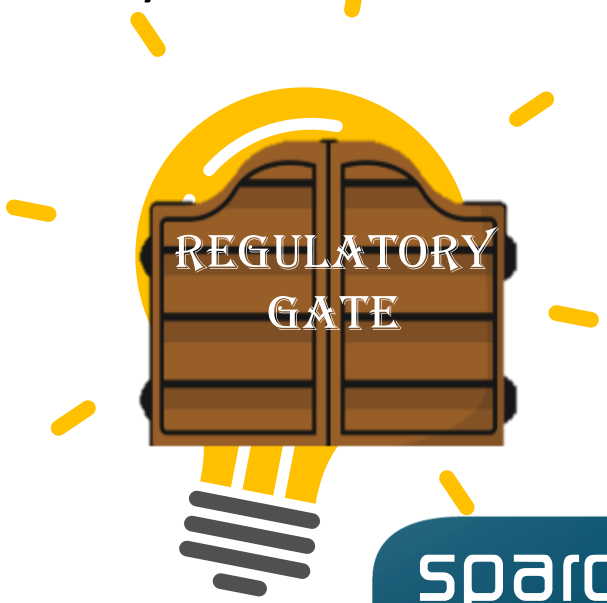
- Alternatives ingredients (growth and health)



- New candidates: insect, microalgae, SCPs, agro-industrial by-products

☑ Nutrition, efficiency and circular economy principles

BUT…
A promising ingredient is only half the battle….



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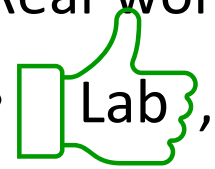
Why Regulatory Readiness matters?

- Having a great ingredient isn't enough. Even the best protein

- SPAROS/ CIPROMED project Local biomass & Circular Economy principles

- Real-world experience:
  -  Lab, legal "Grey zones": unclear classification, no precedent, compliance risks

- Internal framework for **early-stage screening** : align nutrition, sustainability, and regulation

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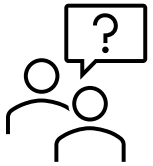
Why Regulatory Comes First

-  *"is it nutritious?"*
- At SPAROS/CIPROMED, we reversed the order
- 1st: regulatory feasibility *"can we even use it legally?"*
- Avoid wasted effort on ingredients that can't be used

To filter for regulatory feasibility first.
Small change, big impact.

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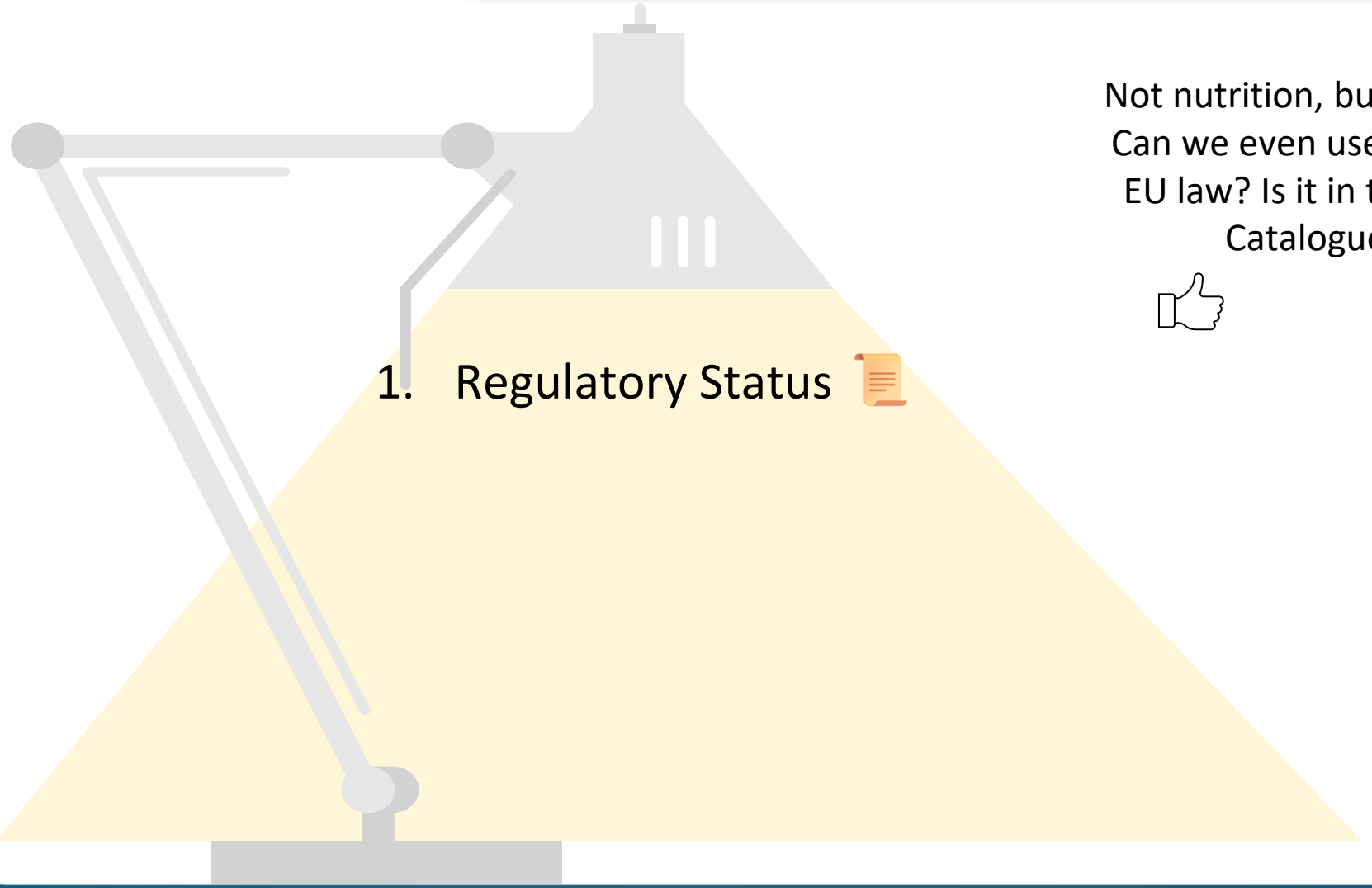
The 5-filter Screening Framework



1. Regulatory Status 📜

Not nutrition, but legality!
Can we even use it under EU law? Is it in the Feed Catalogue?

👍 👎

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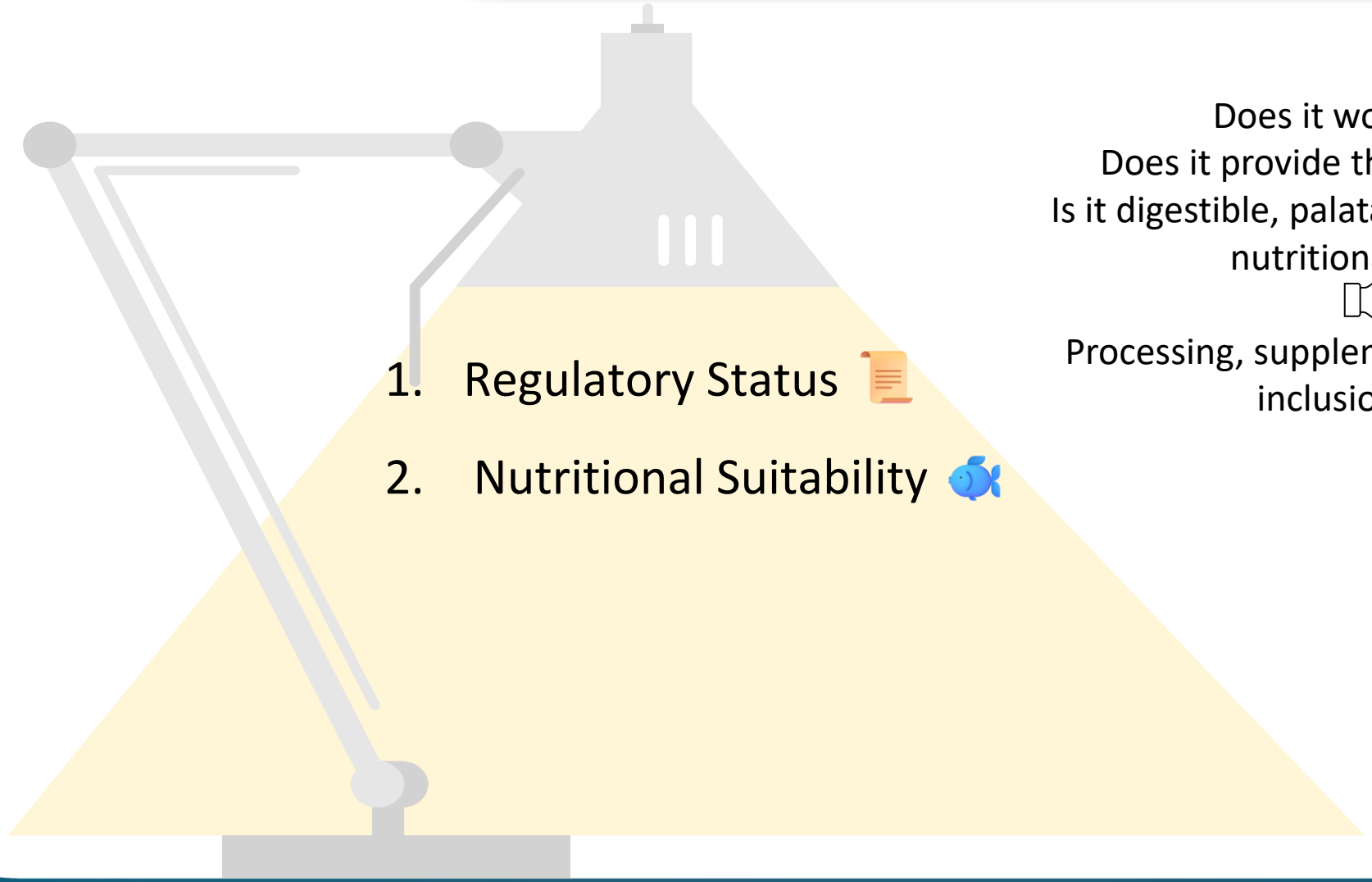

1. Regulatory Status 📜
2. Nutritional Suitability 🐟

Does it work for fish?
Does it provide the protein and aa?
Is it digestible, palatable, and free of anti-nutritional factors?

👎

Processing, supplementation, or limited inclusion levels.

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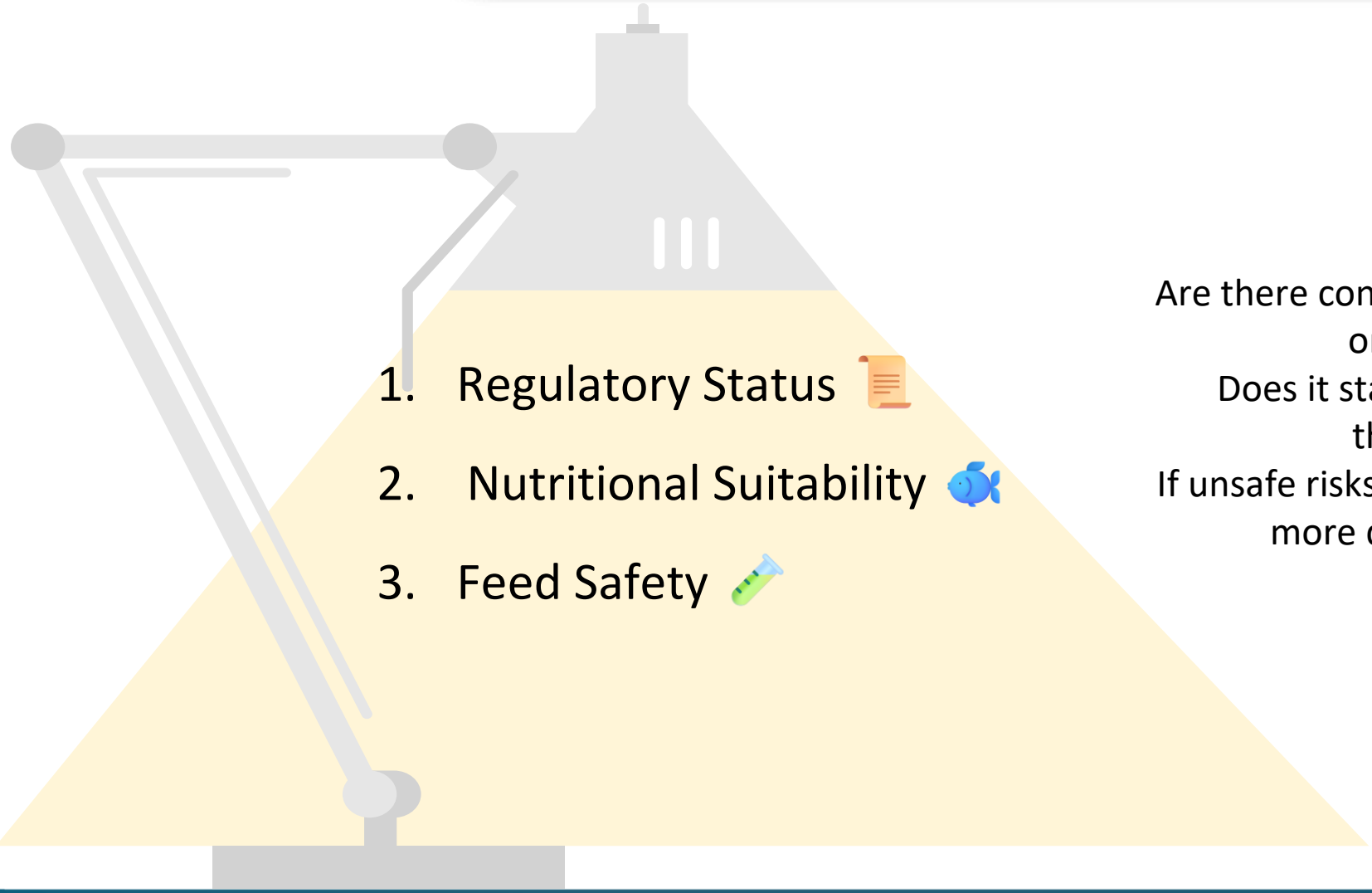

1. Regulatory Status 📜
2. Nutritional Suitability 🐟
3. Feed Safety 🧪

Are there contaminants, pathogens, or residues?
Does it stay within EU safety thresholds?
If unsafe risks must be controlled or more data generated.

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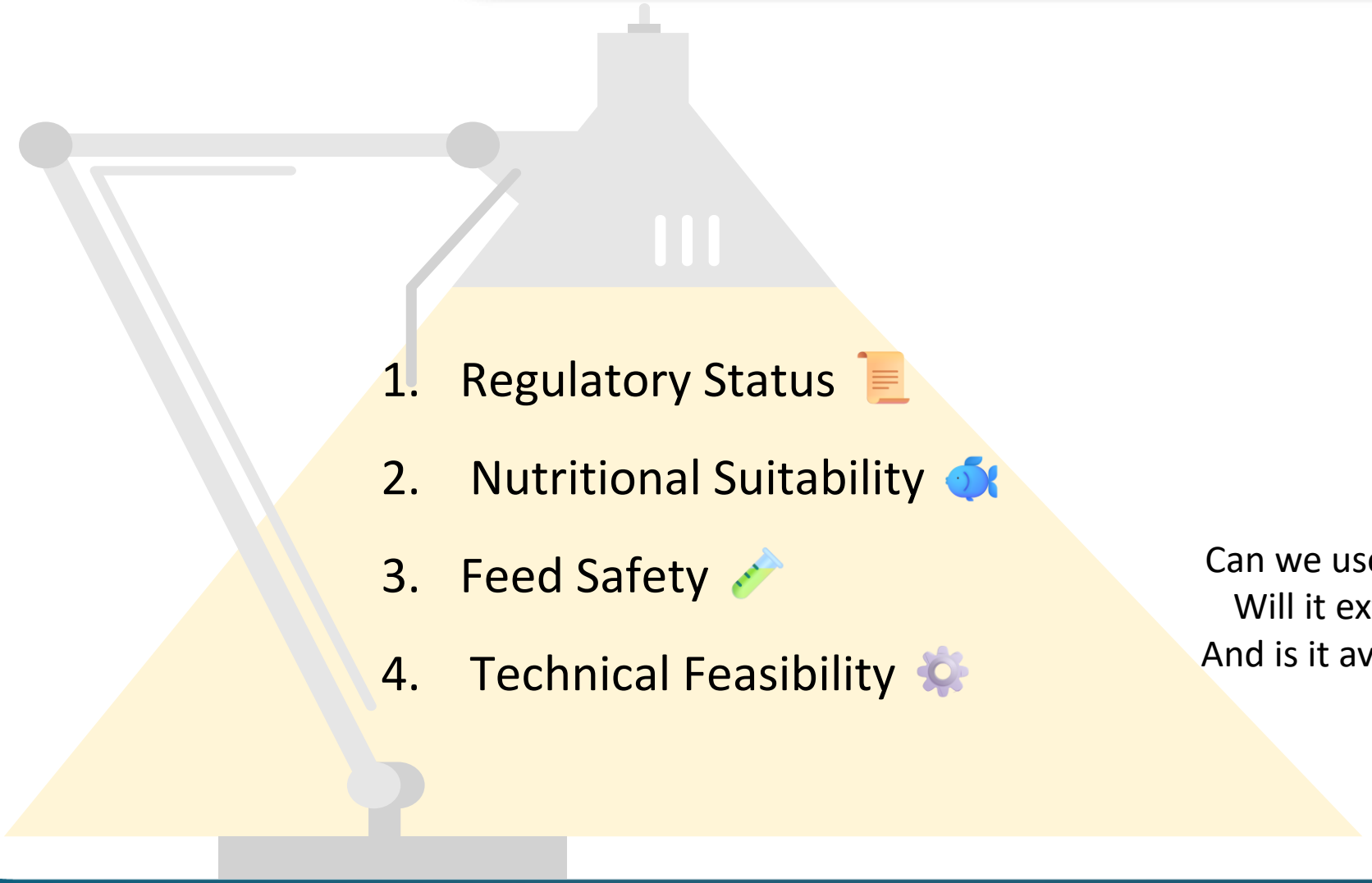
The 5-filter Screening Framework



1. Regulatory Status 📜
2. Nutritional Suitability 🐟
3. Feed Safety 🧪
4. Technical Feasibility ⚙️

Can we use it in a feed mill?
Will it extrude properly?
And is it available at a scale?

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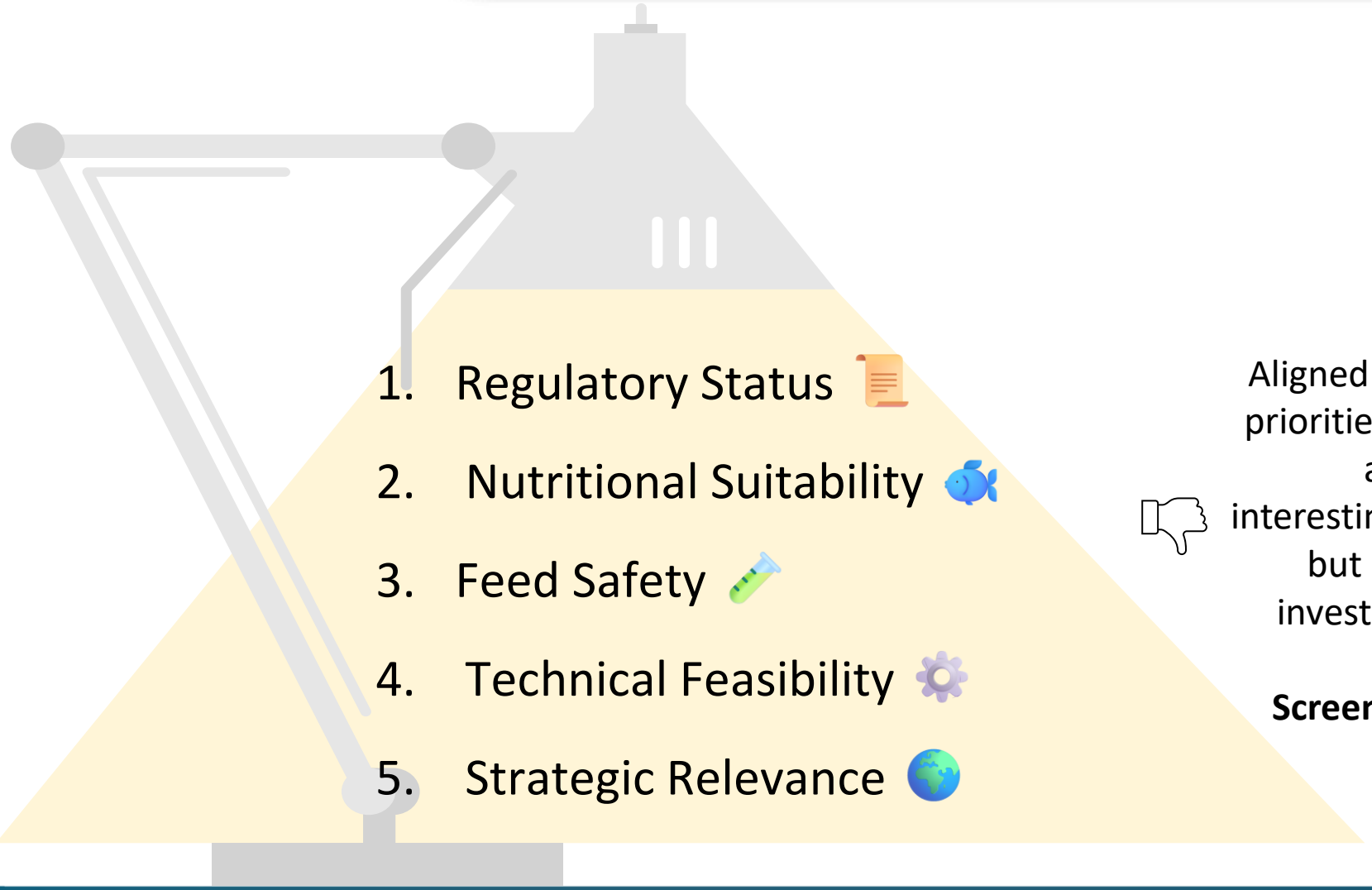
The 5-filter Screening Framework



1. Regulatory Status 📜
2. Nutritional Suitability 🐟
3. Feed Safety 🧪
4. Technical Feasibility ⚙️
5. Strategic Relevance 🌍

Aligned with sustainability priorities, market demand, and timing?

👎 interesting academic idea — but it won't attract investment or industry uptake.

Screening into strategy

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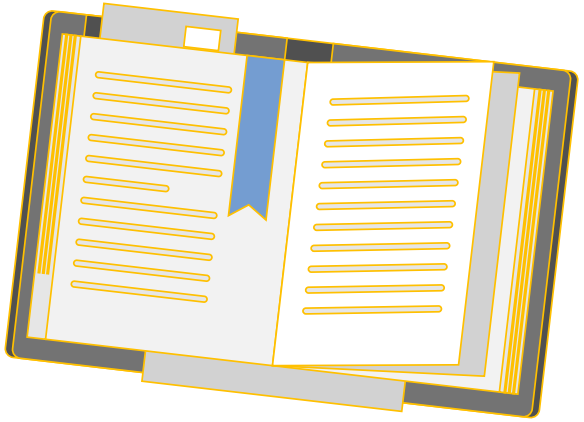
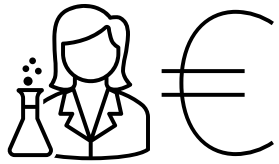
Where good ideas actually fail

- Most promising ideas don’t die in the lab—they stall at the legal gate
- Ambiguous status
  not clearly listed for aquaculture
  or produced by a process the framework
  doesn’t recognise yet.



- Great nutrition doesn't guarantee market success
- Solution: screen regulation first



The two traps behind Filter 1
(Regulatory status)

Trap 1: legal for other species, not for fish

Trap 2: New process / substrate. No history → “novel feed”

Can slow down the process
unless you plan for it from the start

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The classification trap

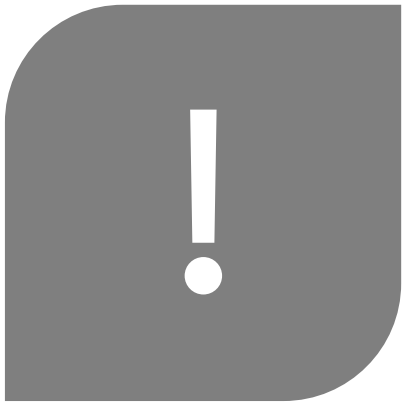
Even with the same ingredient, classification changes everything

FEED MATERIALS

GREEN PATH NO EFSA DOSSIER

FEED ADDITIVES

SAFETY & EFFICACY – LONG TIMELINES



GREY ZONE

“NOVEL” TERRITORY OFTEN EFSA PATH (CASE BY CASE)

EFSA Approval

efsa

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Case 1: Oriental Fruit Fly larvae (*B. dorsalis*) reared on mixed vegetal waste

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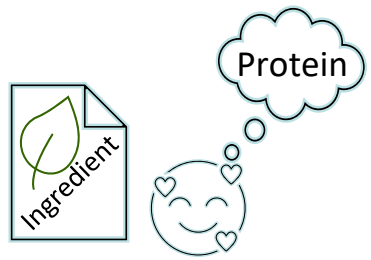
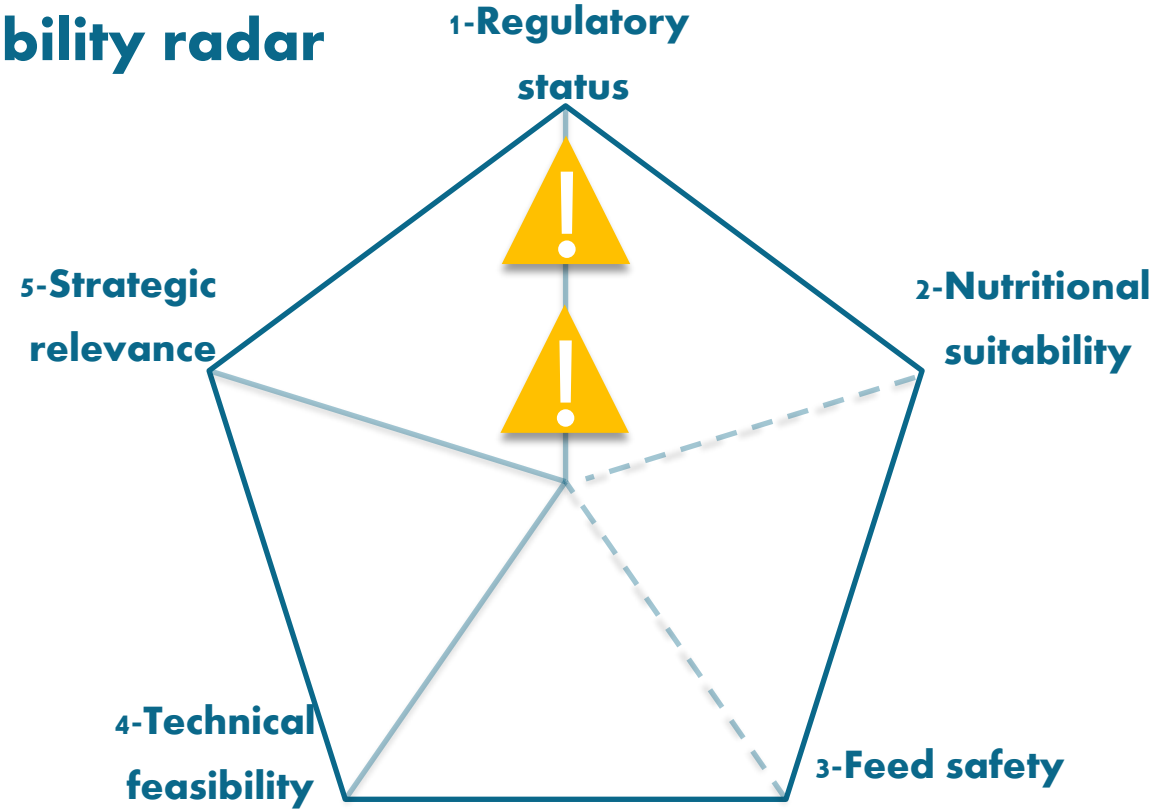


Regulatory Status: (EU) 2017/893

- Species and substrate

Filter 2,3 and 4

Viability radar



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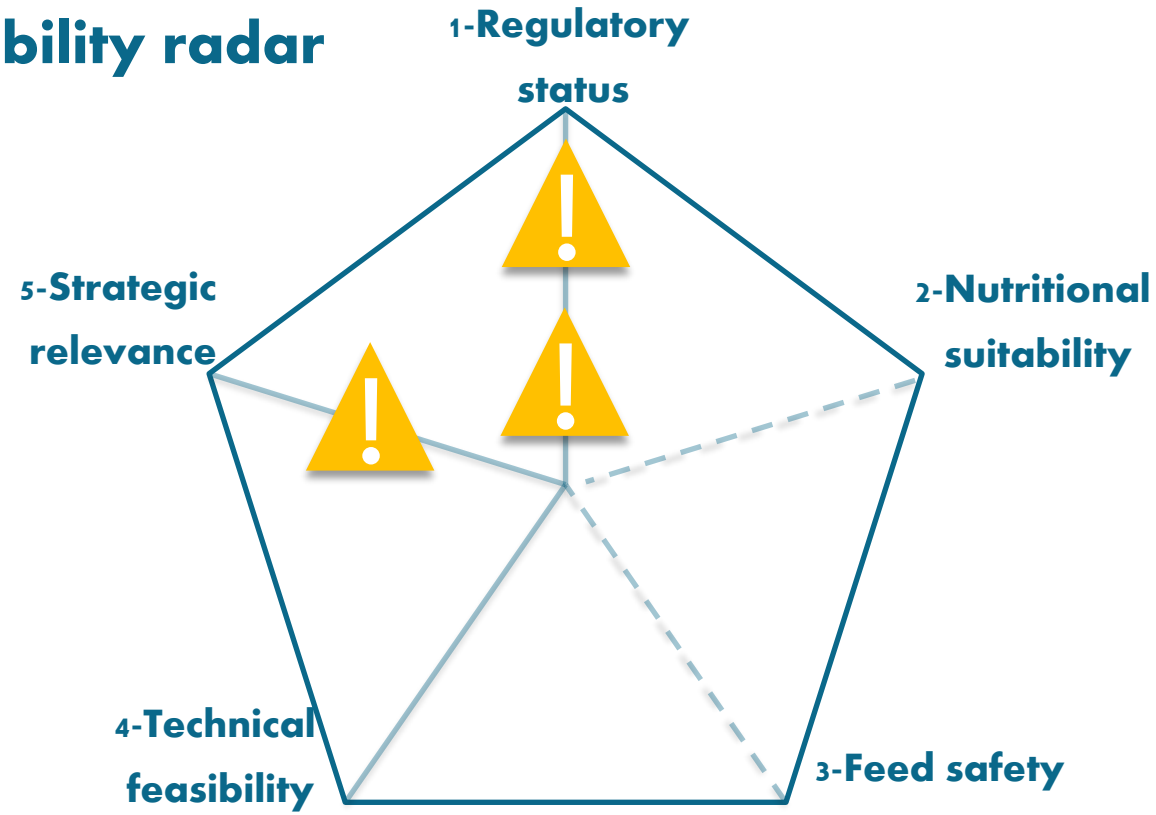
Case 1: Oriental Fruit Fly larvae (*B. dorsalis*) reared on mixed vegetal waste

- Regulatory Status: (EU) 2017/893
  - Species and substrate
- Filter 2,3 and 4
- Strategic relevance:
  - Weak business case

Viability radar



Sustainability Paradox. Screening regulatory status first saves time and resources — letting us redirect effort into options that actually have a path to market.

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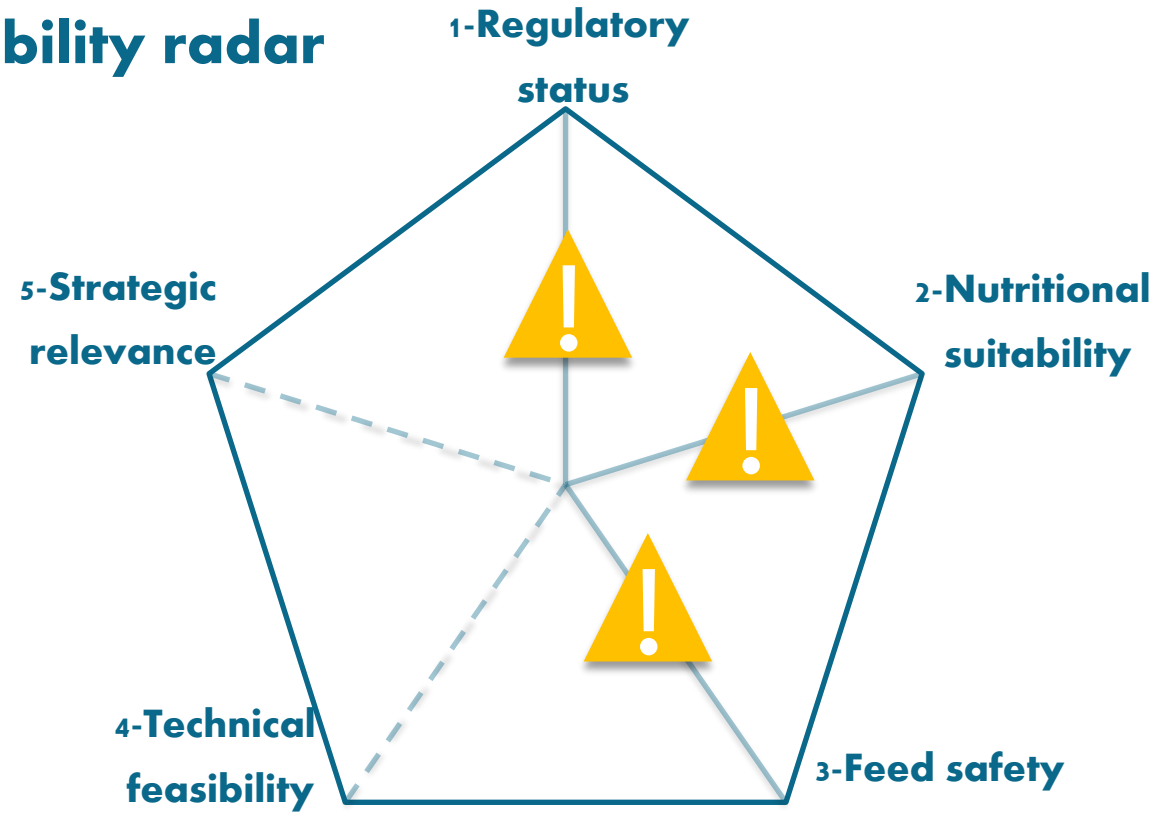
Substrate allowed

Case 2 – Mediterranean Fruit Fly (*Ceratitis capitata*) reared on olive pomace

- Regulatory Status: (EU) 2017/893
  - Species

- Nutritional Suitability:
  - Documented nutritional profile (digestibility trials, performance data, real-world benchmarks)
- Feed Safety:
  - No presumptions of safety from related species
  - Full safety assessment under Regulation (EC) 767/2009 (contaminants, microbiology, stability, species-specific risks)

Viability radar



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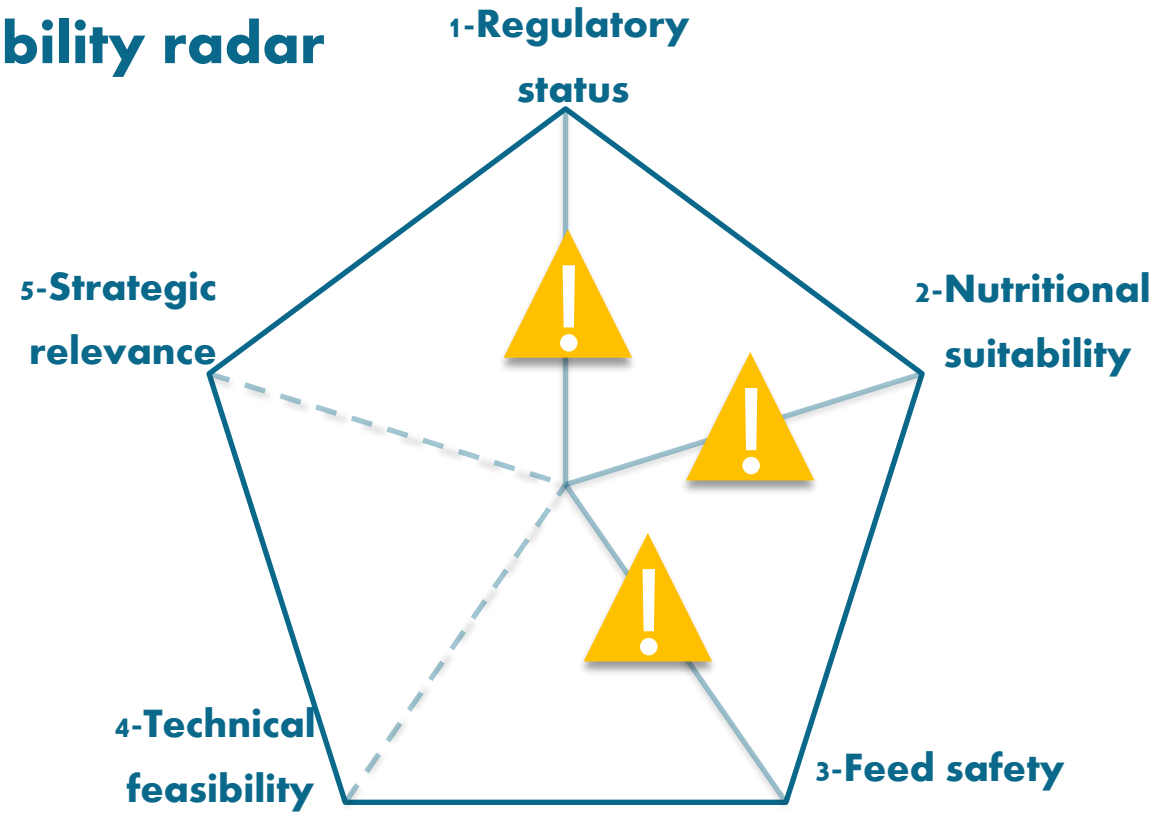

❌ *Legal substrate, but species approval and safety data are missing — high-risk input.*

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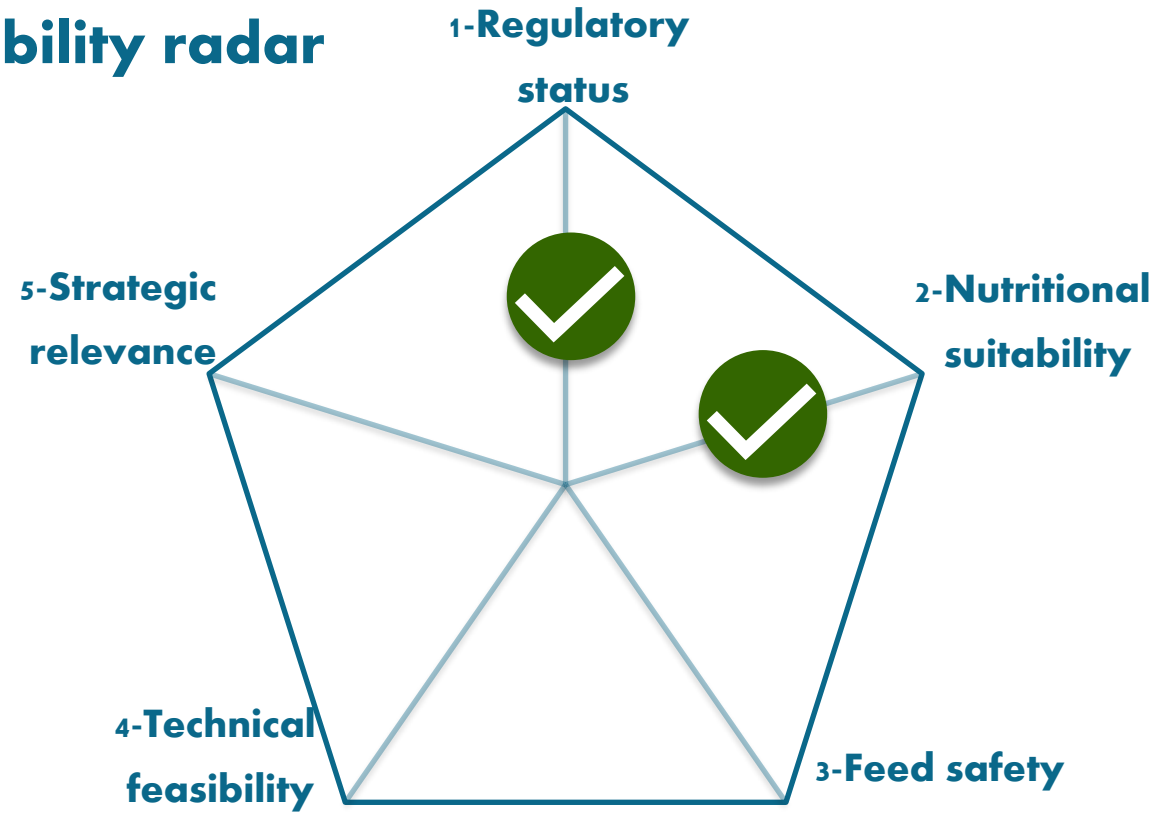
Case 3 – *Schizochytrium* sp. – When Regulatory Compatibility Accelerates Innovation

Key DHA source for aquaculture feeds.

- ✅ Regulatory Status: EU Feed Catalogue
  - ⚠️ change 🧬 **strain, process** or push into **concentrated extracts** with functional claims
- ✅ Nutritional Suitability:
  - DHA (highly digestible, bioavailable and well documented)

Viability radar



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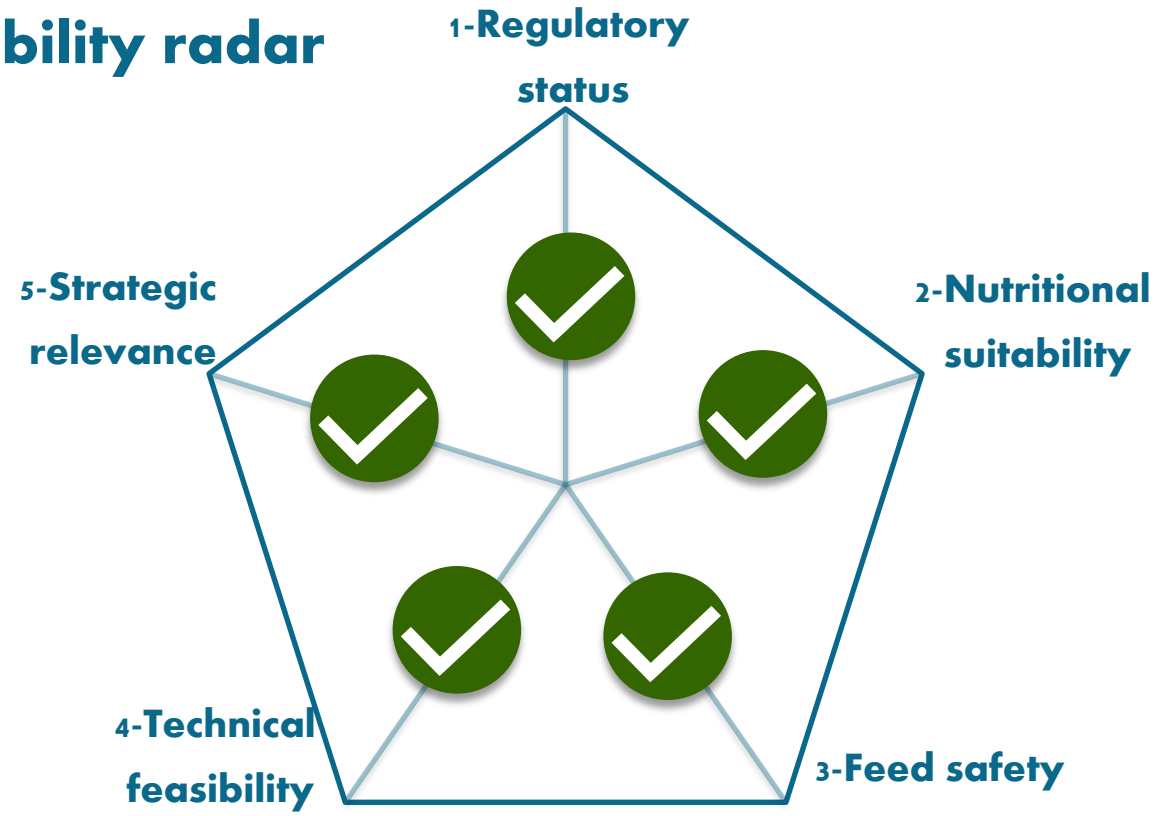
- ✅ Feed Safety:
  - EU thresholds for contaminants and hygiene
- ✅ Technical Feasibility
- ✅ Strategic Relevance:
  - sustainable goals, enhances product differentiation, and meets market demand for omega-3 enrichment

Viability radar



✅ *A textbook case of regulatory-compatible innovation: ready now.*

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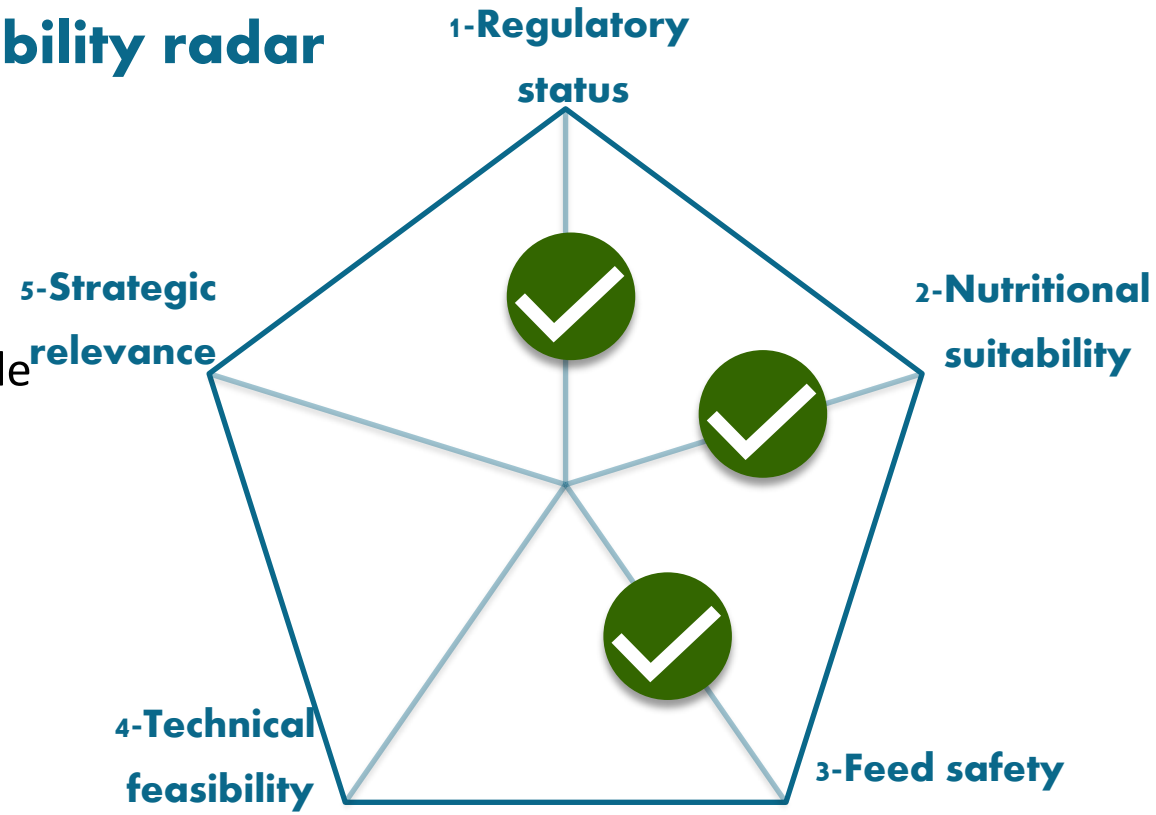
Case 4 – Spirulina: A Legacy Ingredient With Modern Potential

***Arthrospira platensis* is both ancient and modern.**

- Regulatory Status: EU Feed Catalogue
  - ⚠️ change 🧬 **strain, process** or push into **concentrated extracts** with functional claims
- Nutritional Suitability:
  - high protein, rich pigments, and antioxidant profile
  - well-documented pigmentation and health benefits.
- Feed Safety:
  - EU thresholds for contaminants and hygiene

Viability radar



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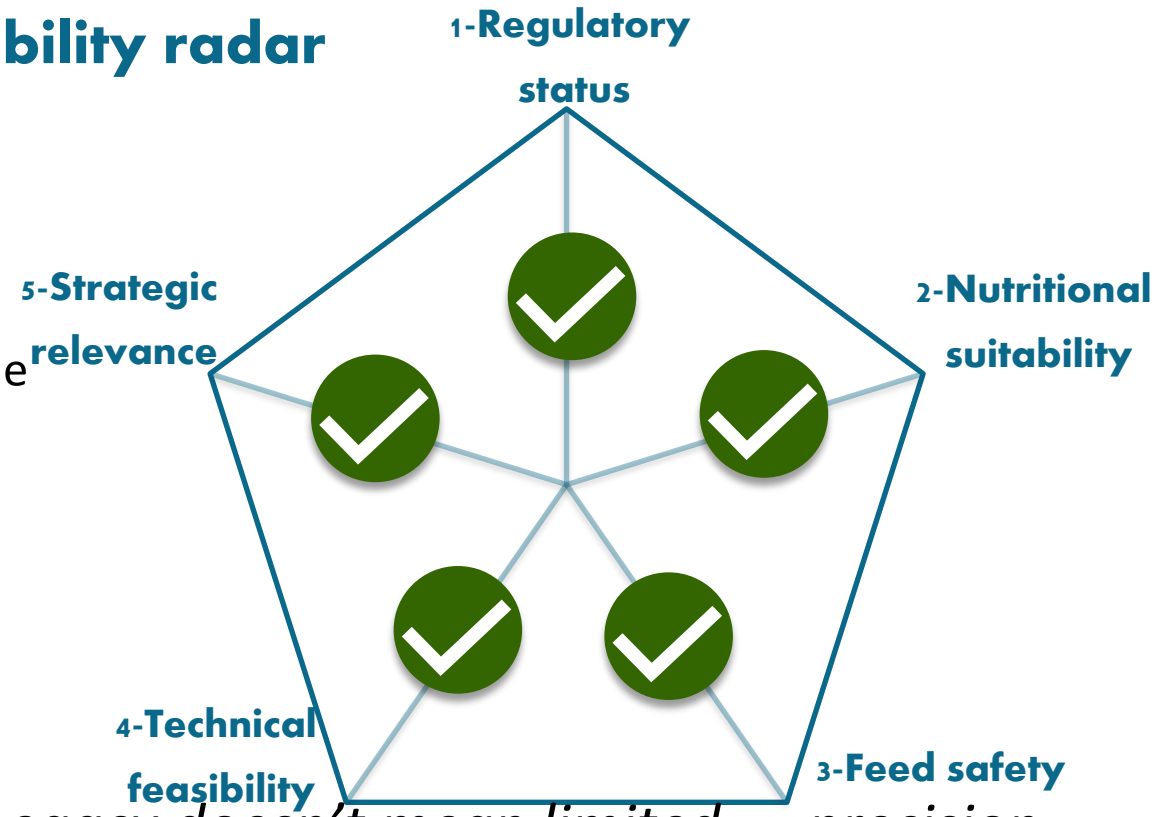
  - high protein, rich pigments, and antioxidant profile
  - well-documented pigmentation and health benefits.
- ✅ Feed Safety:
  - EU thresholds for contaminants and hygiene
- ✅ Technical Feasibility
- ✅ Strategic Relevance:
  - Market-recognisable – product differentiation and premium positioning

Viability radar



✅ *Legacy doesn't mean limited — precision use can unlock premium positioning.* Maximize value while staying compliant

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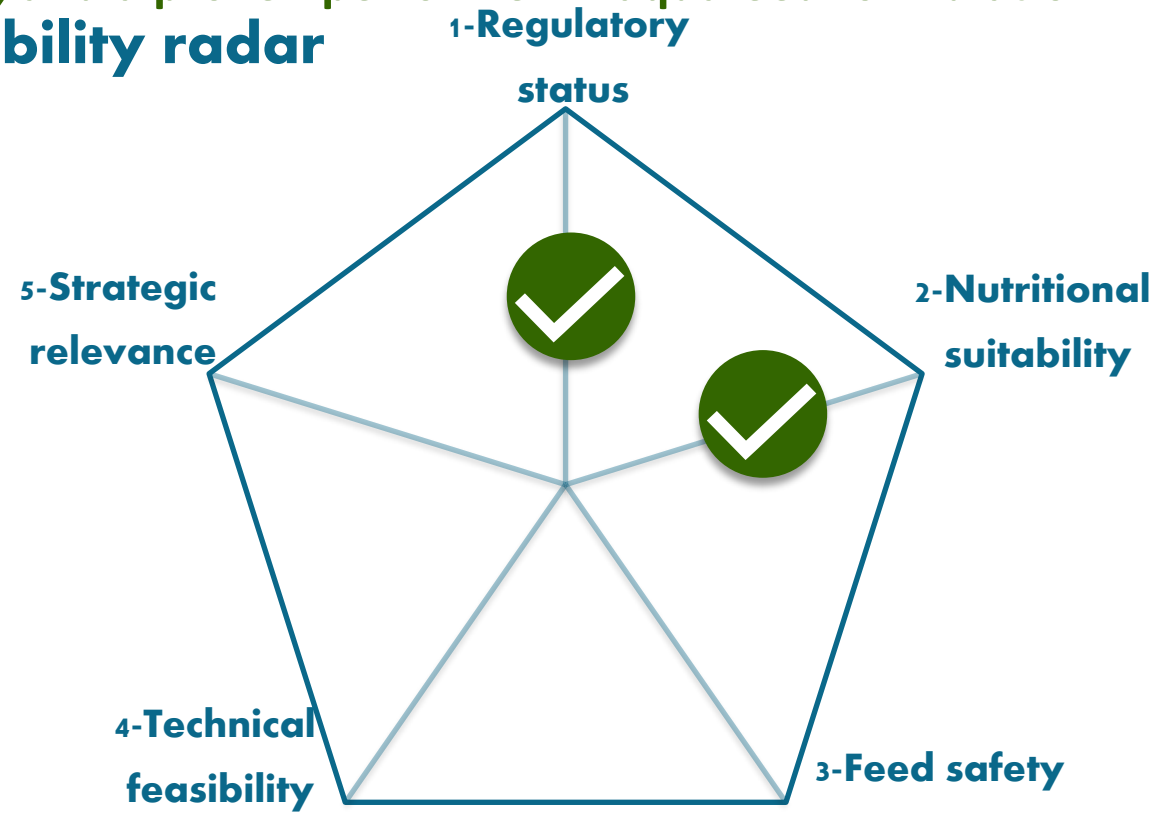
Case 5 – Yeast SCP: Regulatory-Ready Protein for Aquafeeds

***Cyberlindnera jadinii* — a yeast, a single-cell protein, and a proven performer in aquafeed formulation**

- Regulatory Status: EU Feed Catalogue
  - Listed twice
- Nutritional Suitability:
  - rich protein soucer, EAA, decades of feeding trials
  - Aquafeed producers rely on it - performance

Viability radar



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- Nutritional Suitability:
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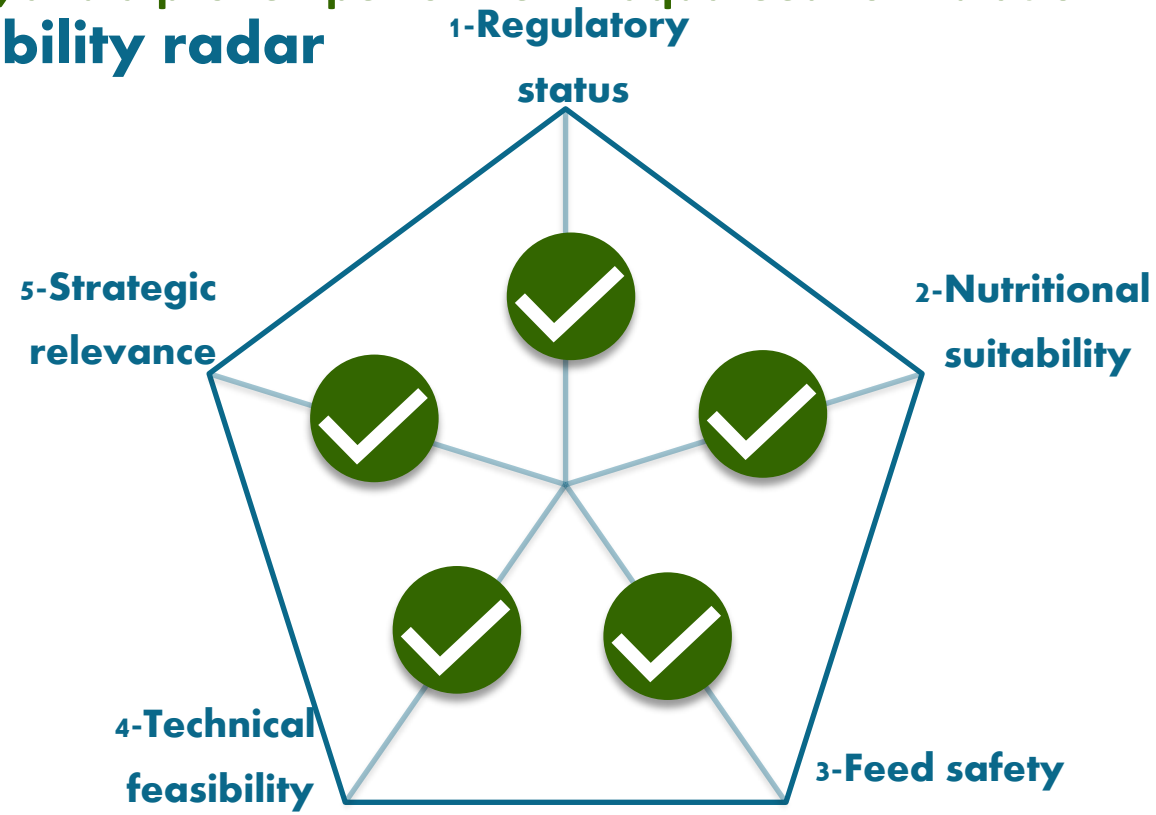
  - Aquafeed producers rely on it - performance
- Feed Safety:
  - EU thresholds for contaminants and hygiene
- Technical Feasibility
- Strategic Relevance:
  - Aligns with sustainability and circularity goals
  - dependable, low-risk protein source that is already in aquafeeds

Viability radar



A sustainable, reliable protein that frees resources for riskier innovation.

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The Bigger Lesson

- **Paradox:** the most sustainable ideas often face the biggest hurdles
- **Strategy:** screen for legal feasibility first — avoid dead ends.
- **Bridge:** innovation only works if it reaches the farm.