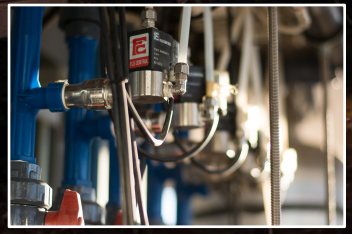
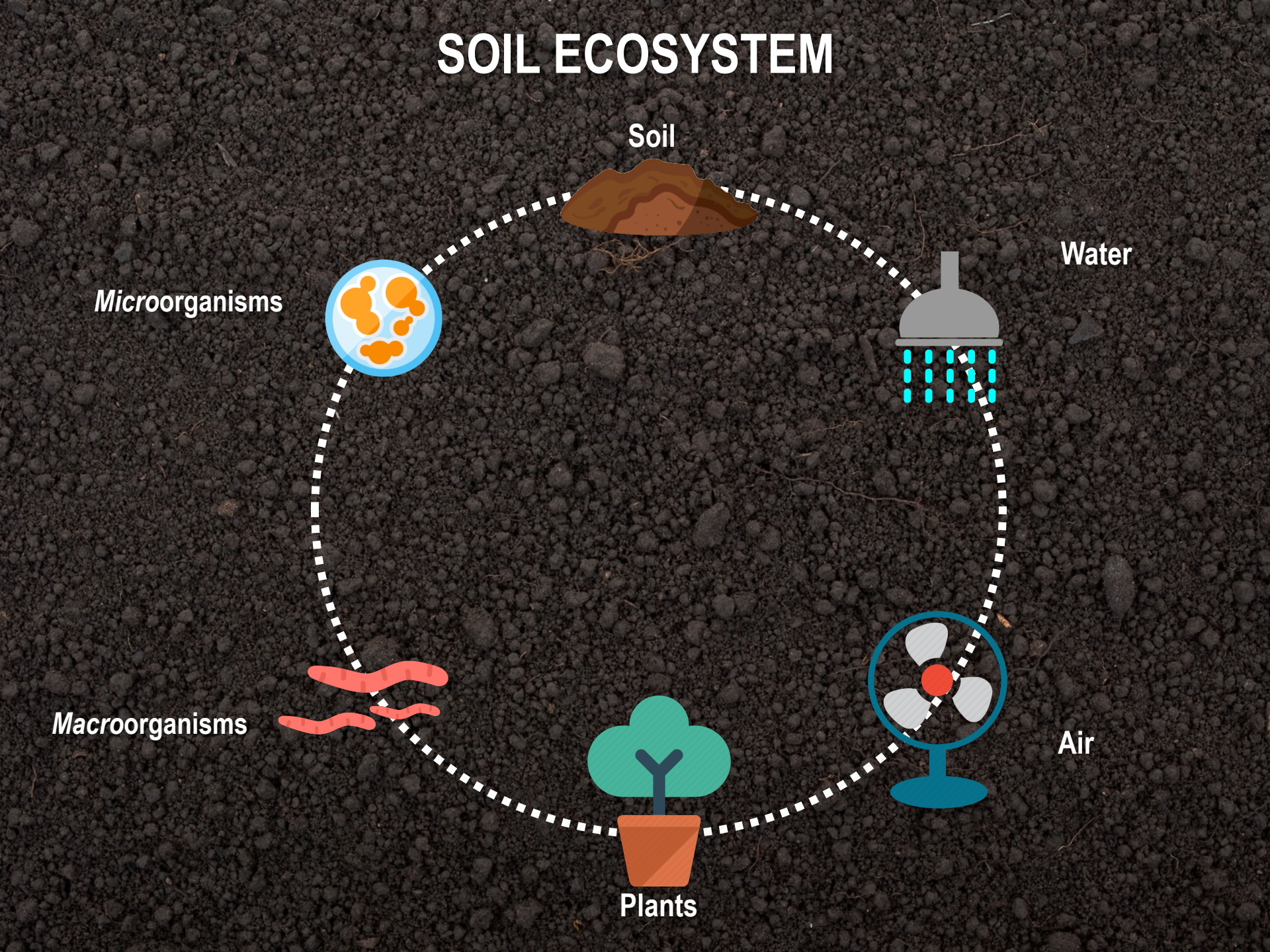
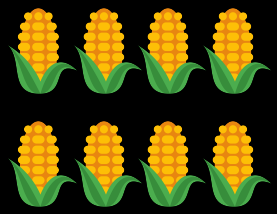
AGROZONO
AGRO3



SOIL ECOSYSTEM



ITEMS ALTERING SOIL ECOSYSTEM



Monocultures

Herbicides

Drip Irrigation

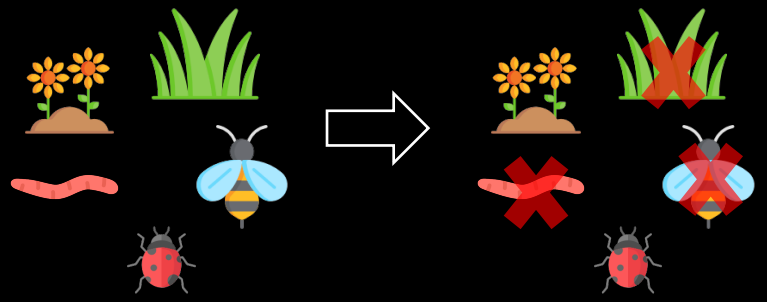
Mineral Fertilization

J F M A M J J A S O N D

No rotatión: always same crop

Outcome

- Biodiversity Reduction
- Imbalance



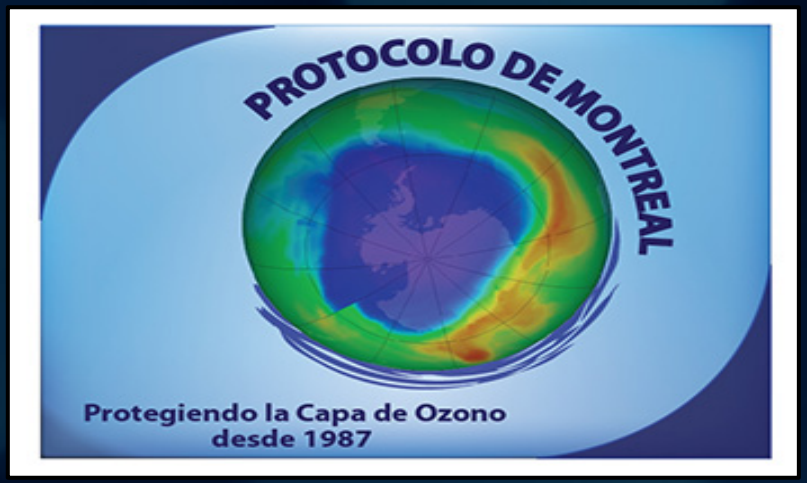
SOIL DISINFECTIONS WORLDWIDE

Historical Background

Crop practices. Less performance

First disinfections, World War II ending

Methyl bromide. First disinfectant

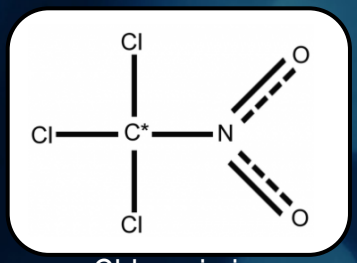


- Utilization prohibition on methyl bromide 1989.
- Creation Directive 414/91. Phytosanitary Regulation EU. July 15, 1991

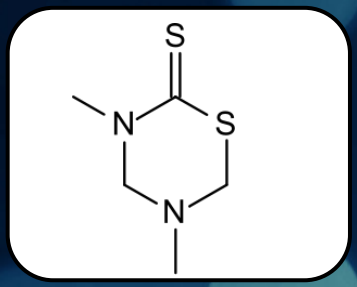
SOIL DISINFECTIONS WORLD WIDE

Nowadays Situation

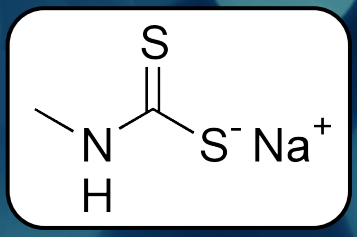
1,3 Dichloropropene → UE Exceptional authorization for using



Chloropicrin → UE Exceptional authorization for using



Dazomet → Only 1 application every 3 years is allowed



Sodium metam → Only 1 application every 3 years is allowed

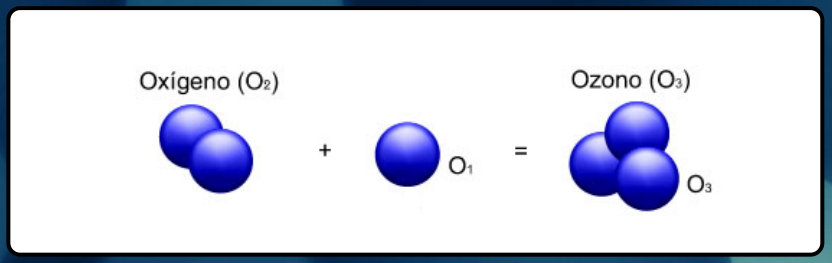
EFFECTIVE ALTERNATIVES URGENTLY NEEDED

SOIL FUMIGANTS EUROPE SITUATION

ACTIVE MATTER	TRADENAME	OWNER	R. EXPIRATION
SODIUM METAM 40%	METAM SODIO 40	TAMINKO BELGIUM	31.06.2019
	SOLASAN 40	TAMINKO BELGIUM	31.06.2019
	LAISOL 40	LAINCO SPAIN	31.06.2019
SODIUM METAM 50%	TRAGUSAN 50	TAMINKO BELGIUM	30.10.2018
	RAISAN 50	LAINCO SPAIN	30.10.2018
	METHAM NA-50	TAMINKO BELGIUM	30.10.2018
	METAM SODIO 50	TAMINKO BELGIUM	30.10.2018
DAZOMET	BASSAMID GRANULADO	KANESHO SOIL BEL	31.01.2019
POTASIUM METAM	RAISAN K -50	LAINCO SPAIN	30.06.2022
	TAMIFUN	TAMINKO BELGIUM	30.06.2022

What is Ozone?

The Ozone (O_3) is an allotropic variety of Oxygen (O_2)



Pungent odor colorless gas

Recognized as biocidal active substance by the BPR Regulation of ECHA (European Chemicals Agency) – Ozone is NOT considered a Phytosanitary.

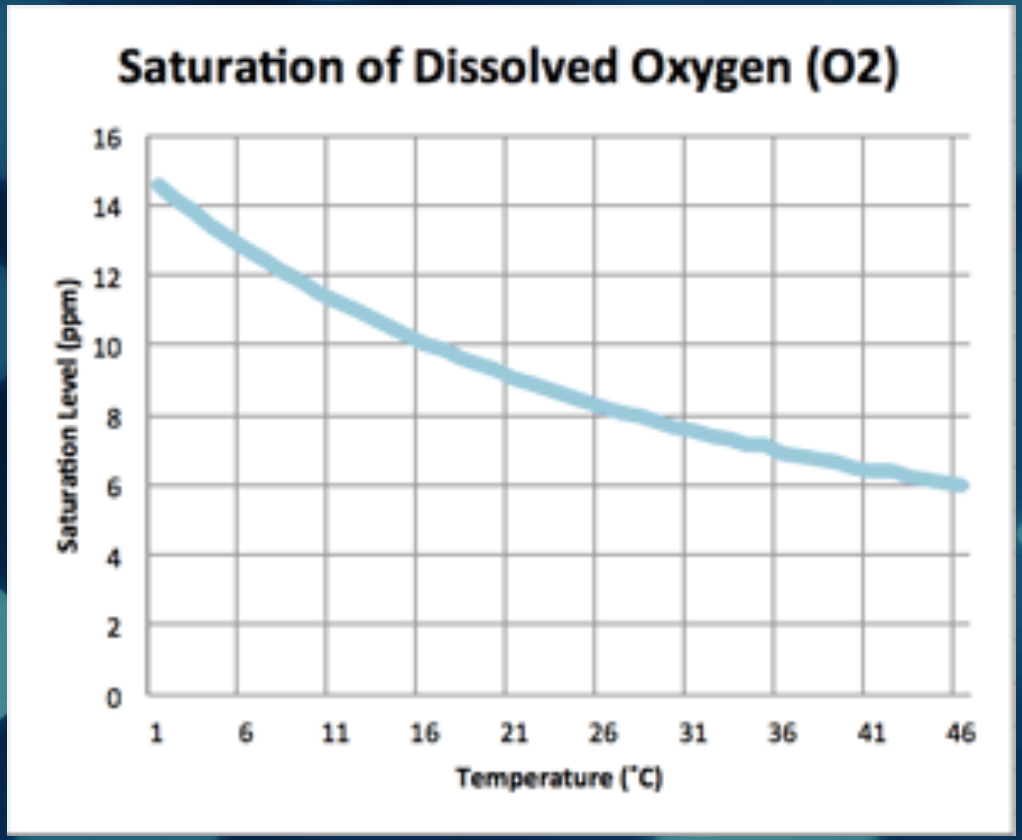
Is NOT present in the list of active substances, in accordance with the European legislation Regulation 1107/2009 and 540/2011.

High oxidizing power → Disinfectant properties

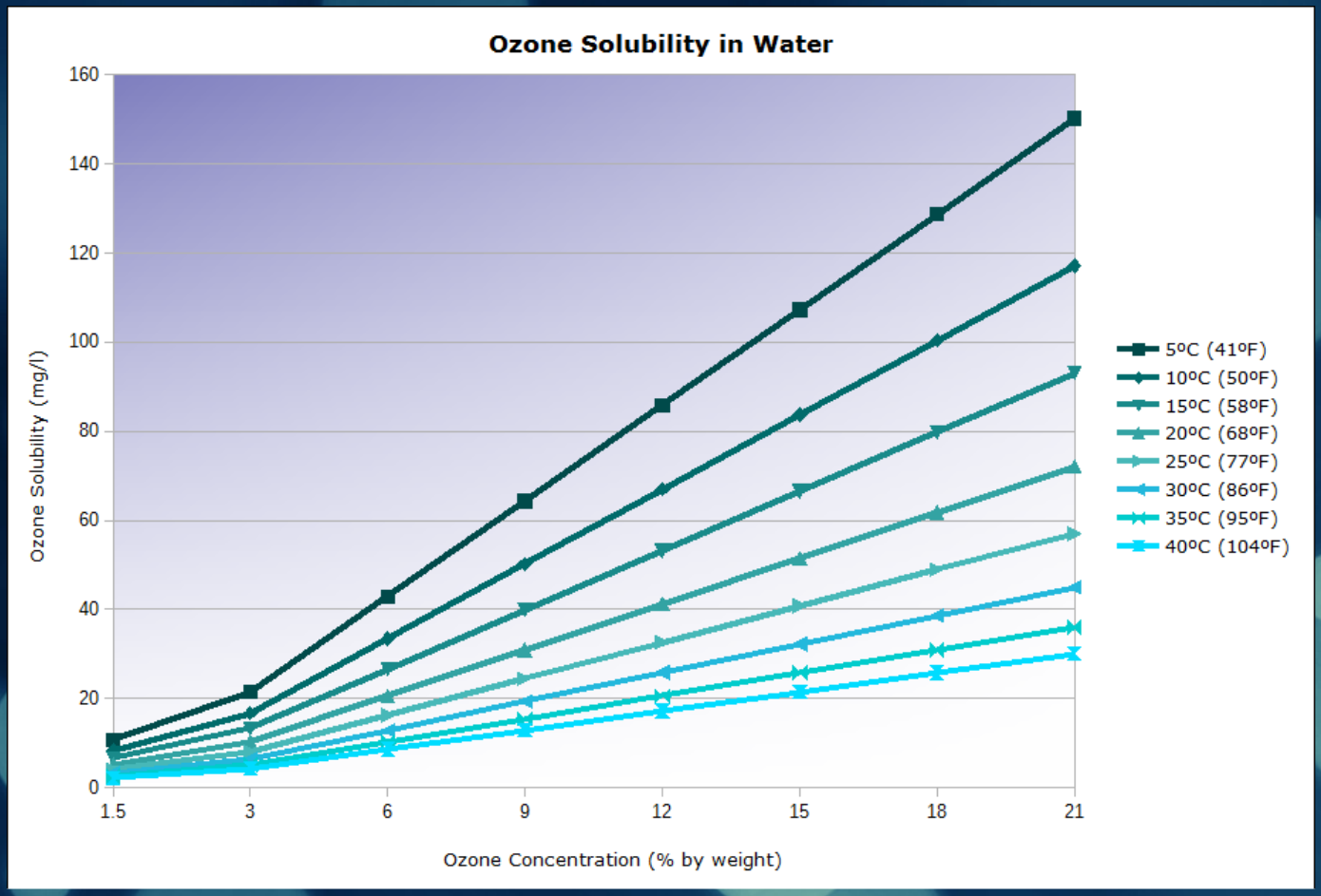
Cell wall break by Ozone action

Fungi, bacteria and nematodes elimination in few minutes

Influence of temperature, in water oxygenation



Influence of temperature, on the Ozone concentration in water



(*) Según el proyecto “OZONOSOL” ITAGRA 2011, el ozono es fitotoxico a partir de 30 ppm)

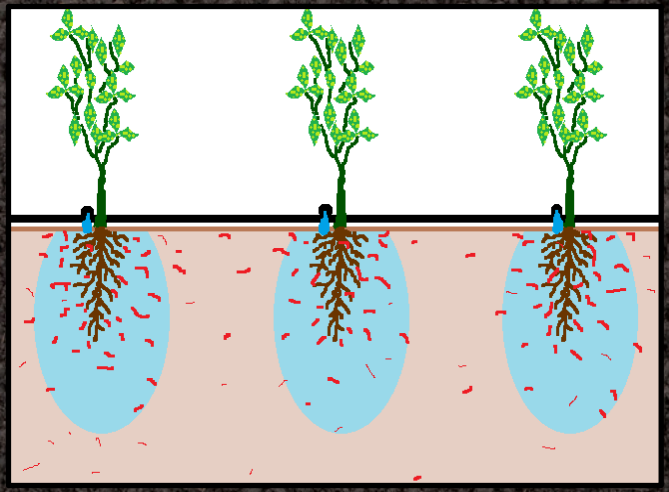
AGROZONO: DUAL SYSTEM

Ozone disinfection

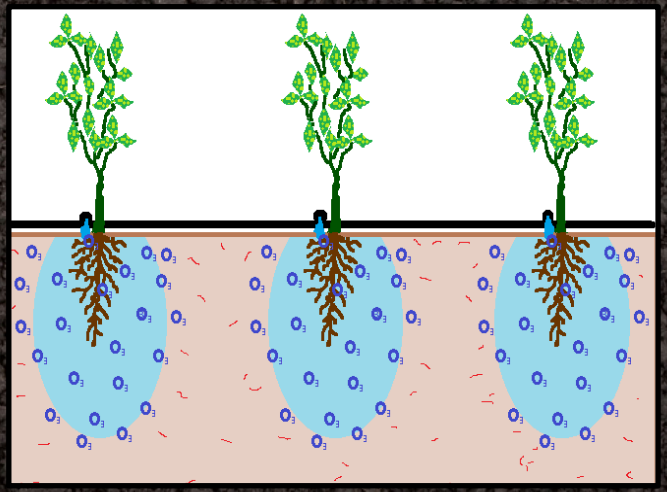
Regeneration with microorganisms

SYSTEM OPERATING DIAGRAM

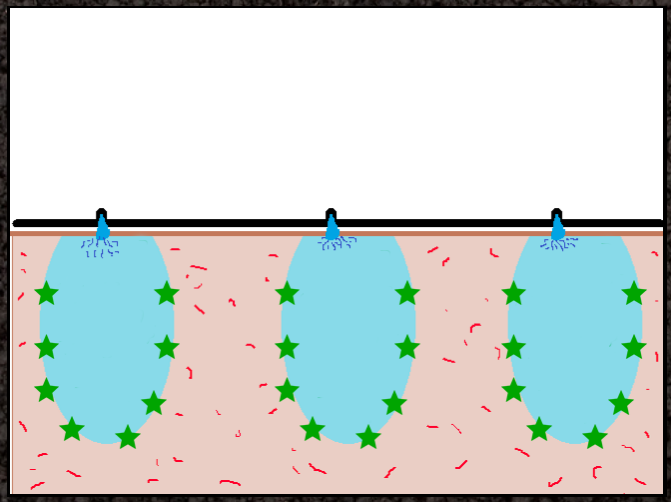
1.- CROP PRODUCTION WITH PATHOGENS IN SOIL.



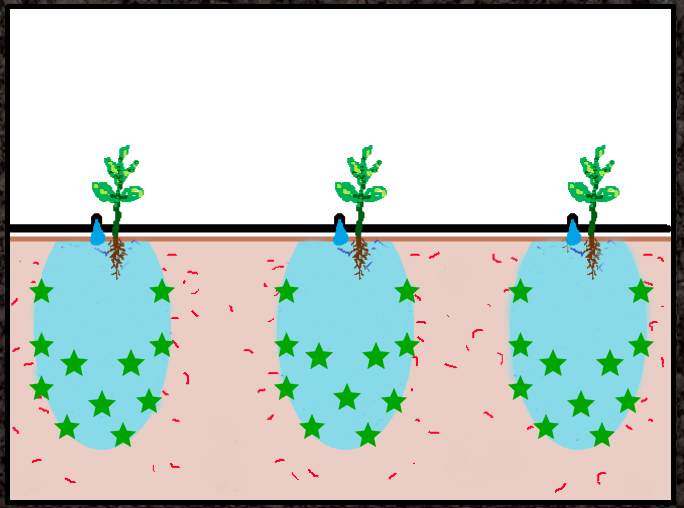
2.-DISINFECTION WITH OZONE VIA DRIP IRRIGATION.



3.- INOCULATION OF BENEFICIAL MICROORGANISMS IN WATERING BULB.



4.- PLANTATION. PATHOGENS' PULL EFFECT. BENEFICIAL COLONIZATION.



AGRZ 800 MOBILE GROUP

BACK GROUP SIGHT

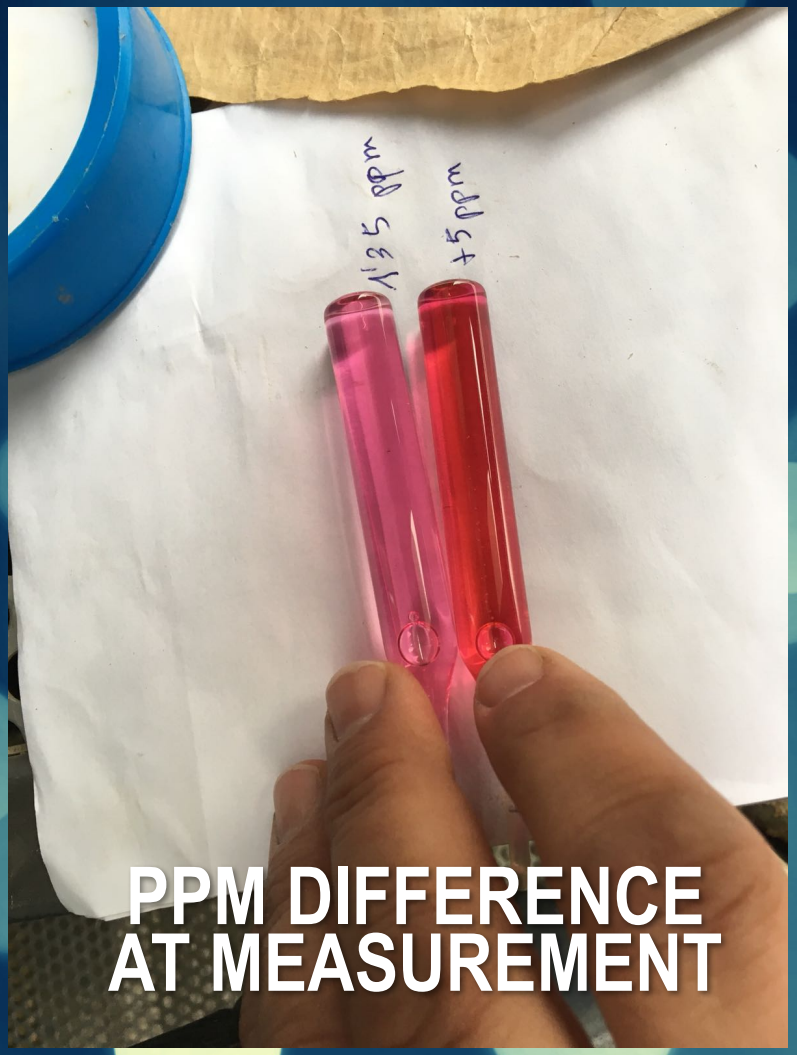
OZONE VISUAL EFFECT ON THE SOIL

WATERING SYSTEM HEAD CONNECTION (sprinkling-dripping)

DOUBLE CONNECTION FOR 2 AGRAZ 800 GROUPS, USED FOR PIVOTING SYSTEM AT 150 M^3/H

2 GROUPS AGRZ 800 DOING THE TREATMENT

OZONE MEASUREMENT BY PHOTOMETRY



California peppers parcel treated. 60 days after

TREATMENT ON SPRINKLING SYSTEM

Treated plot, 90 days after

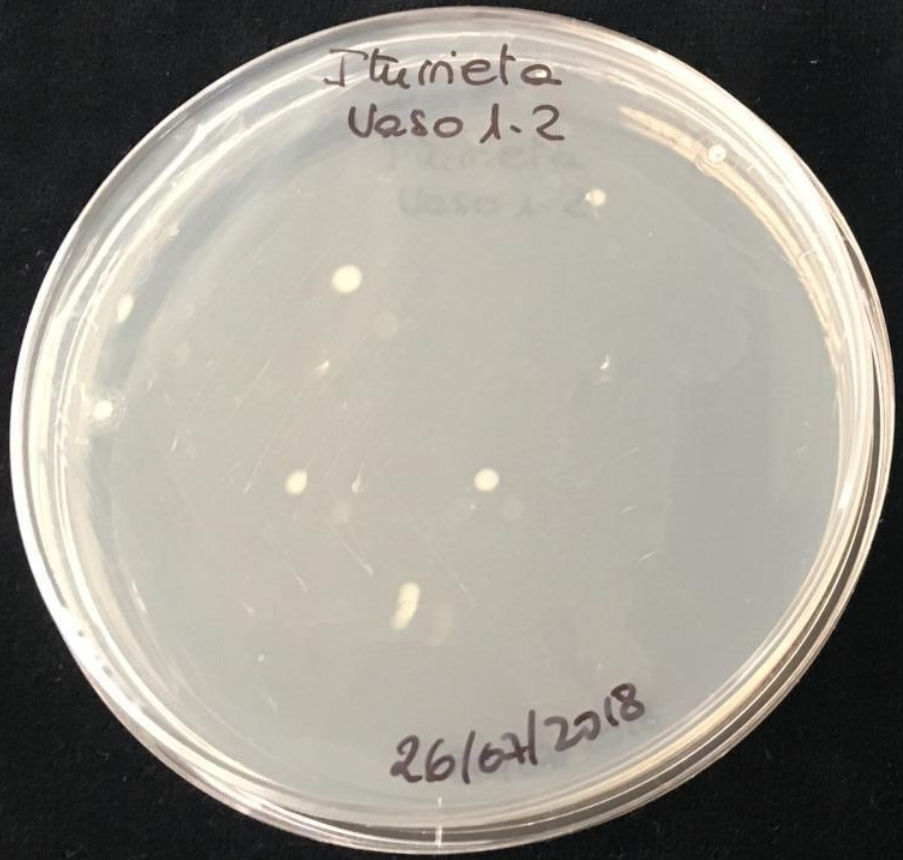
Detail

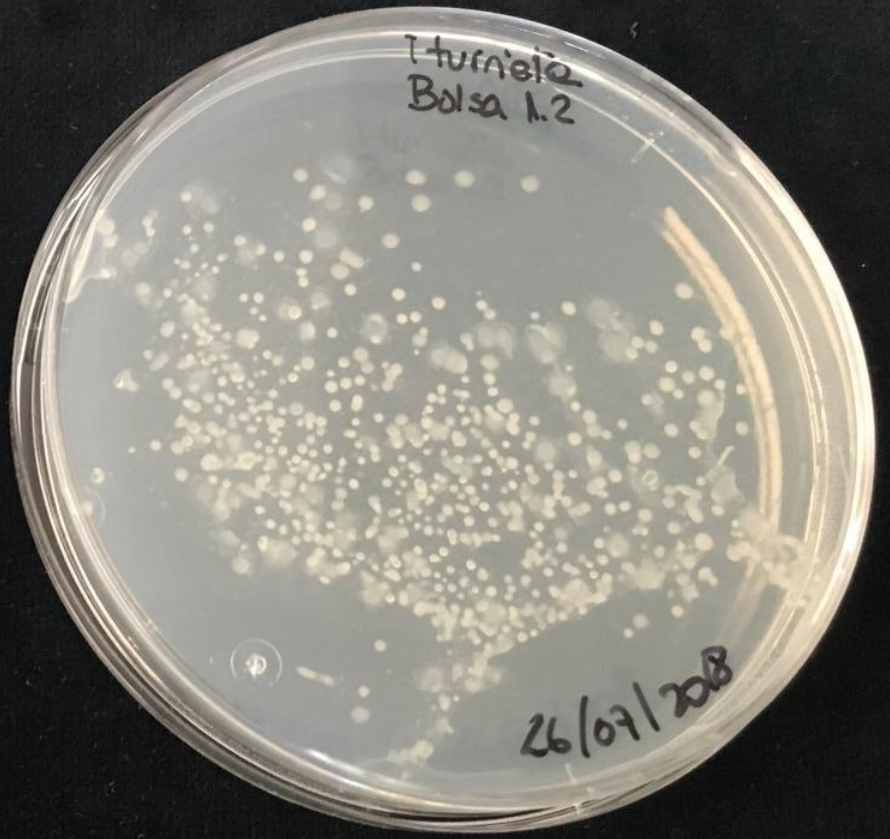
SOME CONTROLS ON PATHOGENS

PATHOGEN	CONTROL DOSE (PPM)	TIME NEEDED
Botrytis cinerea	3,8	2 minutes
Clavivater michiganese	1,1	5 minutes
Cladosporium spp	1,1	12 minutes
Fusarium oxysporum	1,1	10 minutes
Phytophthora spp	3,8	2 minutes
Verticillium dahiae	1,1	20 minutes

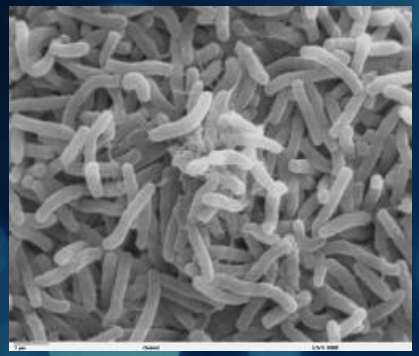
WITH OZONO

WITHOUT OZONO

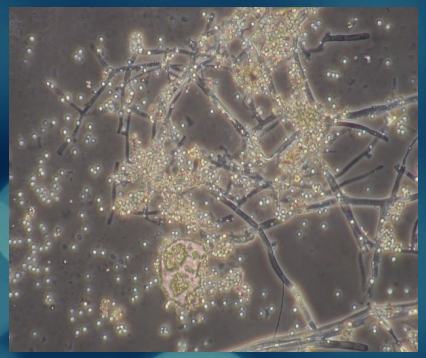




Beneficial MICROORGANISMS



BACTERIA

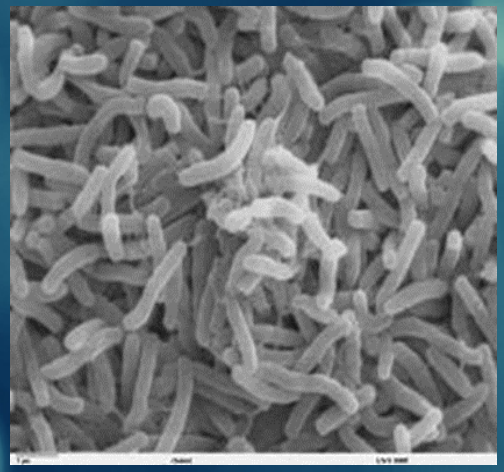


FUNGI

YEASTS

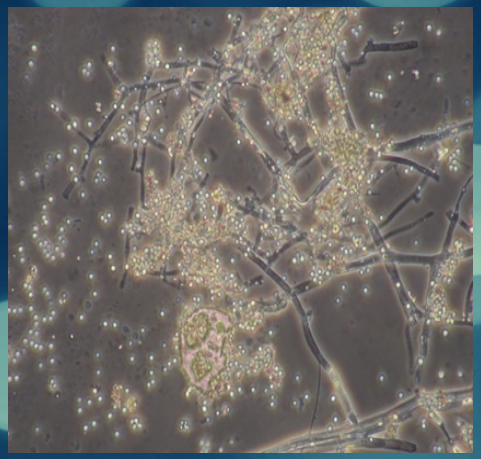
Species usable for biological control and biostimulation (bacteria)

- *Pseudomonas* spp.
- *Bacillus* spp.
- *Gracilibacillus dipsosauri*
- *Burkholderia* sp.
- *Alcaligenes faecalis*
- *Streptomyces* sp.
- *Corynebacterium paurometabolum*
- *Clostridium butyricum*
- *Desulfovibrio* sp.
- *Serratia marcescens*
- *Agrobacterium radiobacter*
- *Pasteuria penetrans*



FUNGI

- *Paecilomyces lilacinus*.
- *Gliocladium* sp.
- *Trichoderma* sp.
- *Arthrobotrys oligospora, A.dactyloides*
- *Monacrosporium haptotylum, M.gephyropagum*.
- *Myrothecium verrucaria*
- *MICORRIZAS*



YEASTS

Saccharomyces spp
Candida olepohila
Rhodotorula glutinis
Cryptococcus sp

Ozone in the European market

- Regulations on Biocides, Phytosanitary and current situation

EUROPEAN REGULATIONS

1) Regulation Nº 1907/2006.
   - Concerning the registration, evaluation and restriction of chemical substances and mixtures.
2) Regulation Nº 1107/2009
   - Concerning to merchandising of Phytosanitary products.
3) Regulation Nº 528/2012.
   - Concerning to merchandising and uses of Biocides.
   - Identified as BPR (Biocidal Product Regulation).

Consequences of regulations

- Regulations concerning the registration of substances.
  - A REACH registration needed above 1 ton per year production.
- Regulations concerning on Phytosanitary.
  - Currently is not affecting.
  - Nowadays Ozone is not considered a Phytosanitary.
- Regulations concerning on Biocides (BPR).
  - Ozone is included as an active substance generated *in situ*.
  - An specific dossier needs to be created. Having not dossier, the commercialization of the substance is forbidden.

Agrozono Situation

- We are able to obtain an access letter to the existing REACH registry when production requires it.
- In procedures for co-ownership of the specific required dossier under the regulation on Biocidal products.
  - Member of the European Ozone Trade Association.
  - Ozone dossier is on procedure of evaluation, as per active substance, presented to the relevant European Organism.
  - Its approval is expected in 2020.

EUO3TA.org
European Ozone Trade Association

CONCLUSIONS

· INNOVATIVE TECHNOLOGY CONTINIOUSLY EVOLVING.
· EXCLUSIVE TECHNOLOGY, SYSTEM WORLDWIDE PATENTED ALONG 25 YEARS.
· NATURAL ALTERNATIVE TO THE USE OF CHEMICAL FUMIGANTS.
· QUICKLY AND EASILY APPLICATION.
· APPLICATION ALLOWED WITH AN ESTABLISHED CROP
· ENVIRONMENTALLY FRIENDLY.
· BIOCIDE SUBSTANCE, BUT NOT RECOGNIZED AS A PHYTOSANITARY BY THE U.E.

"Incorporamos las practicas culturales del PASADO, con la tecnología del PRESENTE, para revolucionar la Agricultura del FUTURO."

"We add the cultural practices of the PAST, with the technology of the PRESENT, to rev up the agriculture of the FUTURE."

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www.agrozono.net