The Rise of Fungi

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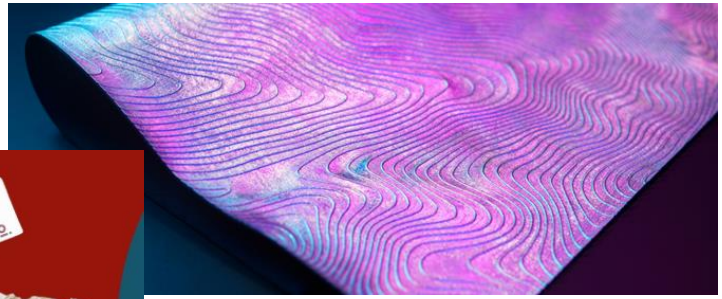
FUNGI INDUSTRY MAP | 2025

Examples of products:



The nutritional fungi protein from Yellowstone

Filamentous fungi protein

Extremophile from Yellowstone National Park

Regulatory approved, incl. GRAS

In-market and at industrial scale

Fy is the proprietary ingredient of The Fynder Group and already commercial

Fy powers B2C finished goods of **Nature's Fynd**, a Fynder Group brand promoting nutritional density in alt meat + dairy

Fy enables sustainable materials and alternative leathers for **Hydefy**, selling into fashion, shoes + apparel, and automotive

Fy is now being commercialized for **B2B speciality ingredient** opportunities, after development for Fynder Group captive brands

Fy is a macro-ingredient with strong nutritional fortification

60%
Protein

60% protein
All essential amino acids
PDCAAS 1.0

30%
Fiber

30% fiber
90% insoluble
Incl. beta glucans, chitin, mannan
Likely prebiotic

6%
Fat

6-8% fat
Primarily polyunsaturated fats
With Omega 3s from alpha linolenic acid

Fy has a wide array of unique properties

Nutritionally Dense

- 60% protein, 30% fiber, 6% fat
- All essential amino acids
- PDCAAS 1.0

Unique Functionality

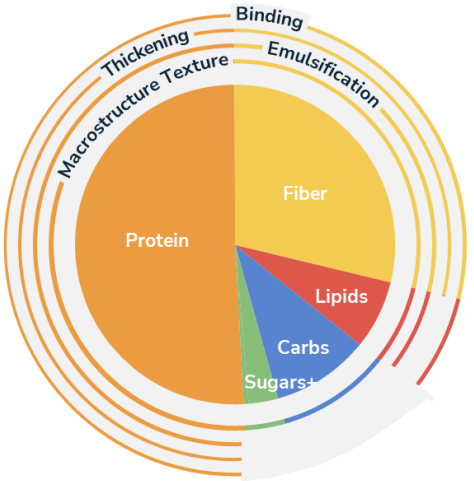
- Neutral, white color
- Dispersible & thickening
- Emulsifying properties
- Heat & acid stable

Advantageous Labeling

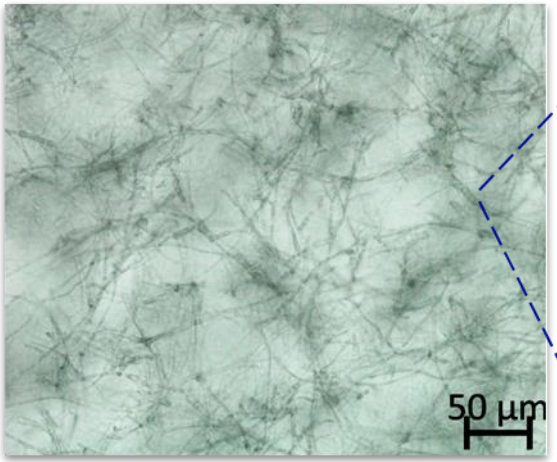
- Allergen free
- Vegan and sustainable

Why fungi?

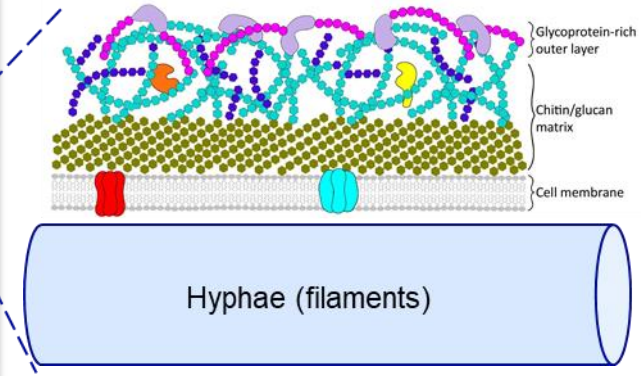
- Sustainability
- Scalability
- Can utilize waste-streams for production
- Fungal biomass, fruiting bodies or overproduction of a single compound (protein, fat, small molecule,..)
- High secretion capacity
- Naturally produce bioactive compounds
- Composition- protein, fiber
- Structure- fibrous, strength
- Can be colorless & neutral in taste
- Other functionalities



Functional Components



Hyphae in Suspension



Hyphal Microstructure

Why so many different fungi & processes? Functionality and composition of fungal biomass (mycoprotein) is impacted by:

Fungal species used:

- *Fusarium venenatum*
- *Fusarium flavolapis*
- *Aspergillus oryzae*
- *Neurospora crassa*
- *Paecilomyces variotii*
- *Pleurotus ostreatus*
- *Rhizomucor pusillus*
- *Ganoderma lucidum*
- *Agaricus bisporus*
- *Hericium erinaceus*

Fermentation process:

- Batch, fed batch, continuous
- Surface tray/solid state
- Liquid-air surface
- Submerged:
  - Traditional with agitator
  - Bubble column
  - Air-lift

Downstream processing:

- Deactivation
- Removal of culture broth
- Washing
- Additions
- Drying
- Freezing
- Milling

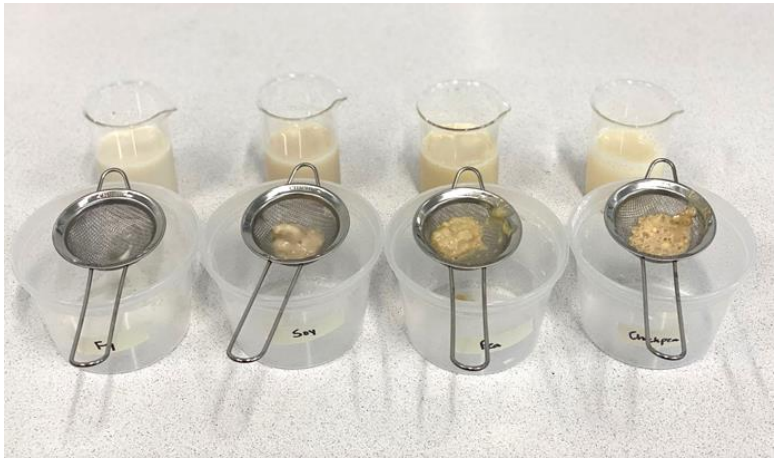
Functional Properties of Proteins/Ingredients in Food

Those physiochemical properties that enable proteins to contribute to the desirable characteristics of food. Intra- as well as intermolecular interactions i.e. protein-lipid, protein-carbohydrate,..

Function	Mechanism	Food Systems
Solubility	Hydrophilic interactions	Beverages, soups
Gelation	Water entrapment & immobilization, network formation	Processed meats, gelled products, cakes, cheeses, baked goods
Water binding	Hydrogen bonding, ion hydration	Processed meats, breads, cakes
Emulsification	Absorption at interfaces	Emulsified meats, cream soups, cakes, dressings
Viscosity	Water binding, hydrodynamic size & shape	Beverages, soups, sauces, salad dressings
Texture (cohesion, elasticity, adhesion)	Hydrophobic, ionic & hydrogen bonding, disulfide cross-links	Processed meats, baked goods, pasta
Foaming	Interfacial absorption, film formation	Whipped toppings, ice creams, cakes, meringues

Examples of unique functionalities

- Thickening and dispersibility which impacts mouthfeel



- Emulsion stability at low pH

Summary:

Filamentous fungi are being harnessed worldwide as sustainable biofactories across food, personal care, nutritional, and materials sectors.

- Different filamentous fungal species are being leveraged depending on end use
- In two years, the number of companies leveraging fungi has almost tripled to >500
- Many different fermentation/growth processes are being investigated
- Fermentation and downstream processes have an impact on composition, functionality and cost of production
- Product produced can be fungal biomass, fruiting bodies, specific protein or other molecule
- Fungal biomass has functionality that makes it beneficial for food applications
- Fungal biomass is high in both protein and fiber

Questions?

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