Improving knowledge, skills and capacity building to ensure plant health in more sustainable agricultural systems

Collaborative research and knowledge sharing on basic substances as an environmentally friendly alternative to synthetic plant protection products for plant protection

Gianfranco Romanazzi - Marche Polytechnic University, Ancona, Italy
E-mail g.romanazzi@univpm.it

BasicS
Euphresco Project

EUROPEAN YEAR OF SKILLS

UNIVERSITÀ POLITECNICA DELLE MARCHE

Plants for the Future
European Technology Platform

Euphresco

3-11 June 2023
#EUGreenWeek
PARTNER EVENT

In 2015, the UN Member States adopted the Sustainable Development Goals (SDGs) – Agenda 2030

European Commission

Farm to Fork Strategy

For a fair, healthy and environmentally-friendly food system

#EUGreenDeal

Ask question at slido.com with #PlantHealth_GW2023

WITHIN 2030:

+25% organic agriculture

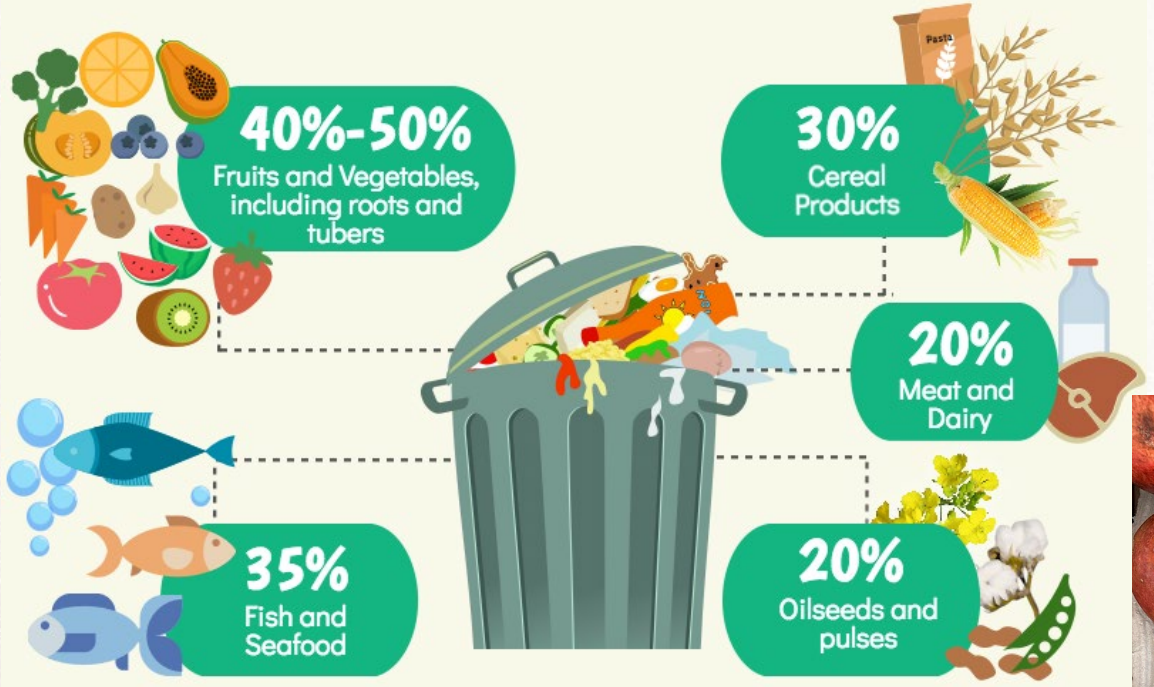
-50% food waste (including fresh fruit and vegetables)

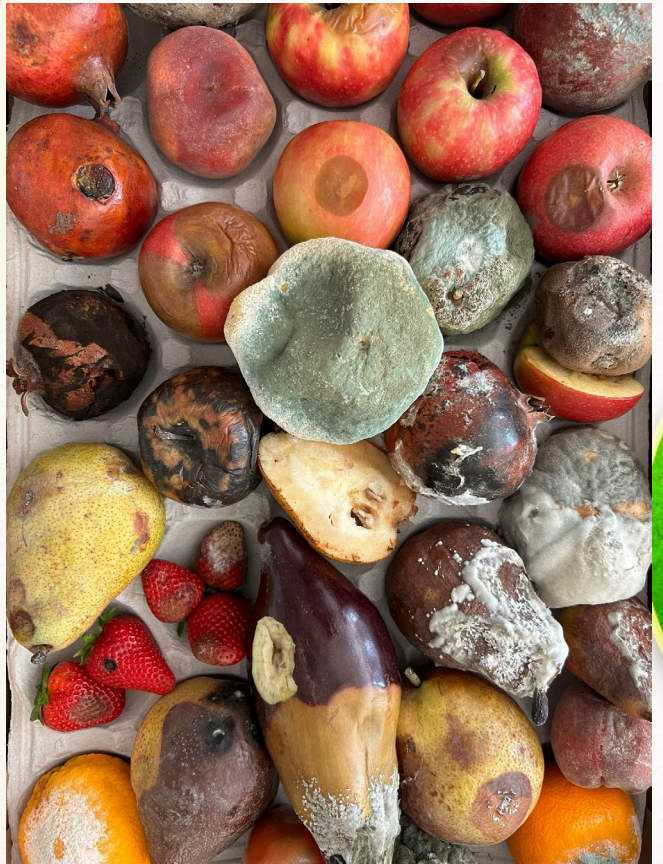
-50% use of synthetic pesticides

Annual loss and waste along the food chain

(occuring during harvest, post-harvest, distribution, processing and/or distribution)

source: FAO





www.stopmedwaste.net

[StopMedWaste1](#)

[StopMedWaste](#)

[StopMedWaste](#)

[StopMedWaste](#)

[StopMedWaste](#)

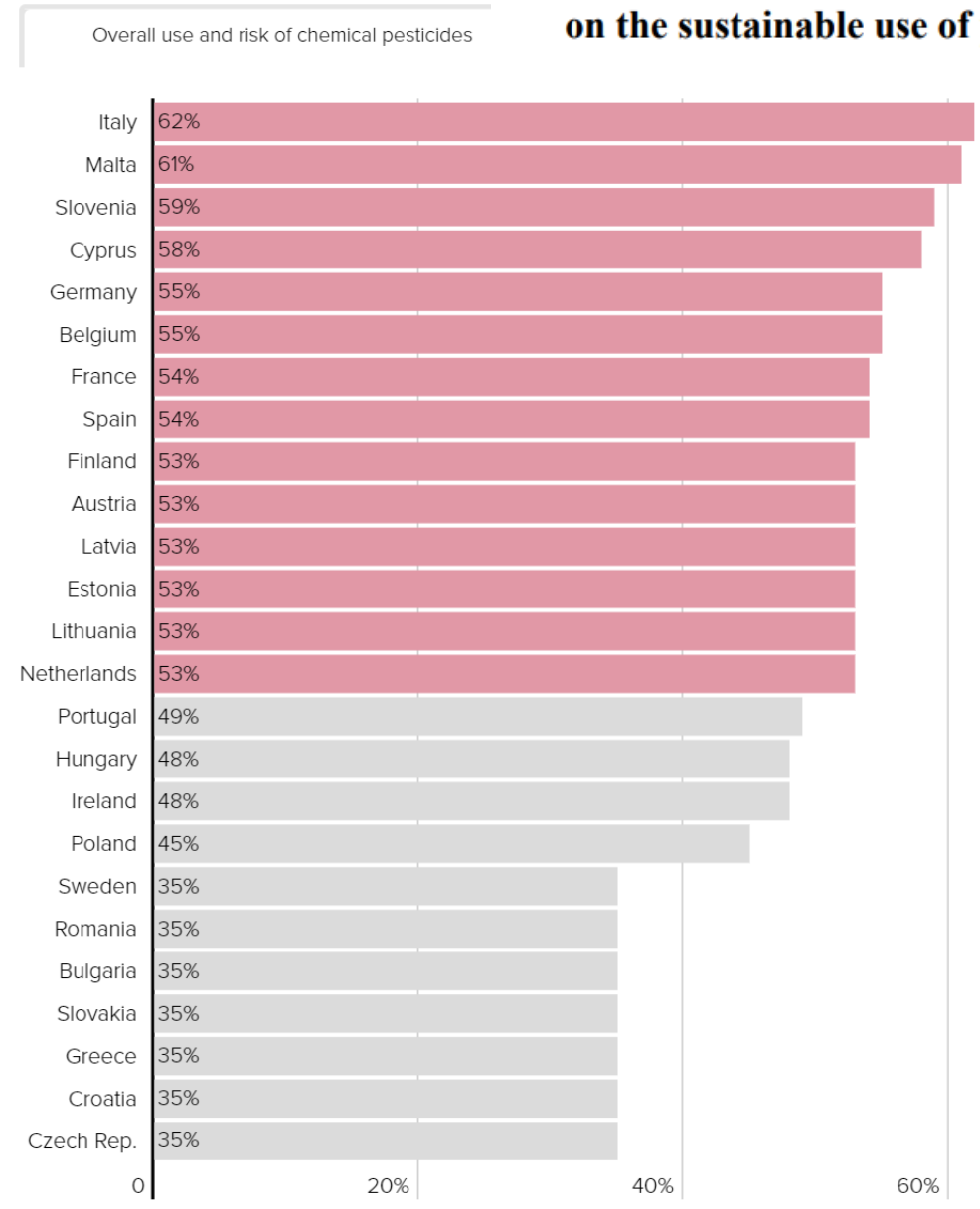
STOP MED WASTE

Ask question at slido.com with #PlantHealth_GW2023

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the sustainable use of plant protection products and amending Regulation (EU) 2021/2115



Ask question at slido.com with #PlantHealth_GW2023

molecules https://doi.org/10.3390/molecules27113484 MDPI

Review

Basic Substances, a Sustainable Tool to Complement and Eventually Replace Synthetic Pesticides in the Management of Pre and Postharvest Diseases: Reviewed Instructions for Users

Gianfranco Romanazzi [1,*], Yann Orçonneau [2], Marwa Moumni [1], Yann Davillerd [2] and Patrice André Marchand [2]

[1] Department of Agricultural, Food and Environmental Sciences, Marche Polytechnic University, Via Brecce Bianche, 60131 Ancona, Italy; m.moumni@staff.univpm.it
[2] Institut Technique de l'Agriculture et de l'Alimentation Biologiques (ITAB),149 rue de Bercy, 75012 Paris France; y.orco17@gmail.com (Y.O.); yann.davillerd@itab.asso.fr (Y.D.); patrice.marchand@itab.asso.fr (P.A.M.)
* Correspondence: g.romanazzi@univpm.it; Tel.: +39-071-220-4336

Abstract: Synthetic pesticides are widely used to protect crops from pathogens and pests, especially for fruits and vegetables, and this may lead to the presence of residues on fresh produce. Improving the sustainability of agriculture and, at the same time, reducing the adverse effects of synthetic pesticides on human health requires effective alternatives that improve the productivity while maintaining the food quality and safety. Moreover, retailers increasingly request fresh produce with the amounts of pesticides largely below the official maximum residue levels. Basic substances are relatively novel compounds that can be used in plant protection without neurotoxic or immune-toxic effects and are still poorly known by phytosanitary consultants (plant doctors), researchers, growers, consumers, and decision makers. The focus of this review is to provide updated information about 24 basic substances currently approved in the EU and to summarize in a single document their properties and instructions for users. Most of these substances have a fungicidal activity (calcium hydroxide, chitosan, chitosan hydrochloride, *Equisetum arvense* L., hydrogen peroxide, lecithins, cow milk, mustard seed powder, *Salix* spp., sunflower oil, sodium chloride, sodium hydrogen carbonate, *Urtica* spp., vinegar, and whey). Considering the increasing requests from consumers of fruits and vegetables for high quality with no or a reduced amount of pesticide residues, basic substances can complement and, at times, replace the application of synthetic pesticides with benefits for users and for consumers. Large-scale trials are important to design the best dosage and strategies for the application of basic substances against pathogens and pests in different growing environments and contexts.

Citation: Romanazzi, G.; Orçonneau, Y.; Moumni, M.; Davillerd, Y.; Marchand, P.A. Basic Substances, a Sustainable Tool to Complement and Eventually Replace Synthetic Pesticides in the Management of Pre and Postharvest Diseases: Reviewed Instructions for Users. *Molecules* **2022**, *27*, 3484. https://doi.org/10.3390/molecules27113484

Academic Editor: James Barker

Table 5. Examples of requests from the retailer of the amount of the Maximum Residue Level (MRL) and Acute reference doses (ARfD).

Retailer	Max. %MRL/ Active Substance	Max. Sum %MRL/Sample	Max. %ARfD/Active Substance	Max. Sum %ARfD/Sample	Max. Number of Active Substances /Samples
ALDI/ HOFER	70%	80%	70%	80%	3–5
ALBERT HEIJN	50%	-	50%	-	-
ASDA	80%	-	-	-	-
BILLA	100%	-	100%	-	-
DOHLA	-	70%	-	70%	3–5
EDEKA	70%	-	100%	-	5
EDEKA OWN BRANDS	50%	-	70%	-	5
GLOBUS	70%	-	70%	100%	5
LIDL	33.3%	80%	100%	-	5
KAUFLAND	33.3%	80%	50%	50%	5
NORMA	-	70%	-	70%	5
METRO	50%	80%	70%	100%	5
MIGROS	-	-	-	-	6
NETTO	70%	-	100%	-	5
REWE	50%	100%	70%	100%	5
REWE OWN BRANDS	50%	100%	50%	-	5
TEGUT	70%	-	70%	-	Max. 4 (>0.01 mg/kg)
TENGEL MANN	70%	150%	70%	100%	-

Ask question at slido.com with #PlantHealth_GW2023

How we can measure the amount of pesticides to decrease the risk?

Ask question at slido.com with #PlantHealth_GW2023

NOT ALL PESTICIDES HAVE THE SAME WEIGHT

Low-risk active substances		Other compounds		Candidates for substitution		Provisional authorization
A	B	C	D	E	F	G
Microrganisms	Chemical compounds	Microrganisms	Chemical compounds	List n. 1	List n. 2	
20 (3 IT)	**13 (7 IT)**	**48 IT**	**359 IT**	**71 IT**	**12 IT**	**?**
1		**8**		**16**		**64**

Basic substances are not included into the list

Article 51

Extension of authorisations for minor uses

1. The authorisation holder, official or scientific bodies involved in agricultural activities, professional agricultural organisations or professional users may ask for the authorisation of a plant protection product already authorised in the Member State concerned to be extended to minor uses not yet covered by that authorisation.

⇨ ***Provisional authorization***

[EU Pesticides Database (europa.eu)]

Ask question at slido.com with #PlantHealth_GW2023

Euphresco
Network for phytosanitary research coordination and funding

Ask question at slido.com with #PlantHealth_GW2023

1. Content of the 'Topic Description' document

1.1. Topic area

Management of pests/vectors

1.2. Links to the Euphresco Strategic Research Agenda

The topic addresses the following objective(s) of the 2017-2022 Euphresco Strategic Research Agenda *(Please keep only relevant objectives)*.

☒ Objective 2017-R-3.1: to identify and evaluate (horizontal) risk reduction options (effectiveness, feasibility and cost)

☒ Objective 2017-R-7.1: to validate cost-effective and socially acceptable phytosanitary measures for consignments (pre-border and at border)

☒ Objective 2017-R-7.2: to validate cost-effective and socially acceptable phytosanitary measures at the place of production (inland) for plants, plant products, water and soil

1.3. Topic title

Basic substances as an environmentally friendly alternative to synthetic pesticides for plant protection (BasicS) *(Objective 2017-R-7.1+ -R-7.2 + 2020-C-353)*

May 2021 - August 2023

Ask question at slido.com with #PlantHealth_GW2023

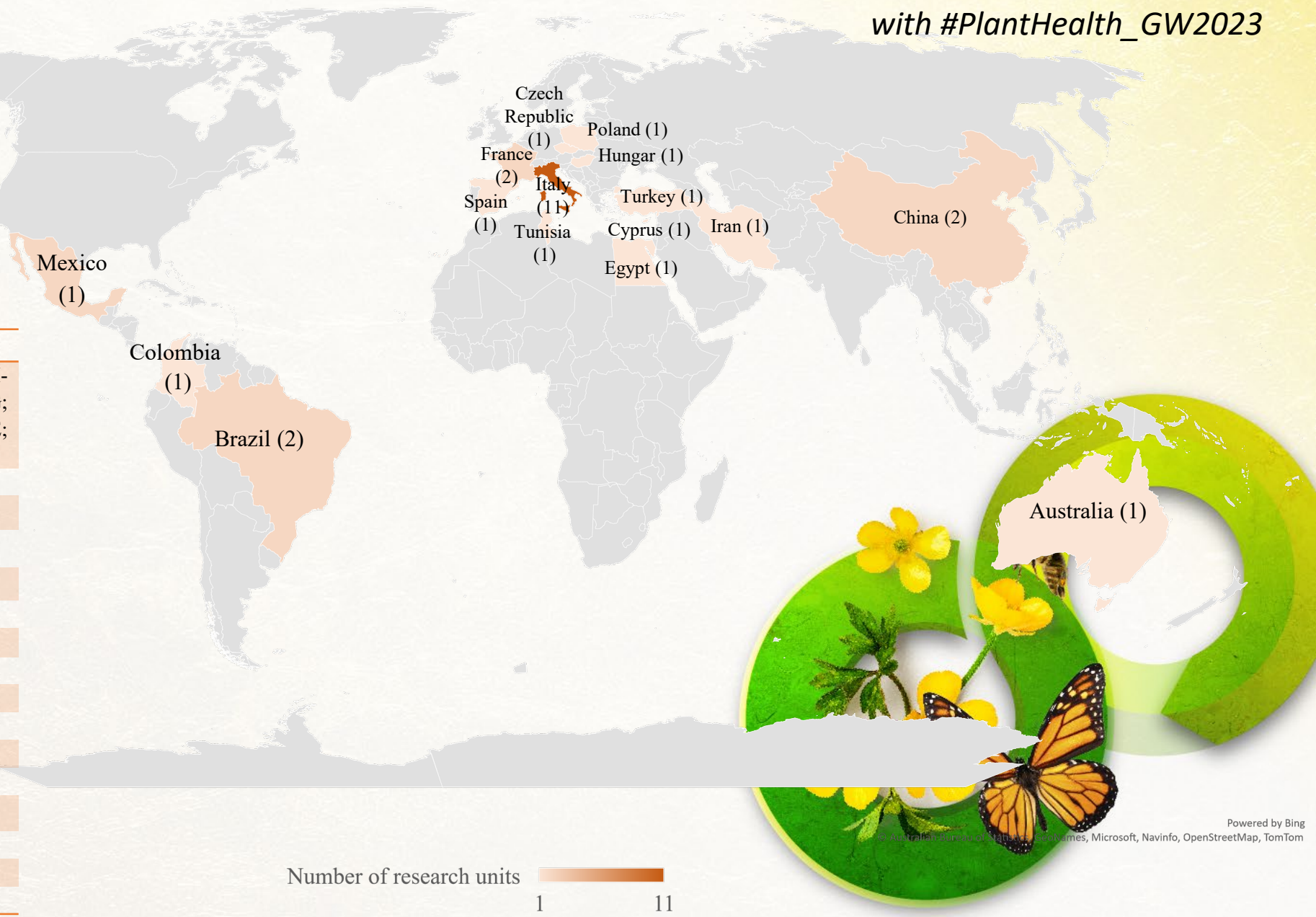
BasicS

Euphresco Project

Ask question at slido.com with #PlantHealth_GW2023

30 Research Units, 16 Countries

Country	Research units
Italy	UNIVPM; CREA; CIHEAM-Bari; UNIBA; UNIBO; UNIFG; UNIMI; UNINA; UNITE; UNITO; UNIVR
France	ITAB; EPPO
Australia	NSW
Brazil	UEL; UNESP
China	SZPT; SCAU
Cyprus	CUT
Colombia	UDA
Czech Republic	CRI
Egypt	ARC
Hungary	UNIDEB
Iran	AZAD
Mexico	NPI; ITT
Poland	IPP
Spain	CSIC
Tunisia	INRAT
Turkey	UE



Budget 618 kEuro (in kind)

EUPHRESCO BASICS ACTIVITIES

WORK PACKAGE TITLE (WP)	LEADER	CO-LEADER
WP0: Project management and co-ordination	UNIVPM (IT)	
WP1: Review on applications of basic substances*	UNIVPM (IT)	NPI (MX)
WP2: Review on the applications of potential basic substances*	UNIVPM (IT)	NSW (AU)
WP3: Testing basic substances and potential basic substances to manage diseases and pests in the field*	UNIMI (IT)	ARC (EG)
WP4: Testing basic substances and potential basic substances to manage postharvest diseases and pests*	UNIBA (IT)	UNIVPM (IT)
WP5: Testing basic substances and potential basic substances to manage seedborne pathogens and pests*	CREA (IT)	INRAT (TU)
WP6: Investigation on mechanisms of action of basic substances*	CSIC (ES)	UNIVR (IT)
WP7: Drawing reports for approval or extension of use	ITAB (FR)	UNIDEB (HU)
WP8: Drawing reports for EPPO	ITAB (FR)	UNIVPM (IT)
WP9: Communication of project activities	UNIVPM (IT)	EPPO (Int)

**in progress review of the state of the art on applications of BS and PBS*

Euphresco BasicS EuphrescoBasicS EuphrescoBasicS euphrescobasics Euphresco BasicS

The phytosanitary purpose is secondary for basic substances, since they are product with foodstuff properties and have a side effect in the control of plant pests and pathogens

Some basic substances (e.g., vinegar, sodium bicarbonate, chitosan, nettle extract) have already been tested for plant disease management

Euphresco BasicS

EuphrescoBasicS

EuphrescoBasicS

euphrescobasics

Euphresco BasicS

Chronicle of Bioresource Management 2021, 5(3):077-080

Chronicle of Bioresource Management
An International E-magazine

September 2021 Popular Article

BasicS, an Euphresco International Network on Renewable Natural Substances for Durable Crop Protection Products

Patrice A. Marchand[1*], Yann Davillerd[1], Luca Riccioni[2], Simona Marianna Sanzani[3], Nico Horn[4], Ewa Matyjaszczyk[4], John Golding[5], Sergio Ruffo Roberto[6], Ben-Hur Mattiuz[7], Dandan Xu[8], Xiaomeng Guo[9], Nikolaos Tzortzakis[10], Yeimmy Yolima Peralta Ruiz[11], Roman Pavela[12], Erzsebet Monika Karaffa[13], Youssef Khamis[14], Mehdi Hosseinifarahi[15], Antonio Ippolito[16], Alessandra Di Francesco[17], Giacinto Salvatore Germinara[18], Silvia Toffolatti[19], Filomena Sannino[20], Clemencia Chaves-Lopez[21], Monica Mezzalama[22], Nicola Mori[23], Silvia Bautista-Banos[24], Porfirio Gutierrez Martinez[25], Jolanta Kowalska[26], Luis Gonzalez-Candelas[27], Teresa Garde-Cerdán[27], Mohamed Bechir Allagui[28], Pervin Kinay Teksur[29], Marwa Moumni[30], Baldissera Giovani[31] and Gianfranco Romanazzi[30]

Open Access

Corresponding Author
P. A. Marchand
e-mail: patrice.marchand@itab.asso.fr

Citation: Marchand et al., 2021. BasicS, an Euphresco international network on renewable natural substances for durable crop protection products. Chronicle of Bioresource Management 5(3), 077-080.

Data Availability Statement: Legal restrictions are imposed on the public sharing of raw data. However, authors have full right to transfer or share the data in raw form upon request subject to either meeting the conditions of the original consents and the original research study. Further, access of data needs to meet whether the user complies with the ethical and legal obligations as data controllers to allow for secondary use of the data outside of the original study.

Conflict of interests: The authors have declared that no conflict of interest exists.

Keywords:
Basic substances, biopesticides, biocontrol agents, international project

Article History
Article ID: CBM71
Received on 02nd July 2021
Received in revised form on 07th August 2021
Accepted in final form on 14th August 2021

Abstract

Under the European Union aegis, a new round of non-competitive projects is being initiated via Euphresco. The topic description developed within the consortium created within Euphresco research coordination is the development of the basic substance for management of pests/vectors via natural compounds. Basic substances are approved for use in the European Union and are products which are already sold for certain purposes, e.g., as a foodstuff or a cosmetic, but which can also serve as plant protection products. A list of 23 basic substances approved is available through the EU Pesticides database. These substances are mostly biorationals (medicinal plant extracts like *Equisetum*, *Urtica*, *Salix* and Mustard seeds powder), products used in human medicine (chitosan, calcium hydroxide), food compounds (milk, whey, vinegar, beer, fructose, sucrose, lecithin, vegetable oils, bicarbonate, sodium

Author's Address

[1]Institut Technique de l'Agriculture Biologique (ITAB), France; [2]Council for Agronomic Research and bioeconomy, Italy; [3]International Centre for Advanced Mediterranean Agronomic Studies, Italy; [4]European and Mediterranean Plant Protection Organization, France; [5]New South Wales, Department of Primary Industries, Australia; [6]State University of Londrina, Brazil; [7]Sao Paulo State University, Institute of Biosciences, Brazil; [8]Shenzhen Polytechnic, China; [9]South China Agricultural University, China; [10]Cyprus University of Technology, Cyprus; [11]University of Atlantico, Colombia; [12]Crop Research Institute, Czech Republic; [13]University of Debrecen, Hungary; [14]Agricultural Research Center, Egypt; [15]Islamic University of Azad, Iran; [16]University of Bari, Italy; [17]University of Bologna, Italy; [18]University of Foggia, Italy; [19]University of Milan, Italy; [20]University of Napoli, Italy; [21]University of Teramo, Italy; [22]University of Turin, Italy; [23]University of Verona, Italy; [24]National Polytechnic Institute, Mexico; [25]Technical Institute of Tepic, Mexico; [26]Institute of Plant Protection-National Research Institute, Poland; [27]Spanish National Research Council, Spain; [28]National Institute for Agronomic Research, Tunisia; [29]Ege University, Turkey; [30]Marche Polytechnic University, Italy; [31]Euphresco, European and Mediterranean Plant Protection Organization, France

Journal Home: https://pphouse.org/cbm.php

BasicS
Euphresco Project

Ask question at slido.com with #PlantHealth_GW2023

molecules

Molecules 2022, 27, 3484

Review

Basic Substances, a Sustainable Tool to Complement and Eventually Replace Synthetic Pesticides in the Management of Pre and Postharvest Diseases: Reviewed Instructions for Users

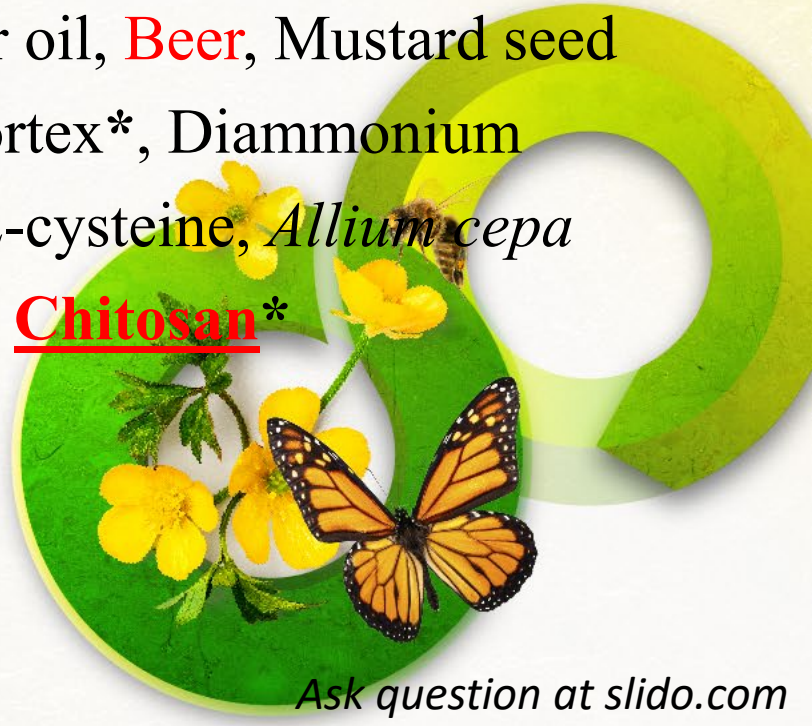
Gianfranco Romanazzi [1,*], Yann Orçonneau [2], Marwa Moumni [1], Yann Davillerd [2] and Patrice André Marchand [2]

https://doi.org/10.3390/molecules27113484

PRIMA

Basic substances

Calcium hydroxide, ***Equisetum arvense* extract***, **Chitosan hydrochloride***, Sucrose*, Vinegar, Fructose*, Cow milk*, *Urtica* spp. extract*, Sunflower oil, Beer, Mustard seed powder, Onion oil, **Sodium hydrogen carbonate***, Salix cortex*, Diammonium phosphate, Hydrogen peroxide*, Sodium chloride*, Whey*, L-cysteine, *Allium cepa* extract, **Lecithins***, Talc E553b, Clayed charcoal*, **Chitosan***



8 BASIC SUBSTANCES OUT OF 24 CAN BE USED ON STRAWBERRIES (*13 ON GRAPEVINE)

BasicS

Euphresco Project

Ask question at slido.com
with #PlantHealth_GW2023

Chitin related food science today (and two centuries ago)

CORRADO MUZZARELLI
RICCARDO A.A. MUZZARELLI

Polytechnic University of Marche, Institute of Biochemistry, Via Ranieri 67, IT-60100 Ancona, Italy

THE DISCOVERY OF CHITIN (IN A BOTANIC GARDEN).

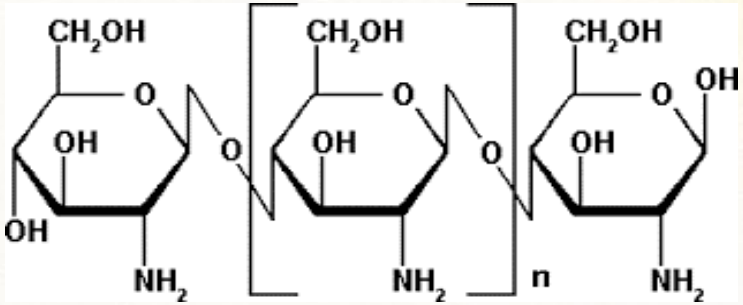
In 1807 Henry Braconnot was appointed director of the Botanic Garden and Professor of Natural History in Nancy. The four-century old University of Nancy, as well as the University of Strasbourg, had been suppressed by the Assemblée Générale, and in Nancy the Medical School and the Academy were the only learned structures. Actually, the Garden and the Chair were part of the Medical School because of the interest in officinal plants. Those years were crucial for the connections between botany, chemistry and medicine. For example, morphine was isolated by Serturner in 1806, quinine was discovered by Pelletier and Caventon in 1823 and atropine was crystallized in 1833. The discovery of the anaesthetic action of nitrous oxide, diethyl ether and chloroform started a revolution in surgery.
Braconnot had access to very modest means for doing research, also due to the continental embargo consequent to the Napoleon's wars. Nevertheless, while taking care of the heavily damaged Garden discovered chitin in 1811 started large scale cultivation of the sugar beet and the extraction and purification of sugar with the intention of alleviating food shortage. This activity was abruptly put to an end by the changed political situation which permitted to import sugar from tropical countries. He went on, however, with his idea of extracting sugars from plants and remarkably anticipated the modern approaches by directing attention to *Helianthus tuberosus* from which inulin is extracted today.
Braconnot was interested in the definition of the nutritional value of mushrooms. Braconnot wrote that poor countrymen considered mushrooms a manna given free as a gift of providence, and eagerly waited for the mushroom seasons. Today *Agaricus bisporus* is widely cultivated.
Systematic sulfuric acid treatment of a large number of substances led him to isolate two amino acids, glycine and leucine, in 1820. This discovery brought a certain renown to him. The direction of the Garden and the relevant problems (risky use of gas for heating the hothouses, fights against military plans to build caserns inside the Garden) prevented Braconnot from exploiting his chemical discoveries. He was a precursor of Chevreul with his studies on fats, but he had no means to identify the fatty acids; he brought forward the idea of plant alkali but he could not isolate the alkaloids.
On the theoretical ground, he expressed the view that hydrogen and oxygen together with fire were the fundamental constituents of the universe, and plants can produce a number of elements from light and water.
Braconnot published 112 papers in the form of memoirs of the Academy of Sciences, Letters and Arts of Nancy, also known as Academy of Stanislas, the King of Polish origin who ruled the Lorraine region. Other publications are in *the Annales de Chimie et Physique* and *Journal de Chimie Médicale*. He was also appointed corresponding member of the national Académie des Sciences, after Wollaston.
Braconnot certainly was an eminent chemist, as D.A. Godron, his successor, wrote, but he profused many energies in botany. Actually his teaching was according to Linnée, in a time period when novel theories on cellular structure, plant sexuality and alternate generations were being brought forward, as a consequence of the studies done on enormous collections of previously unknown plants. For instance the Flinders expedition (1801) made available 4000 unknown species of plants from Australia. In 1852 the 14,100 m^2 Garden had 3452 plants species, including some from New Zealand and Reunion Island provided by Empress Joséphine. Braconnot took into account the novel views in botany, but dimmed sight forced him to refrain from teaching for several years before retirement. He left everything to the City of Nancy.
The discovery of chitin was essentially based on some reactions carried out on raw material isolated from *Agaricus volvaceus, A. acris, A. cantarellus, A. piperatus, Hydnum repandum, H. hybridum* and *Boletus viscidus*.
The existence of chitosan in nature remained unknown until 1954, when it was discovered in the yeast *Phycomyces blakesleeanus*. Chitosan occurs as the major structural component of the cell walls of certain fungi, mainly of the *Zygomycetes* species. However, to date, chitosans have been commercially produced by alkaline deacetylation of crustacean chitins.

MODERN APPLICATIONS OF CHITOSAN IN FOOD SCIENCES

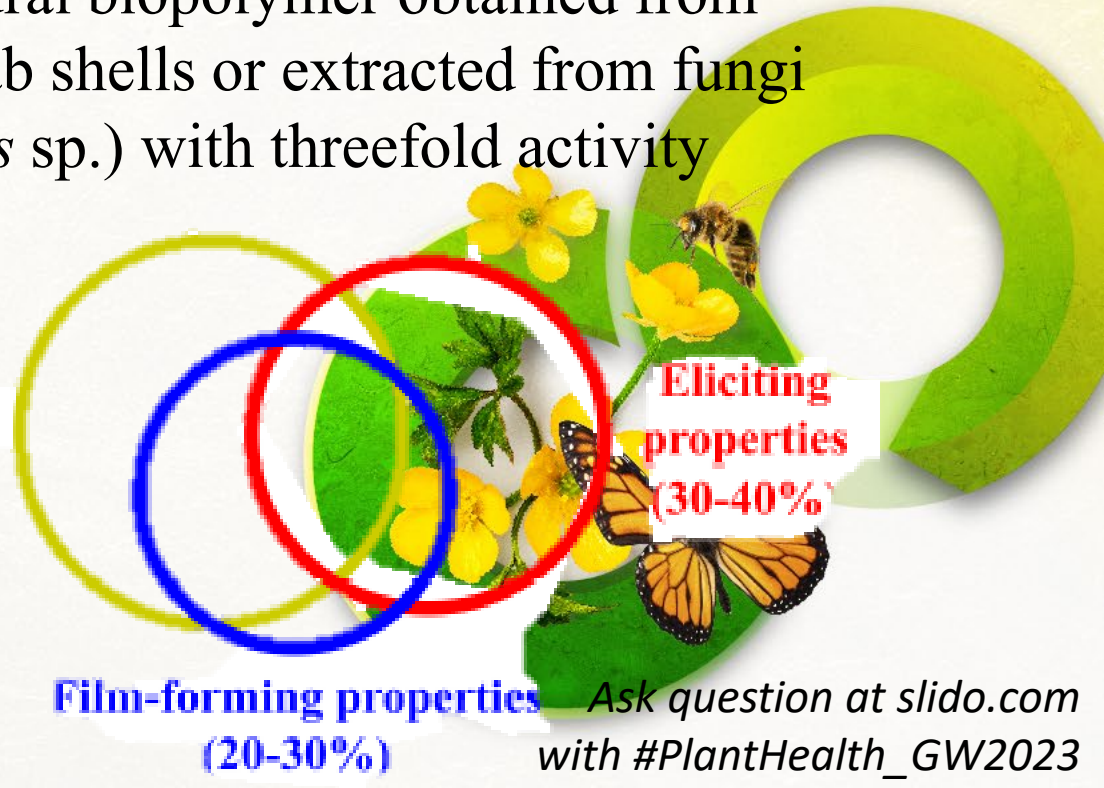
Antibacterial Activity

The antibacterial activity of chitosan was originally documented by Muzzarelli et al. (1990) who published electron micrographs showing the alterations produced in the bacterial cell wall and organelles. Those results were brilliantly confirmed more than a decade later by Helander et al (2001). Chemical and electrophoretic analyses of cell-free supernatants of chitosan-treated cell suspensions showed that interaction of chitosan with *E. coli* and the salmonellae involved no release of lipopolysaccharide or other membrane lipids. Highly cationic mutants of *S. typhimurium* were more resistant to chitosan than the parent strains. Electron microscopy showed that chitosan caused extensive cell surface alterations and covered the outer membrane with vesicular structures. Chitosan thus appeared to bind to the outer membrane, explaining the loss of the barrier function. This property makes chitosan useful for food protection (Helander et al., 2001). It was also found that the antibacterial activity of quaternized chitosan against *E. coli* is stronger than that of chitosan (Jia et al., 2001).
The antibacterial activity may be either bactericidal or

What's chitosan?



Chitosan is a natural biopolymer obtained from deacetylation of crab shells or extracted from fungi (e.g. *Aspergillus* sp.) with threefold activity



frontiers in Microbiology

Chitosan, a Biopolymer With Triple Action on Postharvest Decay of Fruit and Vegetables: Eliciting, Antimicrobial and Film-Forming Properties

Gianfranco Romanazzi[1], Erica Feliziani[1] and Dharini Sivakumar[2]*

[1] Department of Agricultural, Food and Environmental Sciences, Marche Polytechnic University, Ancona, Italy, [2] Department of Crop Sciences, Postharvest Technology Group, Tshwane University of Technology, Pretoria, South Africa

Ask question at slido.com with #PlantHealth_GW2023

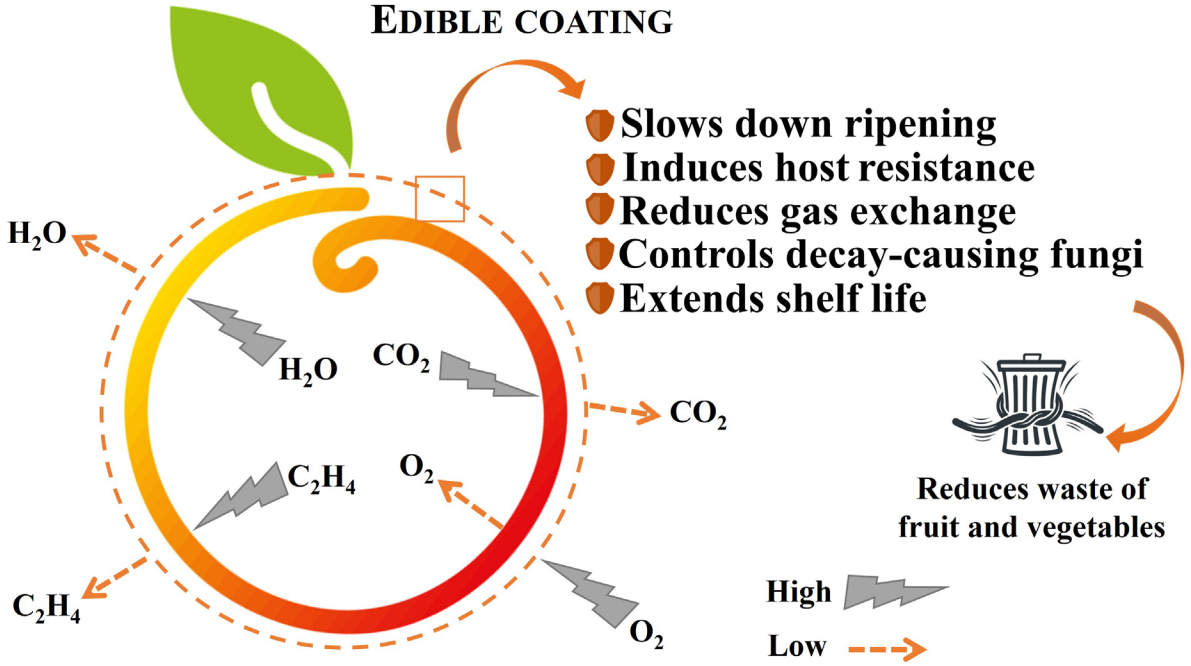


Figure 1. Main proprieties of edible coatings applied on fruit and vegetables, affecting the permeability to ethylene (C_2H_4), water (H_2O), oxygen (O_2), and carbon dioxide (CO_2).

Ask question at slido.com
with #PlantHealth_GW2023

Romanazzi and Moumni, 2022
Current Opinion in Biotechnology
https://doi.org/10.1016/j.copbio.2022.102834

Table 2. Examples of chitosan-based commercial products that are available for the control of diseases of fresh fruit and vegetables (modified by Romanazzi et al. [17]).

Product trade name	Company (Country)	Formulation	Active ingredient (%)
Chito Plant	ChiPro GmbH (Bremen, Germany)	Powder	99.9
Chitosano	Agrilaete (Palmanova, UD, Italia)	Powder	100
Chitosano denso		Liquid	50
OII-YS[1]	Venture Innovations (Lafayette, LA, USA)	Liquid	2
KaitoSol	Advanced Green Nanotechnologies Sdn Bhd (Cambridge, United Kindom)	Liquid	12.5
Armour-Zen	Botry-Zen Limited (Dunedin, New Zealand)	Liquid	14.4
Biorend	Bioagro S.A.(Chile)	Liquid	1.25
Kiforce	Alba Milagro (Milano, Italy)	Liquid	6
FreshSeal	BASF Corporation (Mount Olive, NJ, USA)	Liquid	2.5
ChitoClear	Primex ehf (Siglufjordur, Iceland)	Powder	100
Bioshield	Seafresh (Bangkok, Thailand)	Powder	100
Biochikol 020 PC	Gumitex (Lowics, Poland)	Liquid	2
Kadozan	Lytone Enterprise, Inc. (Shanghai Branch, China)	Liquid	2
Kendal Cops	Valagro (Atessa, CH, Italy)	Liquid	4
Mastgrape	Enocea (Vegrar, VR, Italy)	Liquid	5
Prevatect	Ascenza (Saronno, VA, Italy)	Liquid	5
Chitosano Serbios	Serbios (Badia Polesine, RO, Italy)	Liquid	5
Chitosano	Bioplanet Srl (Cesena, Italy)	Liquid	1.9
Chitosano DC	Dal Cin Gildo Spa (Concorezzo, MB, Italy)	Liquid	2
Ibisco[2]	Gowan Italia s.r.l. (Faenza, RA, Italy)	Liquid	15

[1] Contains 6% yucca extract
[2] The formulation is based on an average of 12.5% of COS (chito-oligosaccharides)-OGA (oligo-galacturonides), with a chitosan concentration of 15%

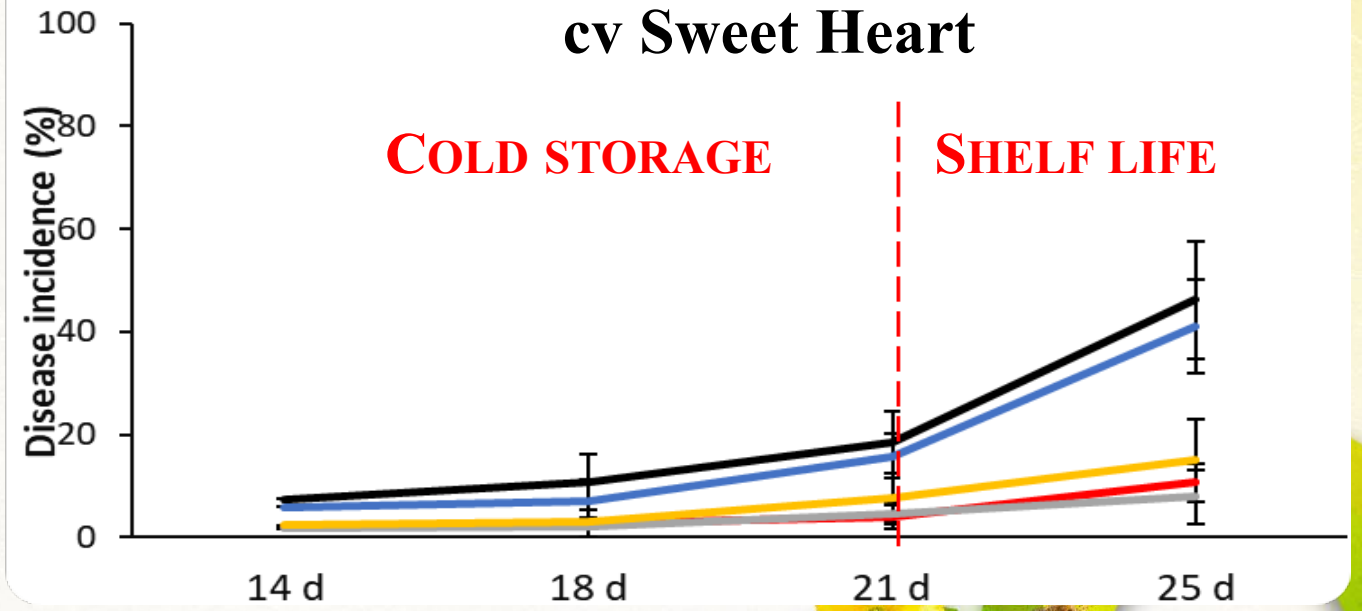
UNIVERSITY OF BARI ALDO MORO

Prof. Antonio Ippolito, Dr. Annamaria Mincuzzi

Sweet cherry cultivars: **Lapins** and **Sweet Heart**
4 treatments: 3 blooming stage + 1 preharvest
Basic substances: 1. **Chitosan**
2. **Sodium bicarbonate**
21 days of **cold storage** (1± 1 °C) and **4 days** of **shelf life** (20 ± 1 °C) in **microperforated plastic bags**

Alternaria **spp.**

Botrytis cinerea

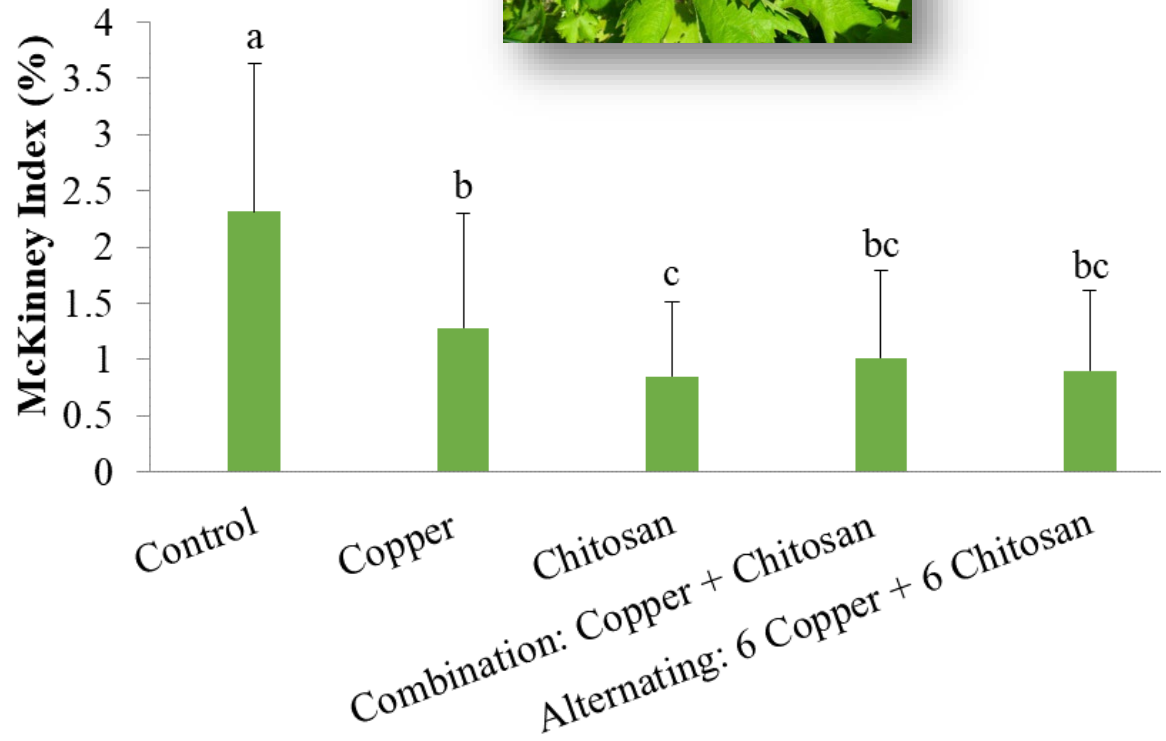


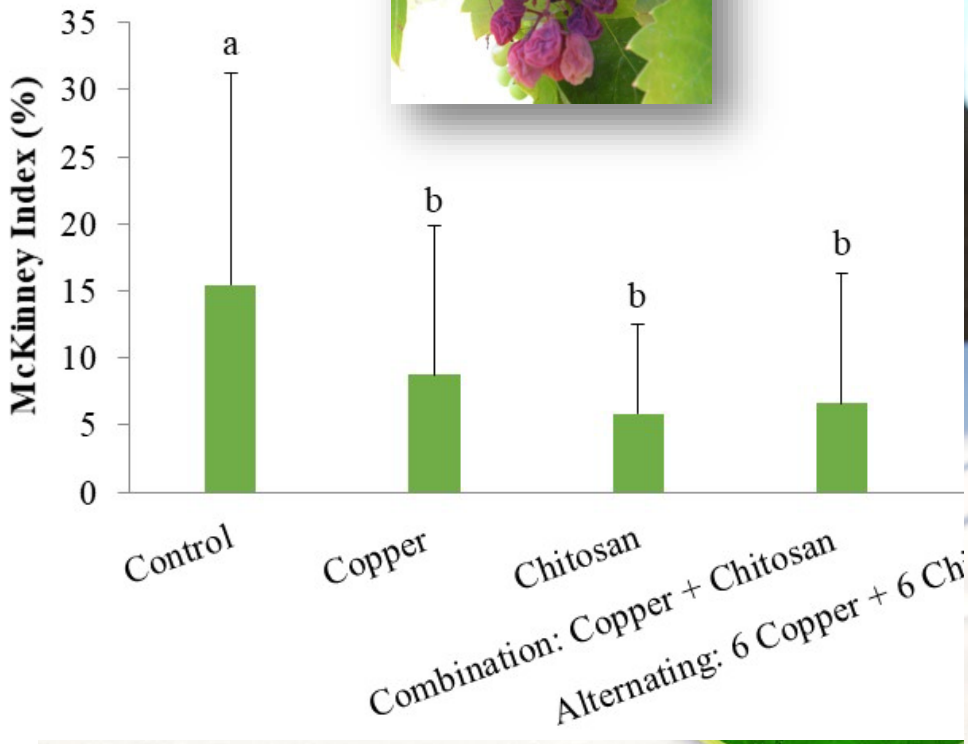
Reduction of **disease incidence** and **severity**

Ask question at slido.com with #PlantHealth_GW2023

Effects of chitosan treatment, alone – combined with copper and alternated – on grapevine downy mildew on leaves and clusters of cv. Verdicchio

UNIVERSITÀ POLITECNICA DELLE MARCHE





Ask question at slido.com with #PlantHealth_GW2023

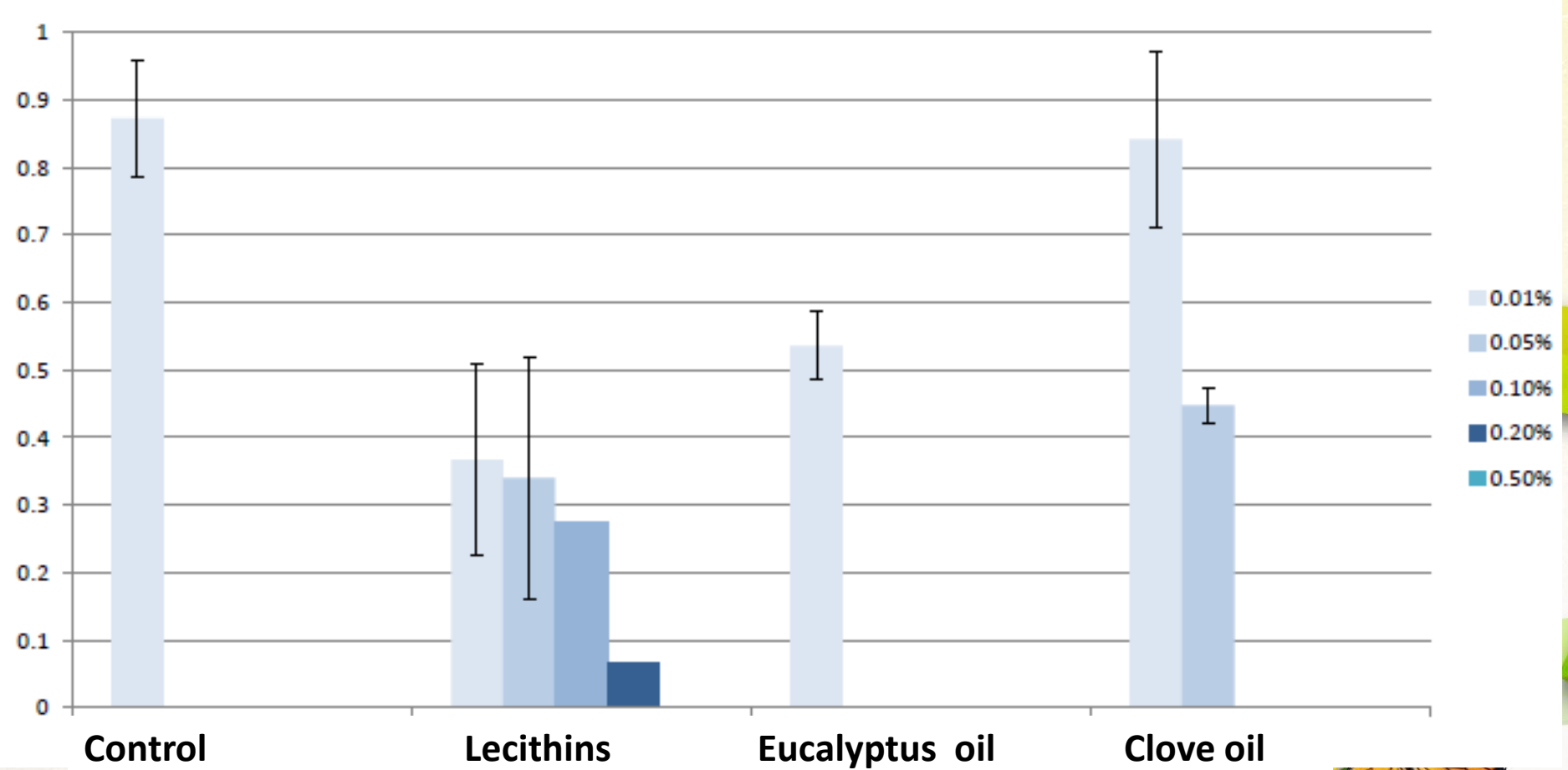
www.vitinnova.it – rvitinnova

Lecithins

Ask question at slido.com with #PlantHealth_GW2023

Fungicide against grapevine powdery mildew in vineyard

ITAB got approved 19 out of 24 basic substances, and Patrice Marchand is member of Anses (F) evaluation Committee



Marchand P.A., 2016. Basic substances under EC 1107/2009 phytochemical regulation: experience with non-biocide and food products as biorationals. *Journal of Plant Protection Research* 56, 312-318

BIO Web of Conferences **50**, 03009 (2022) https://doi.org/10.1051/bioconf/20225003009
GDPM 2022

Fungicide activity of milk and whey powders towards *Erysiphe necator,* the causal agent of powdery mildew of grapevine

Bugiani[1], R., Cavazza[2*], F., Landi[2], M., Preti[2], M.

[1] Servizio Fitosanitario – Regione Emilia-Romagna - Via A. da Formigine, 3, 40129 Bologna, Italy
[2] Astra Innovazione e Sviluppo Test Facility – Via Tebano, 45, 48018 Faenza, Italy

Ask question at slido.com with #PlantHealth_GW2023

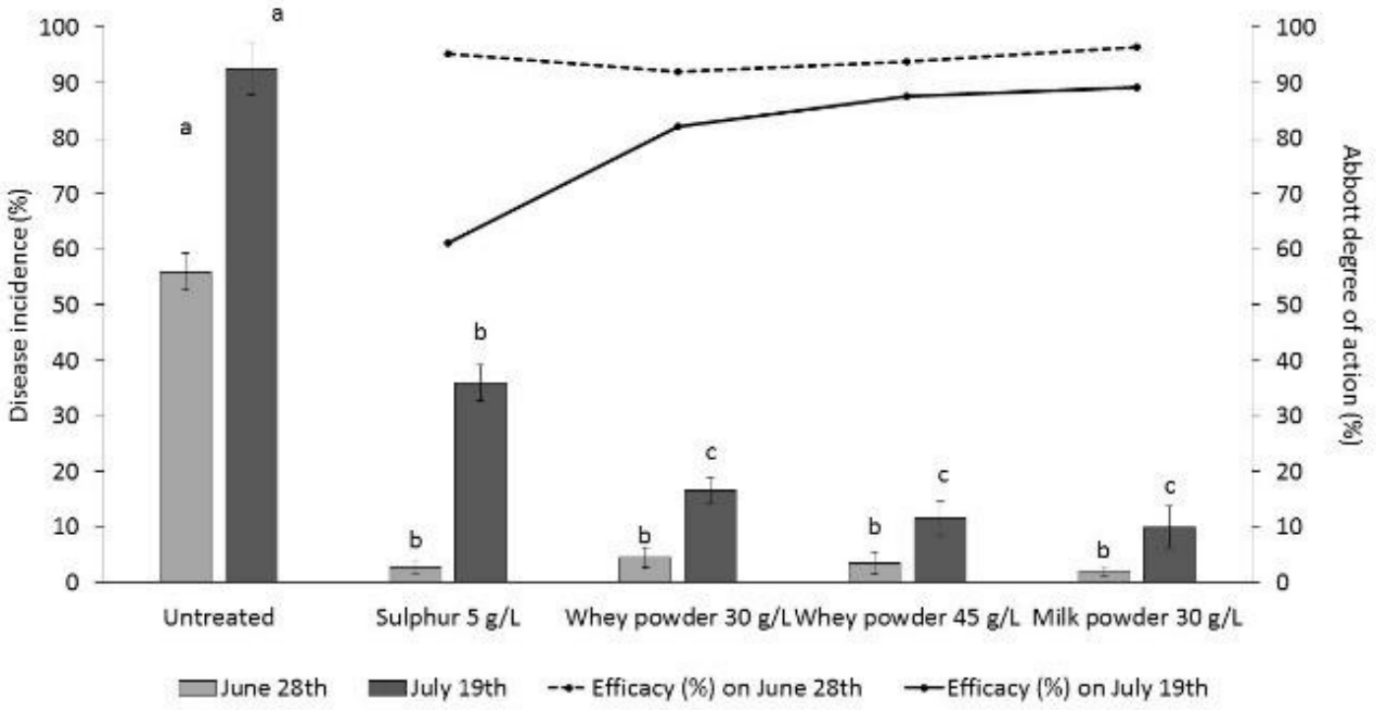
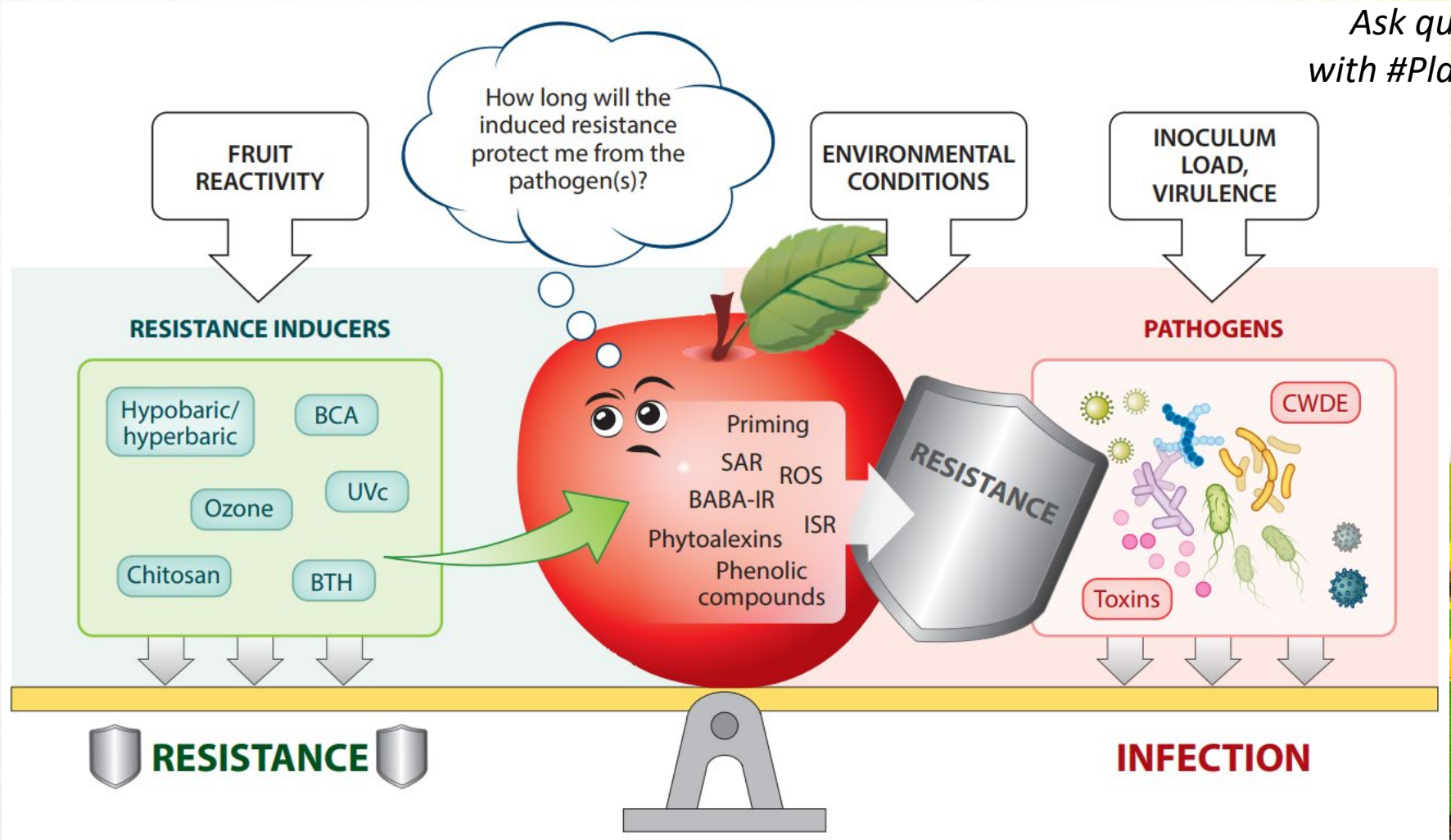


Figure 3: Disease incidence on grape bunches (histograms) and tested products efficacy (lines) recorded in 2019.

Induced resistance in harvested fresh fruits

Ask question at slido.com with #PlantHealth_GW2023



Prusky and Romanazzi, 2023 ARP

https://doi.org/10.1146/annurev-phyto-021722-035135

OVERALL EUPHRESCO BASICS IN PROGRESS RESULTS

- **Six webinars on the application of basic substances and potential basic substances** *(available on YouTube Project channel)*
- **One joint publication**
- **At least 20 scientific papers acknowledging the project**
- **At least 6 Special Issues on the topics of the project**
- **Mobility of young researchers working on the topic (Yann Davillerd from ITAB to UNIVPM, Eva Perez Alvarez from CSIC to UNIVPM, Nicola Santori from UNIVPM to CSIC)**
- **Extended International thematic cooperative network including expertise in basic substance evaluation and approval and International bodies (e.g. EPPO)**

Ask question at slido.com with #PlantHealth_GW2023

IMPACT OF EUPHRESCO BASICS ON POLICY

The Euphresco BasicS project aims to:

- **provide information to growers, phytosanitary consultants (plant doctors), researchers, consumers and policy makers for faster and appropriate registration and use of basic substances**
- **raise attention in different Countries on the use of basic substances for sustainable management of plant diseases and pests to reduce the application of synthetic pesticides and at the same time keep a proper quality and quantity of the production and farmer income (discussion on Sustainable Use Regulation)**

Ask question at slido.com with #PlantHealth_GW2023

BENEFITS FROM INTERNATIONAL COLLABORATION

The Euphresco network provided the opportunity of interaction of researchers from different areas to merge expertise and contribute to test basic substances and potential basic substances and promote sustainable approaches for IPM and organic agriculture

This network can interact with other policy makers (e.g. EPPO, ETP Plants, PRIMA, COST) to promote sustainability of agriculture and effective pest and disease management

cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Open Call Collection OC-2022-1

Proposal Reference OC-2022-1-25971

Title: Sustainable Network for agrofood loss and waste prevention, management, quantification and valorisation

Acronym: FoodWaStop

Plants for the Future
European Technology Platform

Euphresco

STOP MED WASTE

BasicS
Euphresco Project

Ask question at slido.com with #PlantHealth_GW2023

Euphresco

BasicS

Euphresco Project

oepp eppo

Ask question at slido.com with #PlantHealth_GW2023

Final meeting of the Project "Basic substances as an environmentally friendly alternative to synthetic pesticides for plant protection (BasicS)"

EPPO, Paris, 26 August 2023

Thanks you for your attention

For further info g.romanazzi@univpm.it