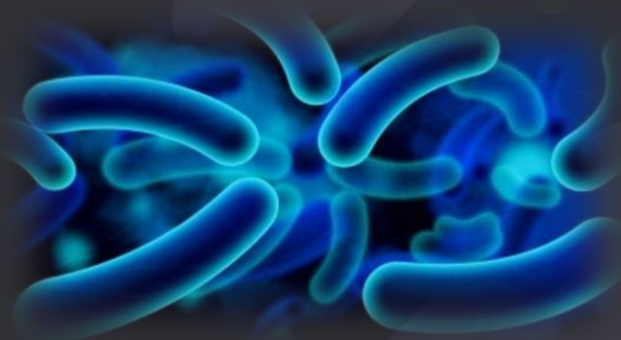


LA VITICOLTURA GUARDA AL FUTURO

Disponibilità presente e futura
di nuove sostanze per la difesa
fitosanitaria a basso impatto
ambientale

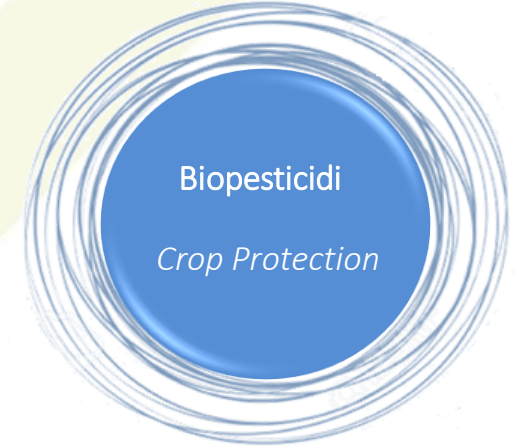
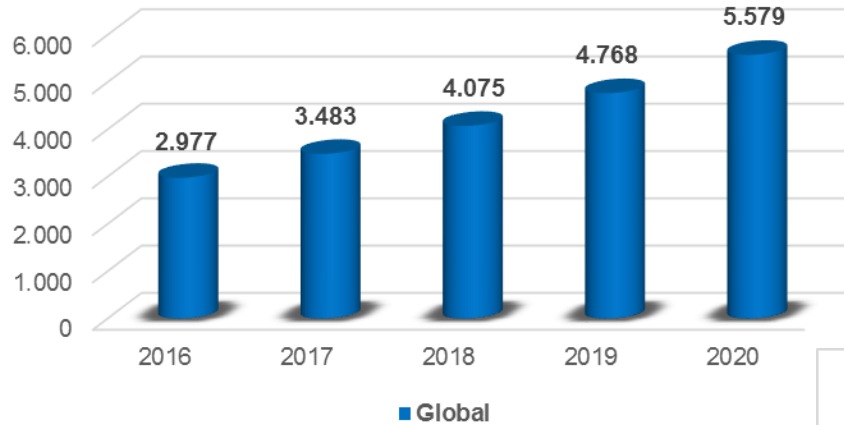


Siena – 08, Febbraio 2018

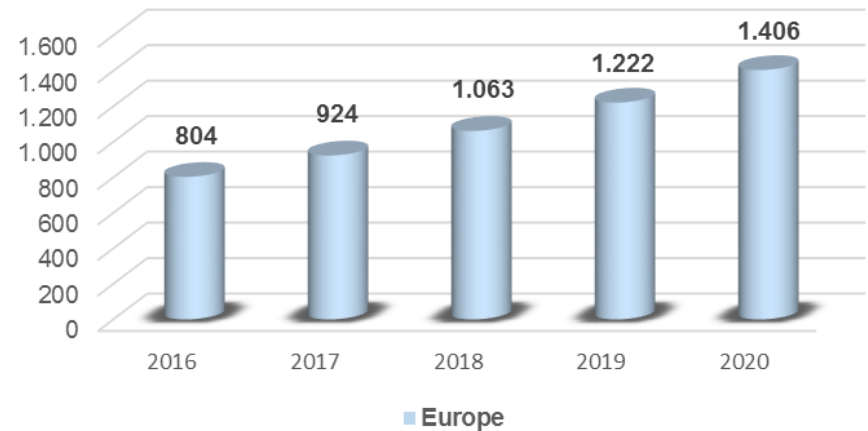
Alcuni dati di mercato.....

Mercato Biopesticidi

Biopesticide Global Market
(Milion \$ - CAGR 17%)



Biopesticide European Market
(Milion \$ - CAGR 15%)



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Mercato Biopesticidi

Biofungicidi ad ampio spettro

Active	Target	Note
Bacillus pumilus QST 2808	Foliar diseases	In the market in US, Brazil Future global development and sales
Reynoutria sachalinensis extract	Foliar diseases	Future global development and sales
Cerevisane	Foliar diseases	In the market in few countries
Potassium bicarbonate	Foliar diseases	Globally in the market
Trichoderma spp. (various)	Soil born diseases	Globally in the market or in development

Biopesticidi target specifici

Active	Target	Note
Aureobasidium pullulans	botritis - erwinia	Globally in the market
Ampelomyces quisqualis	powdery mildew	Globally in the market
Coniothyrium minitans	sclerotinia	Globally in the market

Mercato Biopesticidi

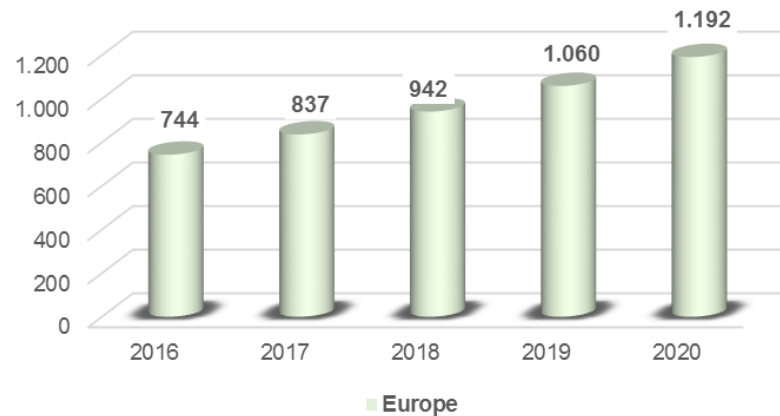
Active	Target	Note
B. subtilis strain QST 713	Foliar diseases and bacteria	Globally on the market
Bacillus subtilis strain GB03	Foliar diseases	In the market in US. Future global development
Other B. subtilis (3 new strains)	Foliar diseases	
B. amyloliquefaciens strain D747	Foliar diseases, soil born diseases and bacteria (Foliar diseases diseases and bacteria)	In the market in US, Mexico, only in Italy in Europe. Recently (1 Apr. 2015) Annex I listed, future introduction in Europe and globally
B. amyloliquefaciens strain FZB24	Foliar diseases, soil born diseases and bacteria	In the market in US. Pending Annex I listing. Future introduction in Europe and globally
B. amyloliquefaciens strain MBI 600	Soil born diseases (foliar diseases and bacteria?)	In the market in US. Pending Annex I listing. Future introduction in Europe and globally
Other B. amyloliquefaciens (5 new strains)	Foliar diseases, soil born diseases and bacteria	

Mercato biostimolanti

Biostimulant Global Market
(Milion \$ - CAGR 12,5%)



Biostimulant European Market
(Milion \$ - CAGR 12,5%)



REGISTRAZIONE

IPM – Sustainable Use Directive 2009/128/EC

On the basis of Regulation (EC) No 1107/2009 and of this Directive, implementation of the principles of **integrated pest management is obligatory** and the subsidiarity principle applies to the way the principles for integrated pest management are implemented. Member States should describe in their National Action Plan how they ensure the implementation of the principles of integrated pest management, with **priority given wherever possible to non-chemical methods of plant protection and pest and crop management.**”

‘integrated pest management’ means careful consideration of all available plant protection methods and subsequent integration of appropriate measures that discourage the development of populations of harmful organisms and keep the use of plant protection products and other forms of intervention to levels that are economically and ecologically justified and reduce or minimise risks to human health and the environment. ‘Integrated pest management’ emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and **encourages natural pest control mechanisms.**

‘non-chemical methods’ means alternative methods to chemical pesticides for plant protection and pest management, based on **agronomic techniques such as those referred to in point 1 of Annex III, or physical, mechanical or biological pest control methods.**

EU PPP Regulation

Biopesticide regulated under 1107/2009/EC

Same for conventional chemical pesticides and biopesticides.

Data requirements for micro-organisms, botanicals – form of 'chemical'

Active substance(s) – EU level approval

Product – country (zonal) authorisation

Commitment to developing Guidance Documents for biopesticides For example:

Botanical Guidance

Semio-chemical guidance update

Microbial storage stability

Micro-organism efficacy

REGOLAMENTO (EC) 1107/2009

Le procedure per la valutazione delle Sostanze attive e dei Prodotti seguono lo stesso approccio per:

- ✓ Chimici
- ✓ Estratti vegetali
- ✓ Micro-organismi
- ✓ Semio-chemicals

Linee guida

- [SANCO Guidance document on “Botanicals”](#)
- [OECD Guidance for Pheromones](#)
- [New EU Guidance on Semiochemicals](#)
- [Guidance Documents on Microorganisms](#)

La lista dei dati richiesti per Sostanze attive ([CR EU 283/2013](#)) e prodotti ([CR EU 284/2013](#))

- ✓ Part A: Sostanze derivate da sintesi chimica inclusi i botanicals e semio-chemicals
- ✓ Part B: Microorganismi (es. batteri, funghi, protozoi) e virus.

Bacteria spp.... Registration case (as ai)

Title	Testing Methods
Identity of the microorganism	ISO/SANCO
Biological characteristics of the microorganism	Internal method
Toxicological studies	OECD 425, OECD 402, OECD 403, OECD 404, OECD 405, OECD 429, OECD 471 and OECD 487
Ecotoxicological studies Effects on bird, bee, non target arthropods, macro organism and microrganism	OECD 223, OECD 201, OECD 202, OECD 203, OECD 211, OECD 213, OECD 214, OECD 222, OECD 232, OECD 226 etc....
Fate and behaviour in the environment	To be defined on the basis of the available data

[More in detail....](#)

Bacteria spp... Registration case (as product)

Title	Testing Methods
Safety of the formulated product	ECC A14, A17, A10, A16
Physical Chemical and technical properties of the formulated product	CIPAC METHODS
Toxicological studies	OECD 425, OECD 402, OECD 403, OECD 404, OECD 405, OECD 429, OECD 471 and OECD 487
Ecotoxicological studies Effects on bird, bee, non target arthropods, macro organism and microorganism	OECD 223, OECD 201, OECD 202, OECD 203, OECD 211, OECD 213, OECD 214, OECD 222, OECD 232, OECD 226 etc....
Fate and behaviour in the environment	To be defined on the basis of the available data
Efficacy	EPPO guideline

[More in detail....](#)

Mercato in crescita significa
nuovi prodotti.....

Nuovi Biopesticidi

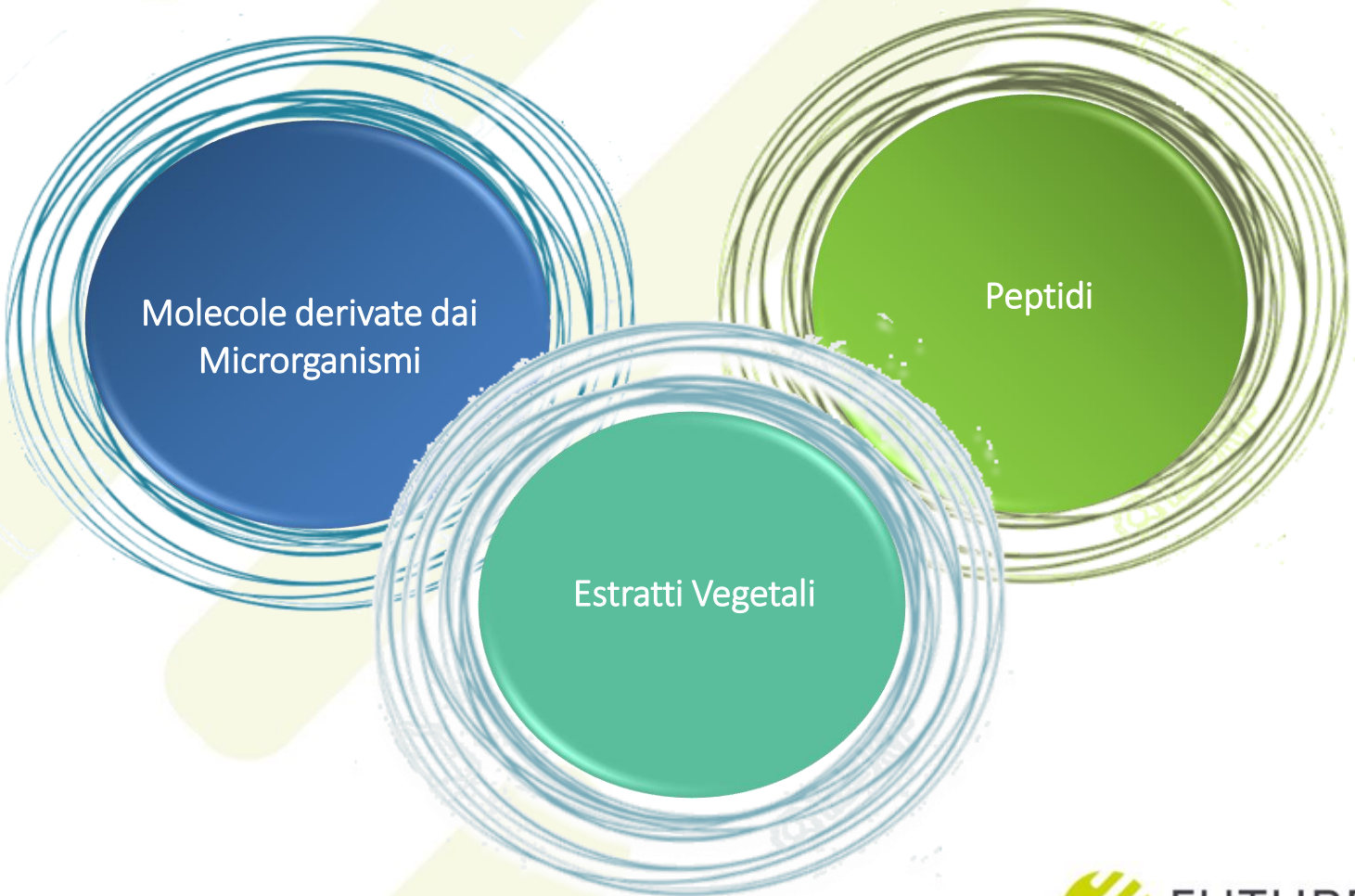
- ✓ Elicitori molecole che stimolano le difese della pianta
- ✓ Microrganismi con azione antagonista
- ✓ Microrganismo con azione battericida
- ✓ Microrganismi parassiti di funghi patogeni o insetti
- ✓ Estratti naturali

Mercato in crescita significa nuovi prodotti.....

- ✓ Botanicals: 13 sa, usate come insetticidi, fungicidi, erbicidi e regolatori di crescita.
- ✓ Batteri: 16 strains provenienti da 13 specie, usati come fungicidi, battericidi e insetticidi.
- ✓ Funghi: 21 strains provenienti da 16 species, usati come fungicidi e insetticidi.
- ✓ Virus: 12 isolati e rappresentativi di 6 specie, usati come insetticidi e induttori di resistenza.
- ✓ Semiochemicals: 6 sostanze attive, usate come PPP e biocida.

Know how e capacità di
sviluppo.....

PRODOTTI DI NUOVA GENERAZIONE PROSPETTIVE



Molecole derivate dai
Microrganismi

Peptidi

Estratti Vegetali



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Biopesticidi: microrganismi

La loro azione è legata al microrganismo o alle sostanze prodotte dal batterio o fungo.



Biopesticidi

Protezione della
coltura

Nuovi sviluppiselezionare molecole attive dai microrganismi, tali molecole sono efficaci anche basse dosi. Tali sa sono ottenute attraverso processi a basso impatto ambientale.

Isolamento di uno specifico strain

Miglioramento della
crescita

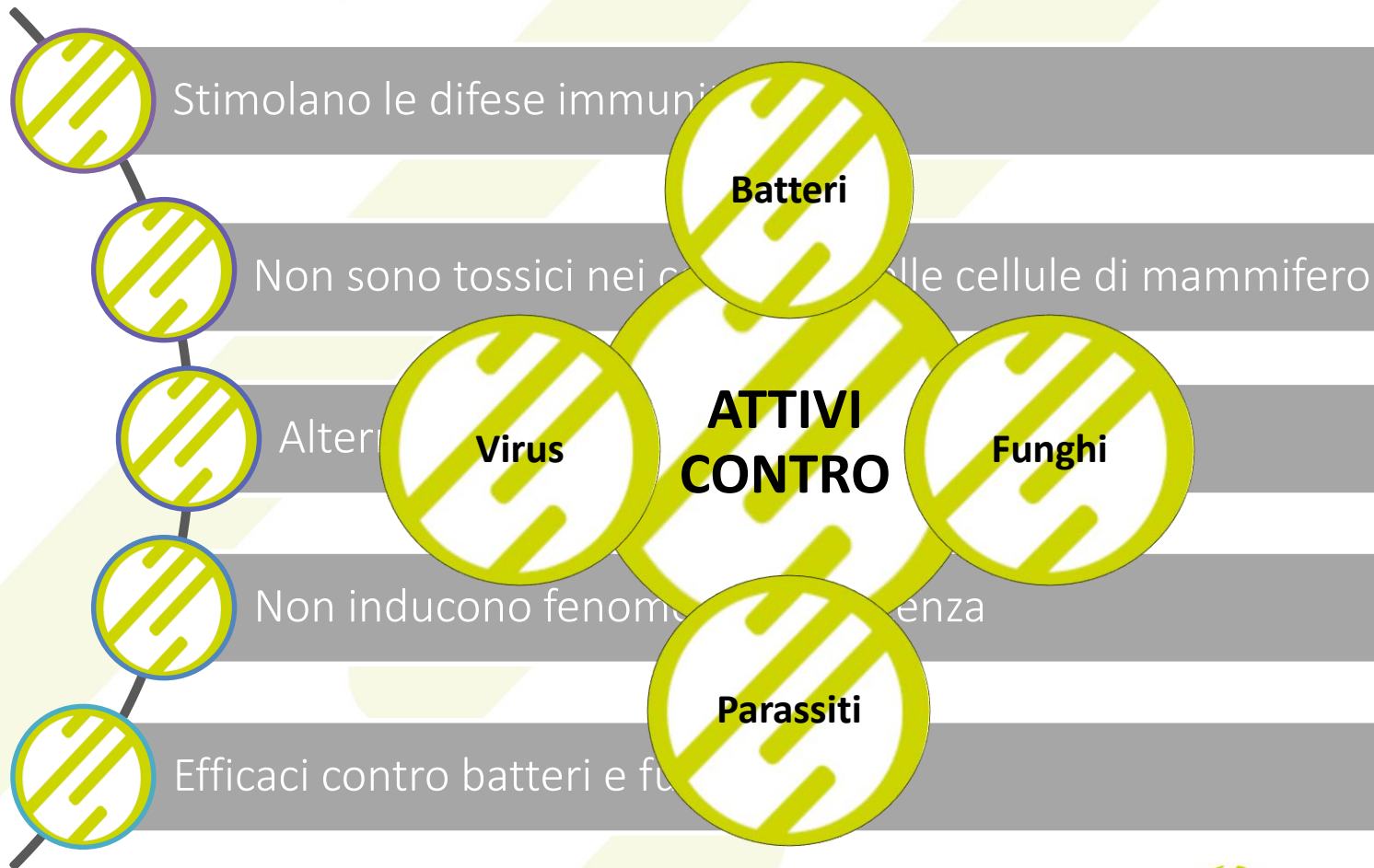
Miglioramento del
metabolismo secundario



PEPTIDI

I peptidi sono una classe dei composti chimici le cui molecole hanno peso molecolare inferiore ai 5.000 dalton.
Sono catene di amminoacidi legati tra di loro attraverso un legame peptidico (o carboamidico).

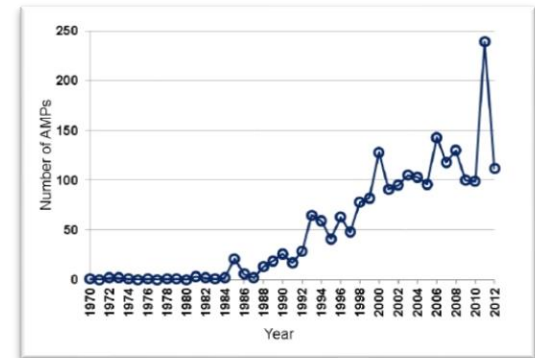
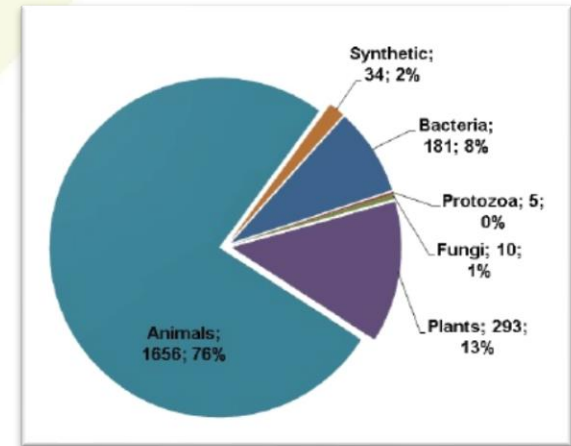
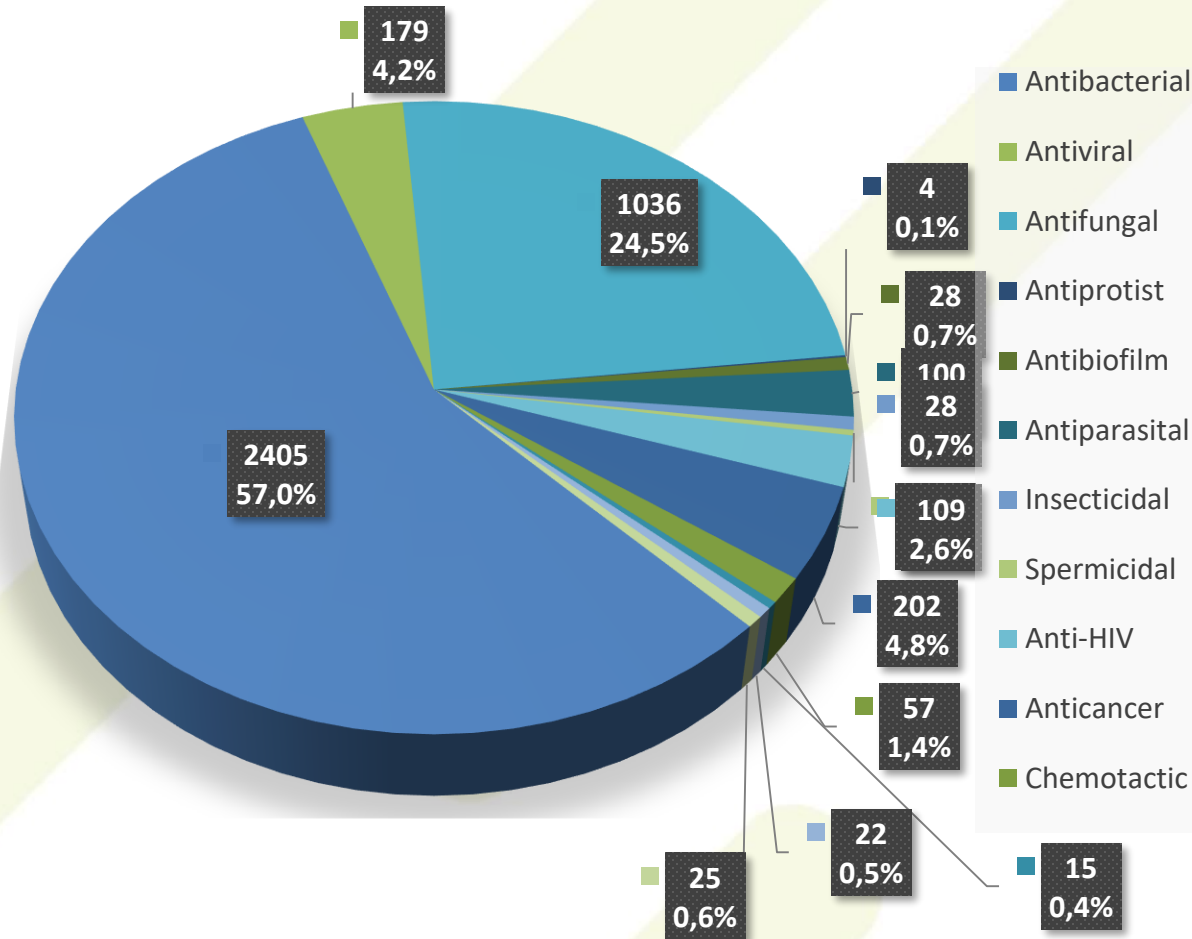
PEPTIDI



PEPTIDI ANTIMICROBICI

....ma non solo

Classificazione delle attività



PROCESSO PER PRODURRE PEPTIDI

IDROLISI DI PROTEINE VS ESPRESSIONE ETEROLOGA

FASTER – CHEAPER – EASIER



ENGINEERED MOO



FERMENTATION & DSP

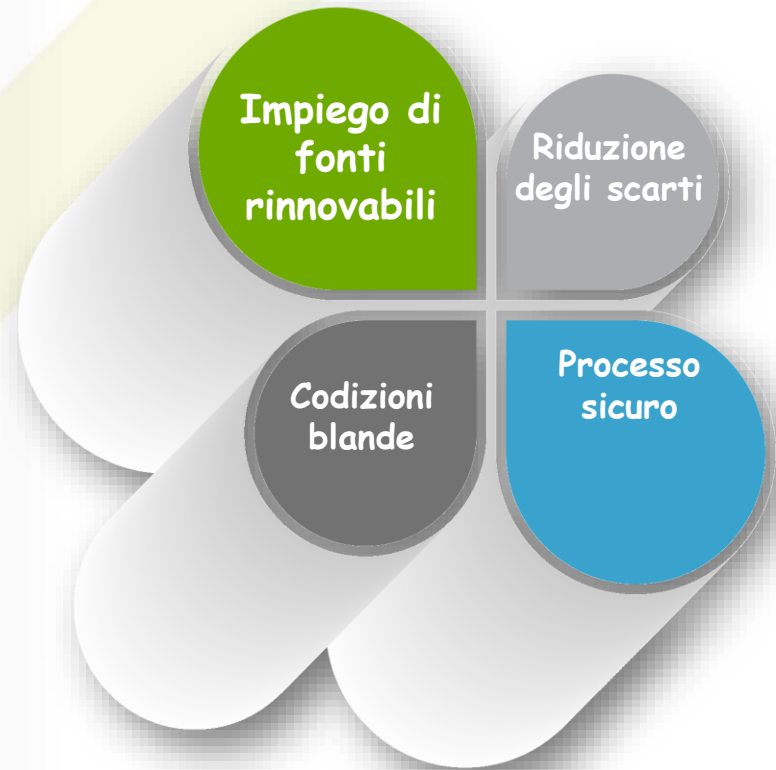


PURER – STRONGER – SMARTER



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VANTAGGIO DELLA BIOCATALISI E DELLA ESPRESSIONE ETEROLOGA



SOCIETÀ INNOVATIVE IN ESPANSIONE



PLANT HEALTH
— C A R E —



Prodotti a base di microrganismi

Scale up dal laboratorio al fermentatore pilota

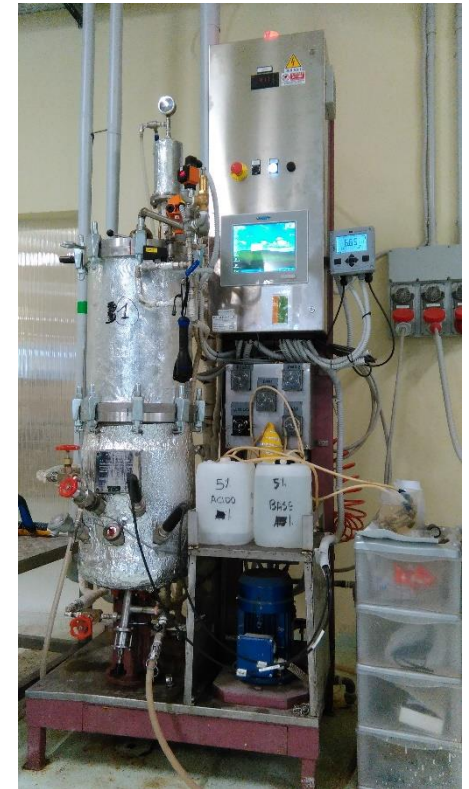
Laboratorio di microbiologia



Fermentazione di laboratorio



Fermentatore pilota



Produzione industriale

From seed to SmF

SmF

or to SSF



80 - 120 - 1000 - 2000 - 10000..... litres

SSF



1200 units

Meccanismo di azione

- ✓ Elicitori molecole che stimolano le difese della pianta
- ✓ Microrganismi con azione antagonista
- ✓ Microrganismo con azione battericida
- ✓ Microrganismi parassiti di funghi patogeni o insetti
- ✓ Sostanze naturali

SCIENZE OMICHE



GENOMICA

TRASCRIPTOMICA

PROTEOMICA - ENZIMI

METABOLOMICA

GRAZIE PER LA VOSTRA ATTENZIONE



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