



ENTOPROTECH

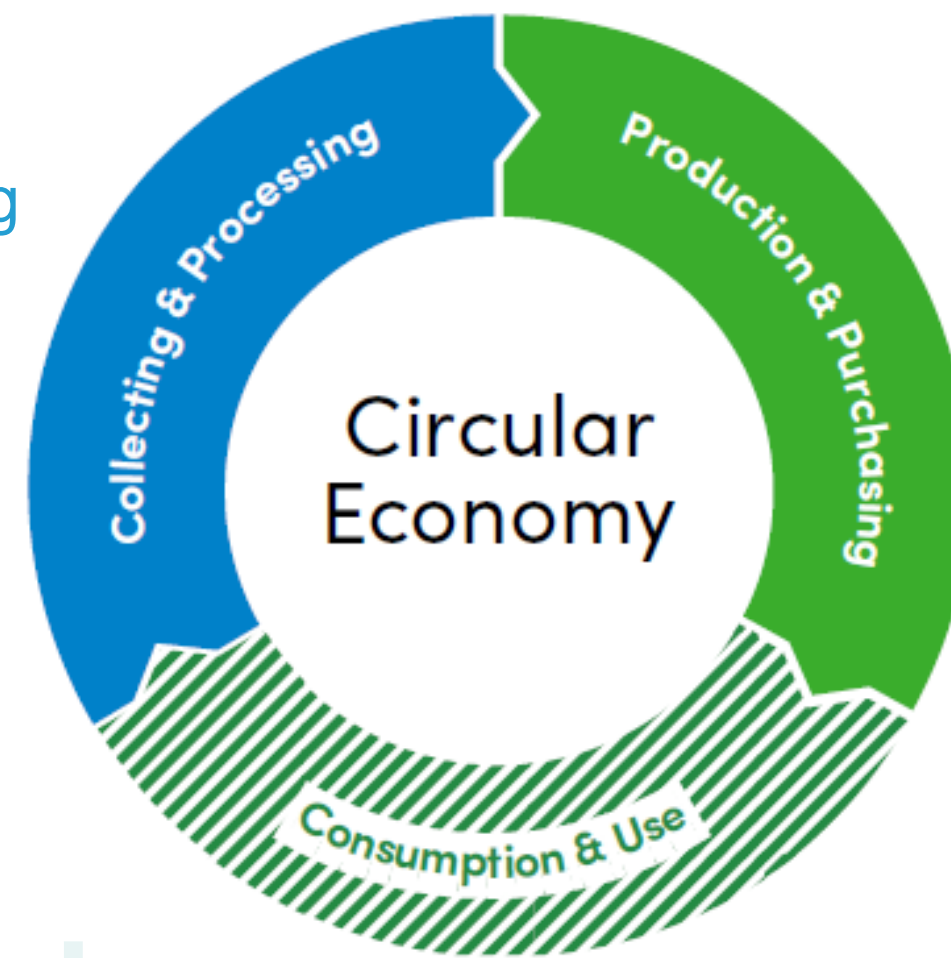
Circular Economy in action



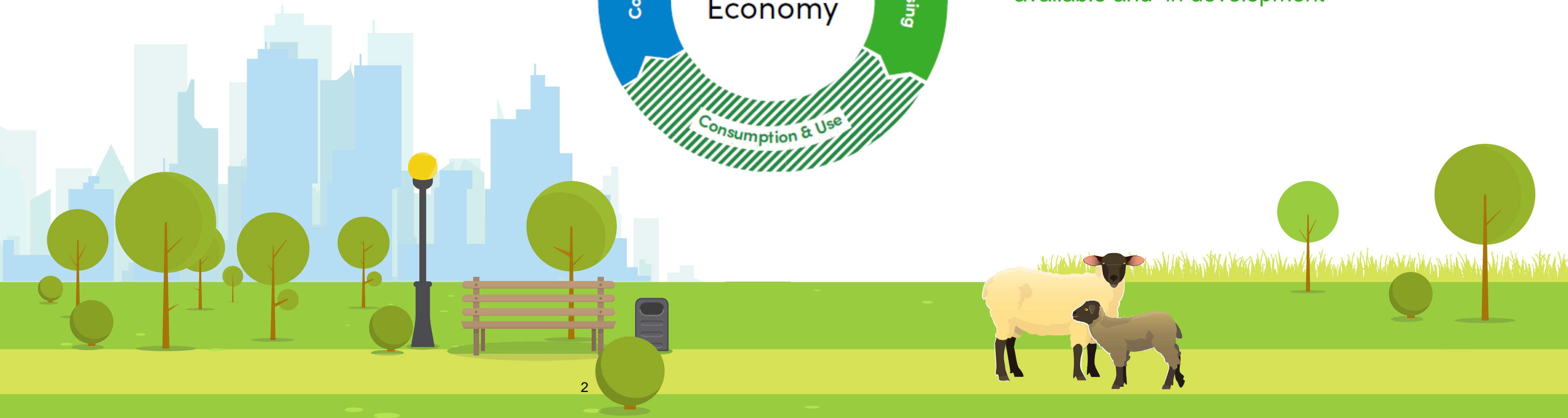
ENTOPROTECH IS A CIRCULAR ECONOMY COMPANY

that converts food waste into high quality protein
(and additional products)

- Preventing food waste environmental damage
- Providing important service to food industry
- Preventing landfilling – saving land and avoiding harmful gas emissions



- Allows sustainable meat & fish industry development
- Reduces the need in fishmeal and provides farm animals with sustainable protein
- Variety of exciting products commercially available and in development



PROBLEMS WE ARE SOLVING

FOOD WASTE & SUSTAINABLE MEAT INDUSTRY



4B tons of landfill gases are released due to food waste and loss, or ~ 8% of global GHG



1.6B tons of global food losses and waste are generated yearly, or ~ 35% of all food produced



25% of all fresh water consumed annually is used to produce food that is ultimately lost/wasted



24M acres annually are deforested to grow food

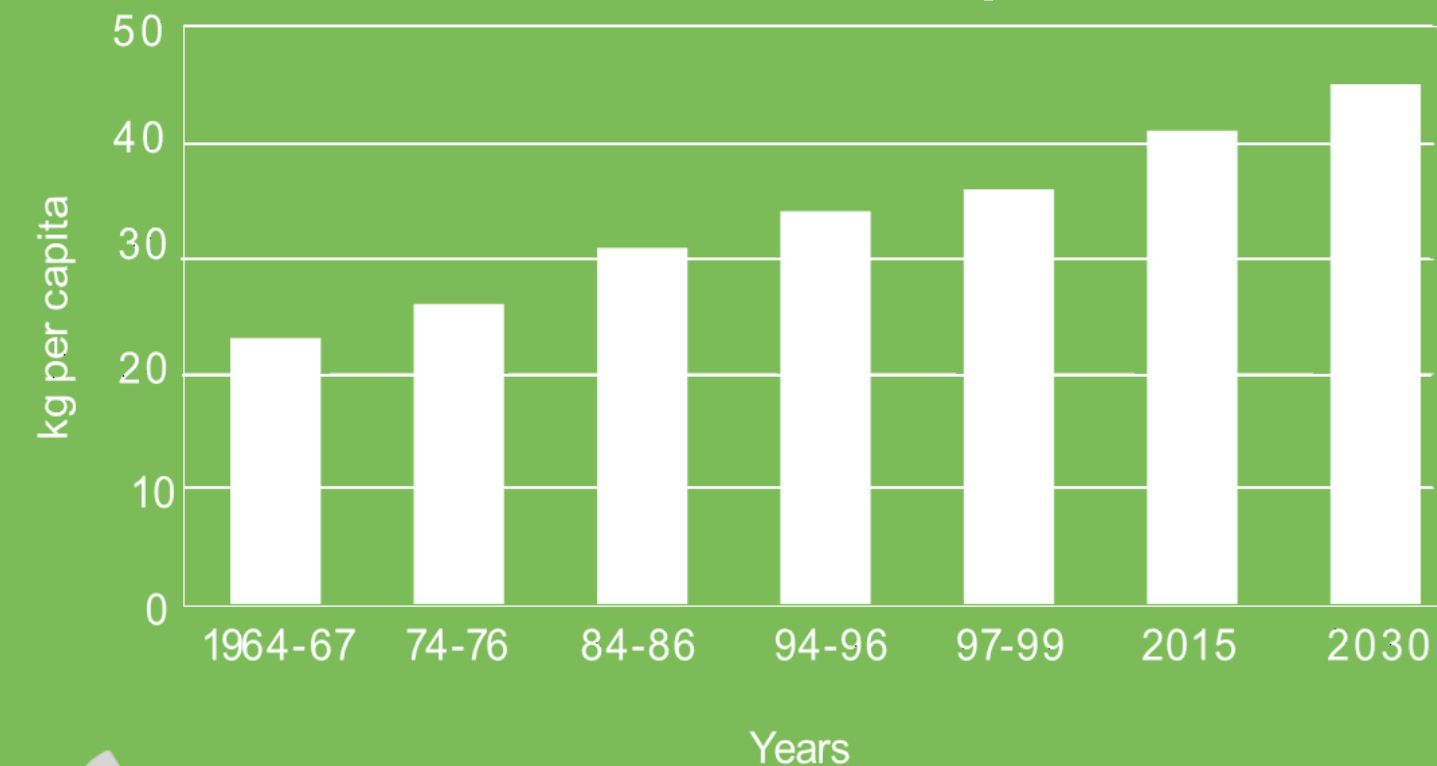


300M barrels of oil are used annually to produce food that is ultimately lost or wasted

Source: <https://www.evoconsys.com/food-waste.html>

<https://www.theguardian.com/news/datablog/2013/jan/10/how-much-water-food-production-waste>

Global meat consumption



The amount of protein produced today needs to double putting growing pressure on environment



The UN estimates that food production will need to **increased by 70%**

Source: World agriculture: towards 2015/2030, FAO
Food wastage footprint & Climate Change (FAO, 2015)



UN 17 SUSTAINABLE DEVELOPMENT GOALS



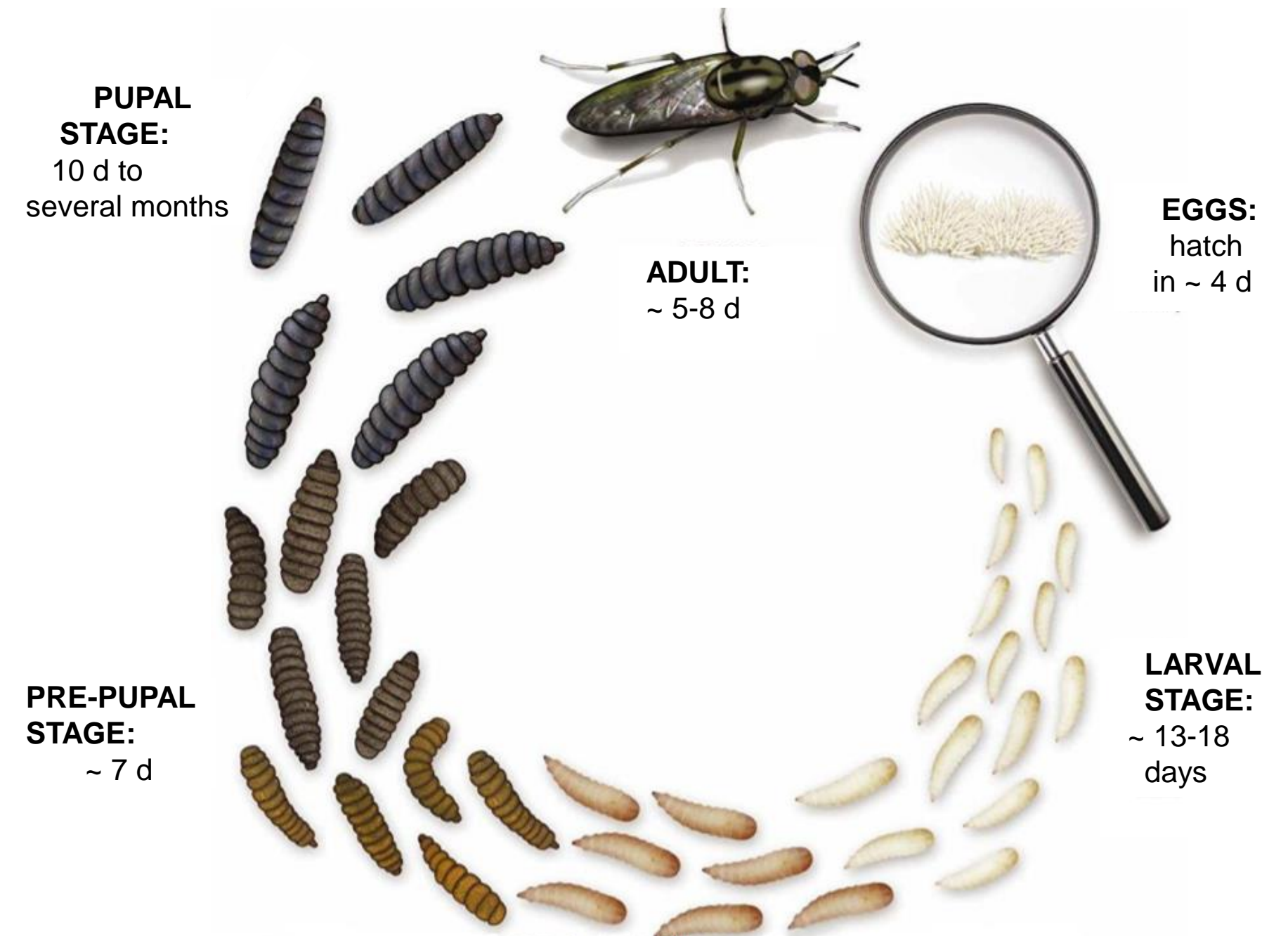
Entoprotech actively contributes to 7 SDGs

OUR SOLUTION: **BLACK SOLDIER FLY (BSF)**

Hermetia illucens

- BSF larvae is a ferocious eater of everything organic
- Daily converting organic waste double of its weight into high quality protein
- No water used in the process
- No pest - adult fly does not feed
- Harmless for humans
- Great candidate for large scale cultivation
- Highly resilient

**BSF can process food waste
into valuable nutritional
ingredients and innovative
compounds for Pharma &
Biotech industry**



https://www.researchgate.net/publication/339537156_Processing_methods_for_the_black_soldier_fly_Hermetia_illucens_larvae_From_feed_withdrawal_periods_to_killing_methods

Standard facility –process & numbers

- Waste processing capacity : ~ 150 ton/day
- Scalable: Processing unit of 50 ton/ shift X 3 shifts
- Capex \$17 mn
- Annual revenue \$13 mn
- EBITDA margin ~ 40%
- Facility repayment period: 6 years



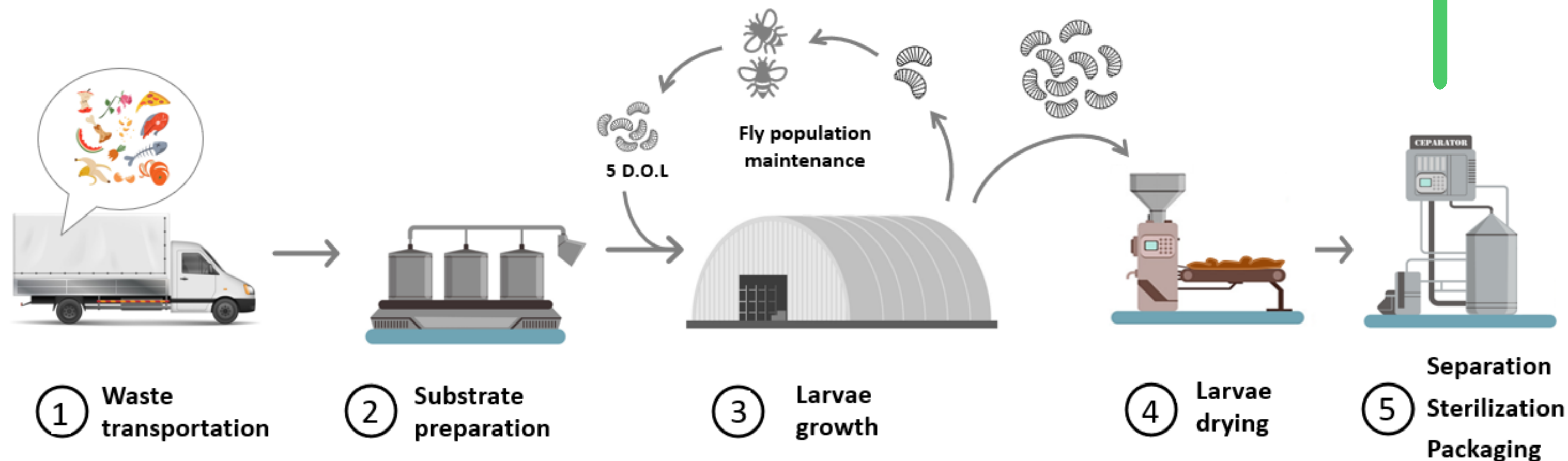
Protein meal ~ **10 t**



Insect fat ~ **5 t**



Fertilizer ~ **30 t**



MARKETS

WASTE MANAGEMENT

	Total US & EU market (t)	Addressable US & EU market (t)	Addressable US & EU market (\$)
Food waste	191 M	91.9 M	\$4.6 B

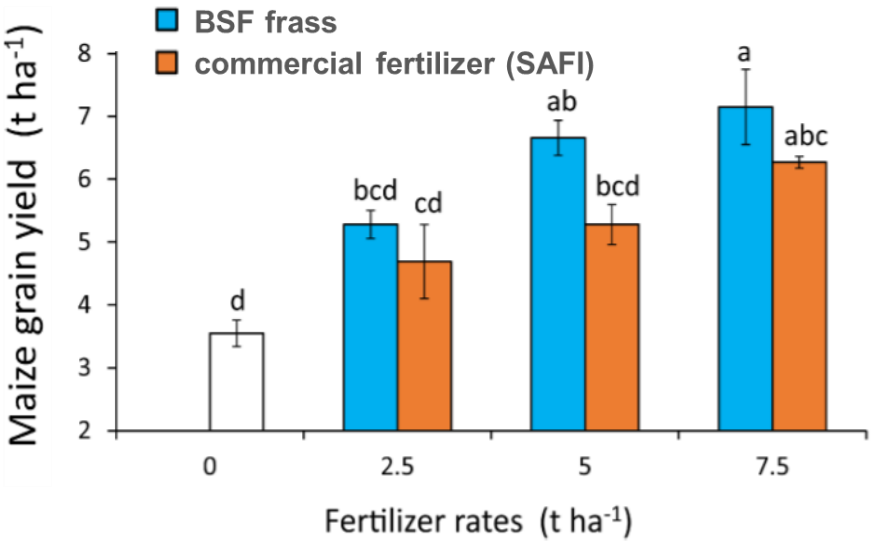


ORGANIC FERTILIZERS

	Total global market	Addressable global market
Market size (\$)	223.8 B	\$13.8 B

BSF fertilizer improves maize grain yields

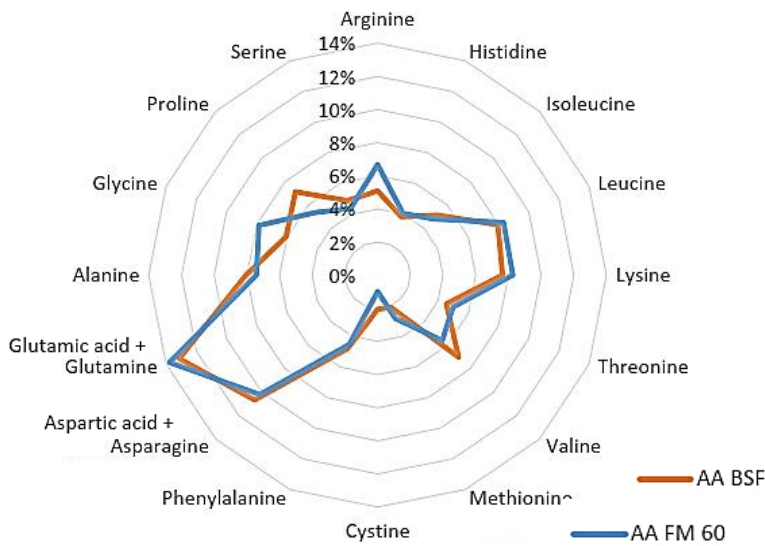
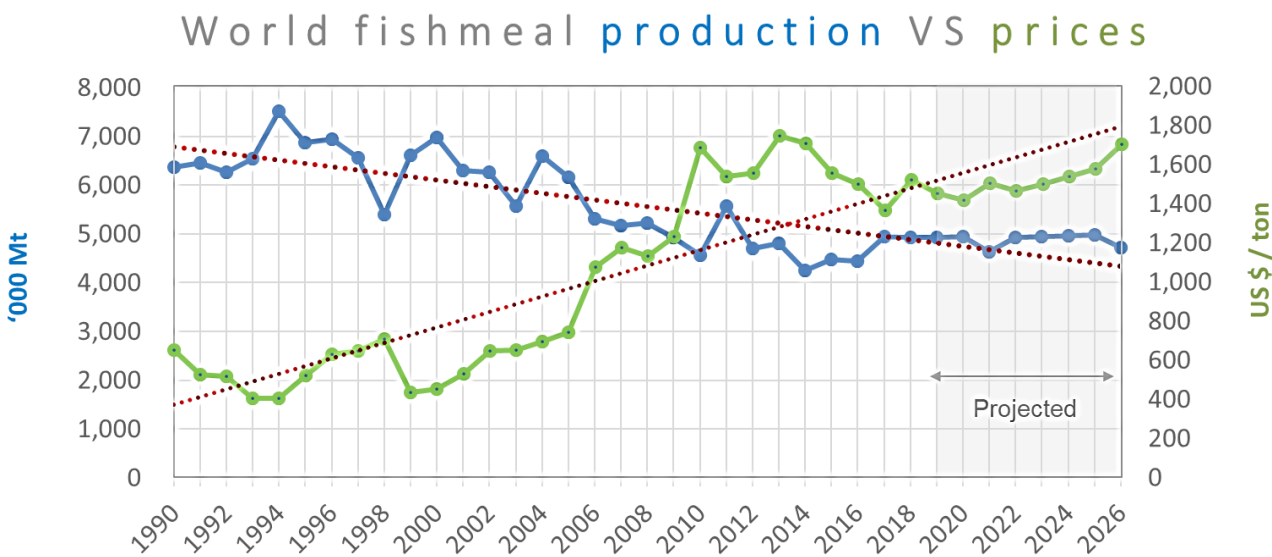
Beesigamukama D, Mochoge B, Korir NK (2020) Exploring Black Soldier Fly Frass as Novel Fertilizer for Improved Growth, Yield, and Nitrogen Use Efficiency of Maize Under Field Conditions. *Front. Plant Sci.* 11:574592. doi: 10.3389/fpls.2020.574592



SUSTAINABLE FEED PROTEIN

	Total global market (t)	Addressable global market (t)	Addressable global market (t)
Feed-grade protein	125.2 M	12.5 M	\$52.1 B

- Fishmeal prices are on rise, due to overfishing & quotas
- Insect protein can replace fishmeal, thanks to similar AA profile
- Compared to crops, BSF allows 120-fold reduction in land use



SUSTAINABLE FEED FAT

	Total global market (t)	Addressable global market (t)	Addressable global market (t)
Feed-grade fat	32.4 M	5.7 M	\$4.0 B

- BSF fat is high in valuable lauric & linoleic acids
- A range of applications: feed, industrial, cosmetics

Fatty acid content, %	Value
Saturated	51.26
Monosaturated	18.34
Polysaturated	28.43
Lauric	28.44
Myristic	4.97
Palmitic	14.15
Palmitoleic	3.59
Heptadecenoic	0.08
Oleic	14.21
Linoleic	26.78
Alpha-linoleic	0.97

CURRENT REGULATORY FRAMEWORK

- In EU, 7 insect species, including BSF, are permitted as feed for farmed animals
- The regulations specify the substrates for the larvae. For example, fish meal, dairy, vegetable and fruit wastes are allowed, while catering waste and animal manure are not
- Growing pressure to include catering waste will increase production potential significantly

The regulations are being relaxed – a trend expected to continue

	Processed animal proteins	Insect fats & hydrolysed proteins	Whole larvae	Processed animal proteins	Insect fats & hydrolysed proteins	Whole larvae	Processed animal proteins	Insect fats & hydrolysed proteins	Whole larvae
	EUROPE			USA			CANADA		
Authority & regulation	EFSA (EU Decisions/regulations)			FDA (FFDCA), AAFCO			CFIA (FAFR)		
Pets & fur animals	✓	✓	✓	✓	✓	✓	✓	✓	✓
Aquaculture	✓	✓	✓	✓	✓	✓	✓	✓	✗
Poultry	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pigs	✓	✓	✓	✓	✓	✓	✓	✓	✗

- European regulation directives: (EU) 142/2011, (EU) 2017/893, (EU) 2017/1017, (EU) 1069/2009, (EU) 767/2009
- *IPIFF Guide on Good Hygiene Practices for EU producers of insects as food & feed (Decemembr 2019)*
- *The Potential Role of Insects as Feed: A Multi-Perspective Review*
- *Varelas, Vassileios. (2019). Food Wastes as a Potential New Source for Edible Insect Mass Production for Food and Feed: A review. Fermentation. 5. 81. 10.3390/fermentation5030081*
- AAFCO Annual Meeting Agenda Book (August 2020)

- ✓ Full approval
- ✓ Conditional approval
- ✗ Not yet approved



ENTOPROTECH

Insect protein market - BUZZ

- Insect protein market expected to reach \$1,336 Million by 2025
- It was just \$ 144 in 2019 CAGR of 45%

| Insect company secures £10 million in funding to construct feed farm

BY CHLOE RYAN ON OCTOBER 12, 2020

FEED & NUTRITION

Entocycle has announced a £10m funding package from the UK Government's Industrial Strategy Challenge Fund (ISCF) to help fund the construction of a large-scale industrial insect farm that would produce insects for animal feed.

<http://www.poultrynews.co.uk/news/insect-company-secures-10-million-in-funding-to-construct-feed-farm.html>

Insect protein start-up raises \$372m to fund world's largest insect farm

By Alec Mattinson | 8 October 2020

French insect farming startup Ynsect has raised a further US\$372m as it seeks to build the largest insect farm in the world. The company has extended its Series C funding to \$372m on top of \$148m disclosed last year, increasing total financing to \$425m – the largest amount ever raised by a non-American 'agtech' business and more the rest of the global insect protein industry has raised collectively.

<https://www.thegrocer.co.uk/fundraising/insect-protein-start-up-raises-372m-to-fund-worlds-largest-insect-farm/649164.article#:~:text=French%20insect%20farming%20startup%20Ynsect,insect%20farm%20in%20the%20world.&text=It%20will%20also%20let%20the,supply%20of%20wet%20pet%20food.>

APAC NOVEMBER 5, 2020 / 9:19 AM / UPDATED A MONTH AGO

Nestle uses insect protein in Purina pet food

By Reuters Staff

3 MIN READ



LONDON/ZURICH (Reuters) - Nestle's Purina brand is launching a line of pet food using insects, as the world's biggest food group tests more environmentally sustainable protein sources.

InnovaFeed opens biggest insect protein plant globally, secures €140m in funds, and partners with ADM to build US site

By Jane Byrne

19-Nov-2020 - Last updated on 19-Nov-2020 at 15:04 GMT

Insect protein producer, InnovaFeed, has announced the opening of its insect protein production site in the north of France, it has also closed a new €140M (US\$166M) fundraising effort to accelerate its domestic and international expansion strategy, while inking a deal with ADM to build a US facility.

<https://www.feednavigator.com/Article/2020/11/19/InnovaFeed-opens-biggest-insect-protein-plant-globally-secures-140m-in-funds-and-partners-with-ADM-to-build-US-site>

Insect-growing startup Beta Hatch raises \$3M to further innovate and build giant new facility

BY KURT SCHLOSSER on May 21, 2020 at 9:00 am

Beta Hatch, the insect-growing startup looking to revolutionize the animal feed business through its science and technology, has raised \$3 million as part of a new funding round.

<https://www.geekwire.com/2020/insect-growing-startup-beta-hatch-raises-3m-innovate-build-giant-new-facility/>



ENTOPROTECH

ENTOPROTECH TODAY

R&D (Israel)

- R&D centre in Caesarea Industrial park
- R&D closely integrated in Israeli biotech ecosystem
- Cooperation with leading research teams in academia, healthcare system and industry
- Very efficient tech transfer to the pilot facility-implementation of any technological breakthrough on industrial scale



Pilot facility (Russia)

- A pilot facility of 15 ton/day
- Supports R&D activities
- Provides waste management services to global food players (MARS, DANONE)
- POC and ongoing sales to fish farmers and pet food producers
- Considering to increase capacity to 100t/day following growing demand



Fundraising & business development

- Pre IPO (SAFE) - \$3.5 mn raised
- High Quality lead investor – Granot
 - The biggest agri-cooperative in Israel
 - Biggest producer of feed (30% of the market)
- Several additional high-quality investors are in DD process
- Business development initiatives
 - The aim is to partner with local partners and to build waste processing facilities globally
 - Currently working with partners or starting POCs in Mexico, Poland, Russia and Israel

OUR TEAM



 **DAMATE** Naum Babaev
-founder of DAMATÉ
Founder of Entoprotech

B.Sc. in Finance from Financial Academy under the Government of the Russian Federation; 20+ years of outstanding management and entrepreneurship in agritech & food processing industry; founder of Rusmolco, a major raw milk producer in Russia; co-founder & joint owner of DAMATÉ group, a large agricultural holding in Russia



Ivan Sokolov
Global COO + CEO RF
Co-founder of Entoprotech

B.Sc. In Biotechnology from Russian State Agrarian University, “Innovation in Agriculture” certificate from Kansas State University (US); 10+ years in agritech industry, co-funded several agritech start-ups



Alexander (Sasha) Babitsky
CEO

B.Sc. In Industrial Engineering from Technion - Israel Institute of Technology, MBA from Said Business School, University of Oxford. 20+ years experience in operational management, investment banking and VC



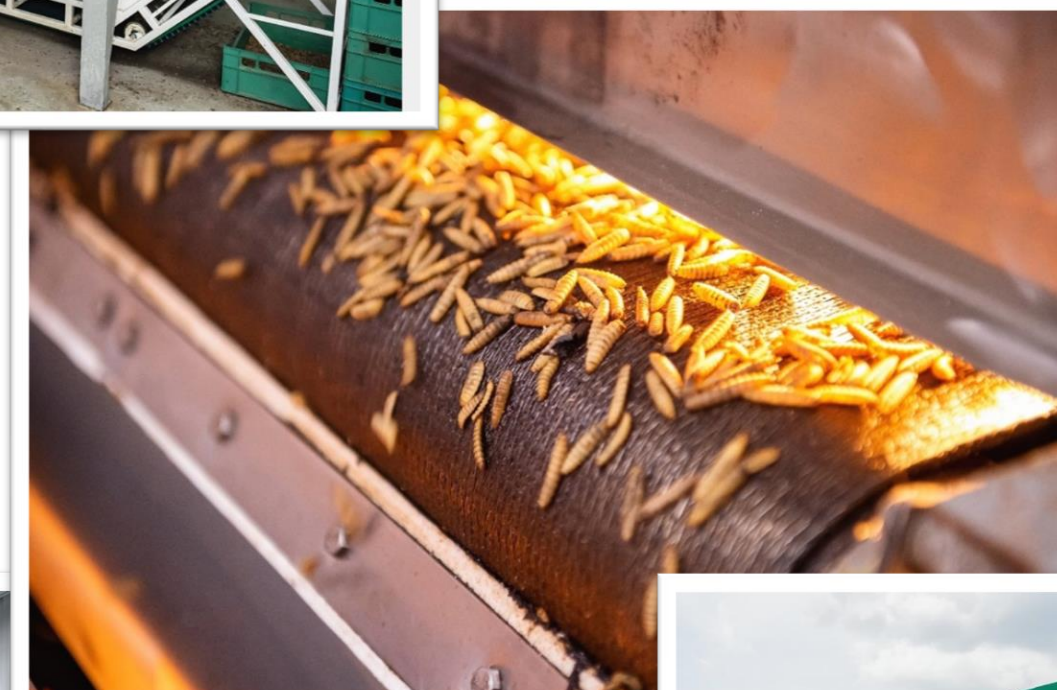
Yulia Matiuhin
R&D leader

PhD in Biology from Technion - Israel Institute of Technology. 10+ years experience in management, strategic planning, pre-clinical and clinical R&D in bio-pharma companies: Protalix, SmartZyme, BiomX







PILOT PLANT

- Established in 2016
- Provides waste utilization services to Mars and Danone., local retailers and food producers (15 ton/d)
- Final products for trials (insect meal, insect fat, frass)
- Enables industrial scale trials and pilots
- Sales (revenues):

	2020	2021 (E)
Revenue (\$ 000')	317	800
Waste processing	88.3%	74.6%
Product Sales	11.7%	25.4%



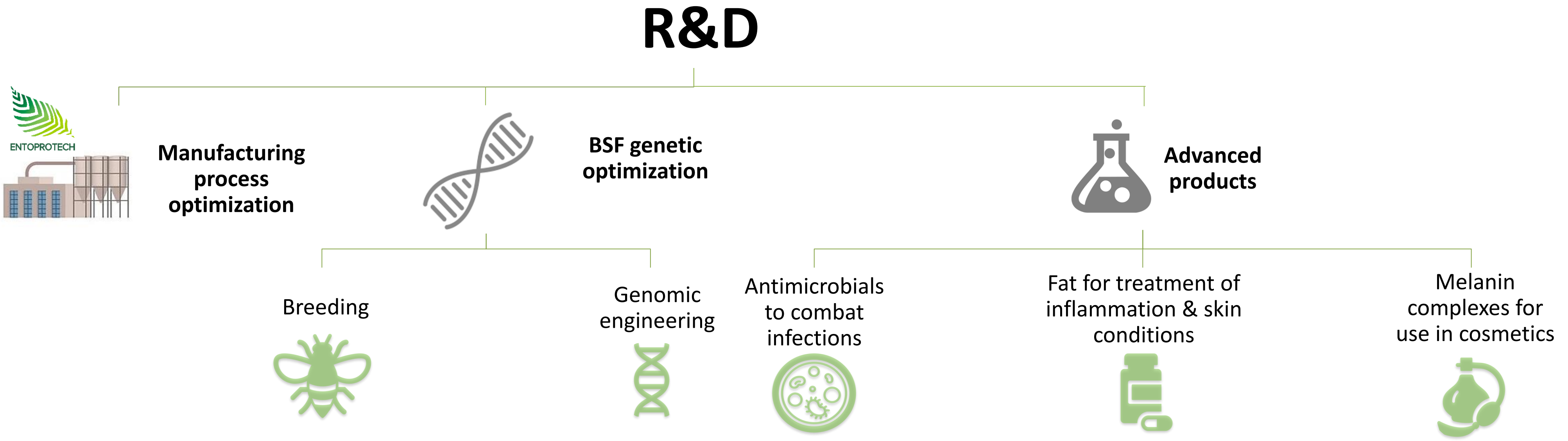
Business Development

	2020	2021	2022	2023	2024	2025
Facilities:	 1	 1	 1	 2	 4	 7
Revenues (\$ '000) (**):	317	800	1000	5,629	23,039	53,539
EBIDA (\$ '000)				(3,279)	3,576	18,044
Capacity (tons/day) :	4	15	20	170	470	920
Capital raising (*):		SAFE Granot (lead) -\$2 M Raised \$ 3.5 Will be \$5mn by end of 2021	Priced round to finance expansion (~\$30 mn)			
Use of proceeds:		R&D, Business development	R&D, Facilities building	R&D, Facilities building	R&D, Facilities building	R&D, Facilities building

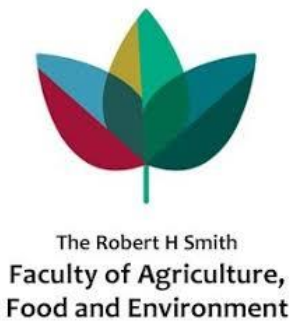
(*) Does not account for: capex and R&D related grants, tax rebates, consortium participation or any form of non-dilutive financing

(**) Based entirely on the products available for sale today (waste management, BSF protein meal, BSF fat, organic fertilizer) – i.e without accounting for value-add products in development

R&D: LEAN, EFFICIENT and ENGAGING BEST-IN-CLASS RESEARCHERS



Best in class
R&D partners



FAT: Anti-inflammatory products

nutrition for inflammatory conditions

Inflammatory bowel disease, IBD (Crohn's/Colitis)



Market size: \$ 30 B with expected CAGR 4%-5% (2020-2025)

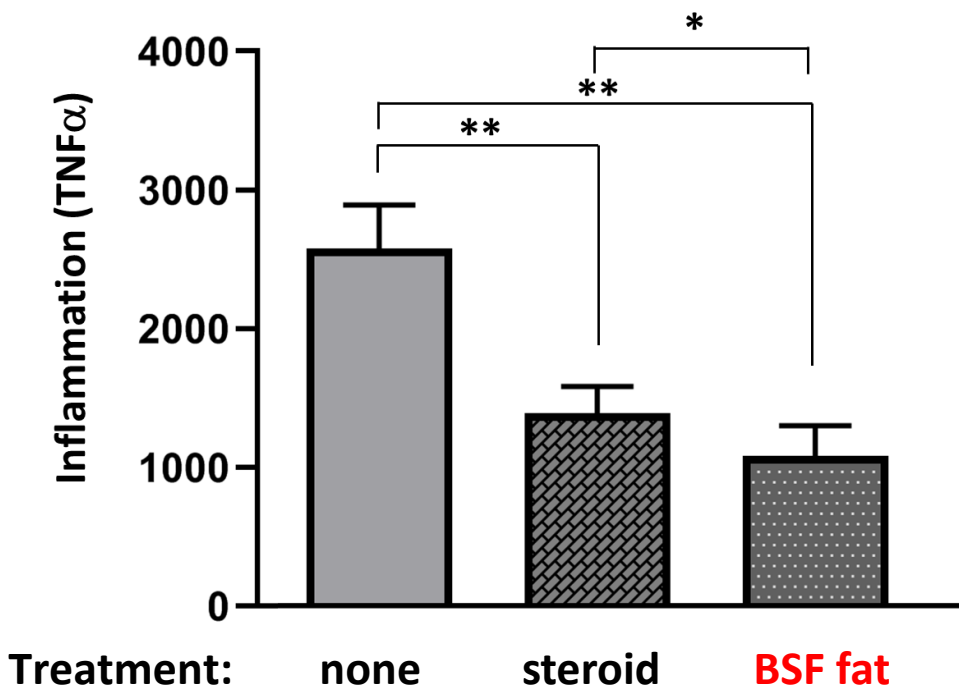
Disease prevalence: *US:* 3.5 mn cases
EU: 4 mn cases
Rest of the world: 5 mn cases

Problem: >70% patients are mild/in-remission
prescription of anti-inflammatory drugs (steroids) - problematic due to side effects

Solution: safe anti-inflammatory molecule to replace steroids - **BSF fat as a food supplement for long-term treatment**

Initial efficacy data

Immune response in vitro



Data are indicated as mean \pm SEM (n=4) ;
*p < 0.01 , **p < 0.05



Courtesy of Prof. Schwartz

Safety profile (mice)

HIGH SINGLE DOSE ADMINISTRATION

Safe over the range of:
1.2 - 9.6 g/kg weight (70 - 700g in human)

CHRONIC ADMINISTRATION

Safe over the range of:
20 - 180 g/kg feed daily for 3 months

Completed

Impact of BSF fat on reduction of intestinal inflammation in animals with Crohn's disease



Anti-bacterial products: anti-microbial proteins to tackle biofilm

Biofilms

collective of bacteria growing on surfaces as an antibiotic-impermeable layer



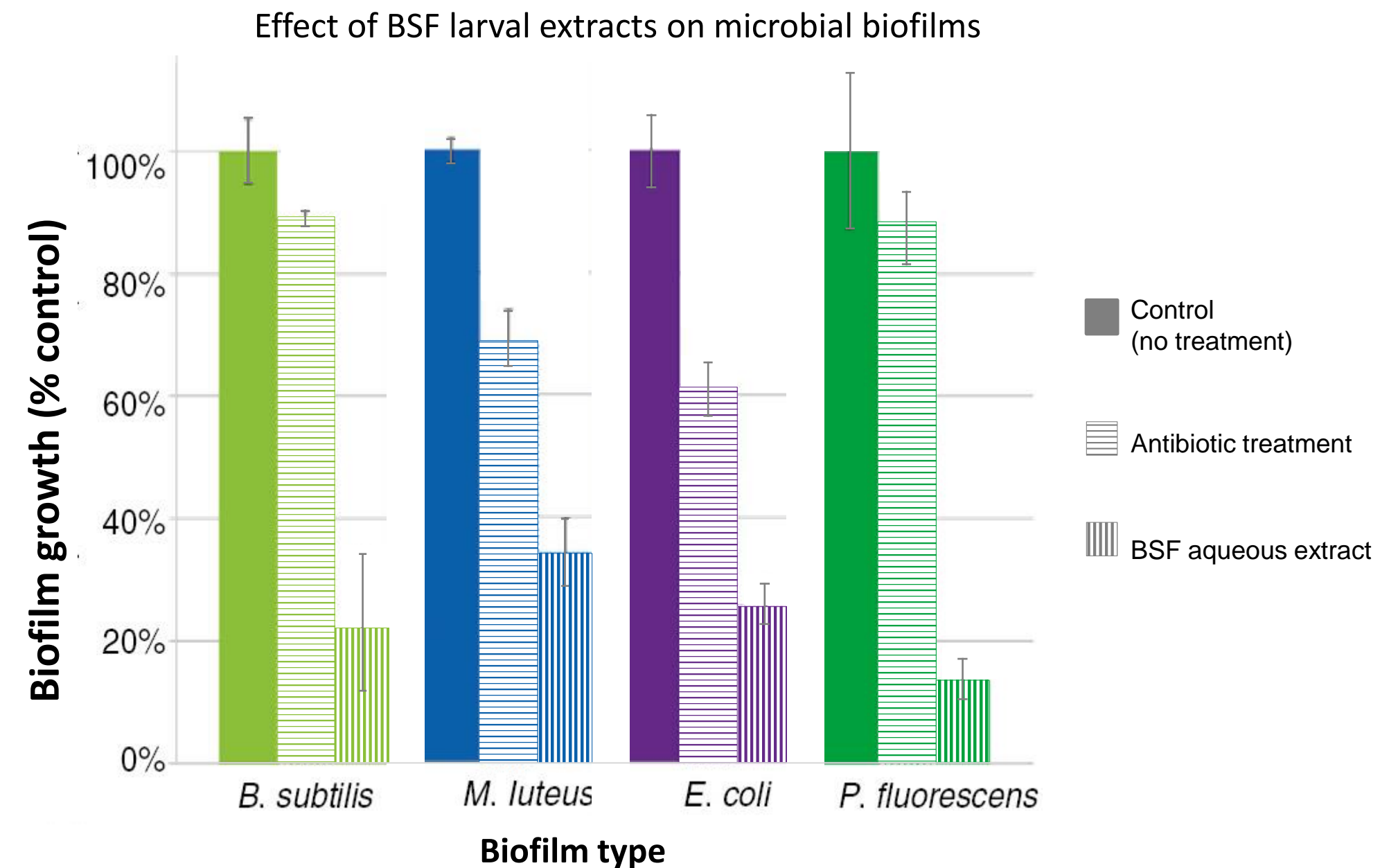
Market size: \$ 2.6 B in healthcare by 2025
\$ 2.5 B agri-food industry

Disease prevalence: 80% of all microbial infections

Problem: In most cases, biofilm infection is treated by surgical replacement

Solution: Antimicrobial proteins produced by BSF with demonstrated antibiofilm activity

Antibiofilm properties of BSF larvae extract: Published data

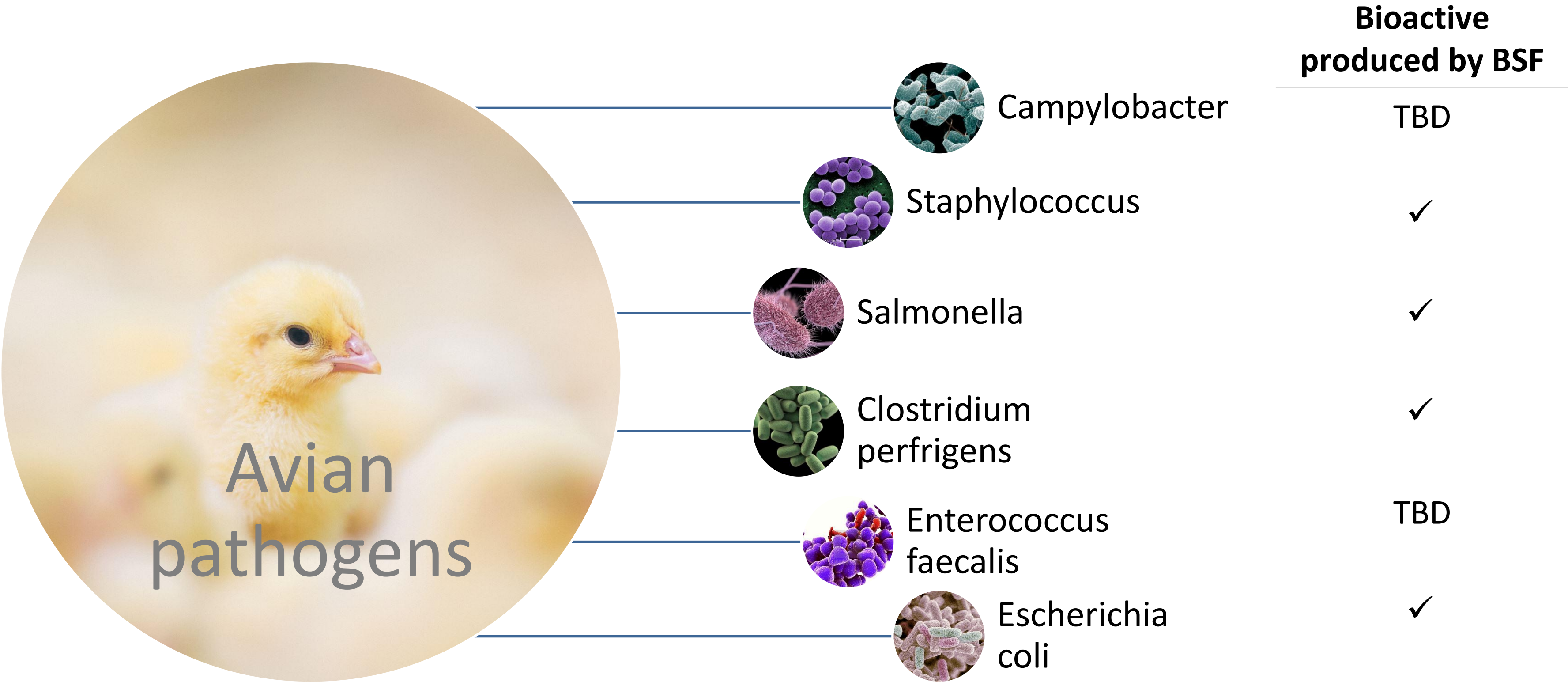


Conclusions: BSF larval extract effectively suppresses biofilm growth *in vitro*

Müller, A., Wolf, D., & Gutzeit, H. O. (2017). The black soldier fly, *Hermetia illucens* – a promising source for sustainable production of proteins, lipids and bioactive substances, *Zeitschrift für Naturforschung C*, 72(9-10), 351-363.

Health by Nutrition

Since 2014 NAE (No Antibiotics Ever) policy implementation led to revenue losses in poultry business



Our solution: produce BSF immunized against the avian pathogens



DAMATE – founding shareholders

- A vertically integrated company: from breeding & slaughtering to processing & distribution
- Present at all retail chains across Russian Federation
- Exports to 18 countries; vast customer base, including prominent companies e.g., Emirates Airlines and Etihad Airways
- Modern technology in production and management
- Cost competitive manufacturing



MAIN SEGMENTS



Turkey
production &
processing



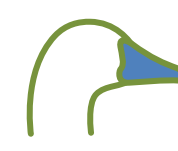
Dairy
farming



Milk
processing



Lamb
production



Duck
production

KEY FACTS



No. 1 turkey producer
in Russia (9th largest
in the world)



43% sales CAGR
(2013 – 2020)



6,000
employees



\$411 million
annual revenue



No.1 brand
recognition in
Russia

PARTNERSHIPS





- Biggest agricultural cooperative in Israel
- No. 1 feed producer in Israel (~30% market share)
- Extensive R&D capabilities
- Biggest poultry integrated producer
- Significant shareholding in Tnuva
- 70% of farm produce exported (mainly Europe)



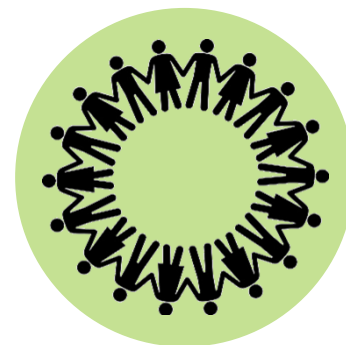
KEY FACTS



60 years on market
(established
in 1940)



41 kibbutz
members



3500
employees



Over \$1 billion
combined
sales



1 million tons
feed/year



90 large-scale
industrial farms



35% of Israel's
avocado
exports

CONTACTS



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