SALVIA OFFICINALIS L. EXCTRACTS: THE SOLUTION TO COPPER ABUSE IN ORGANIC CROPS?

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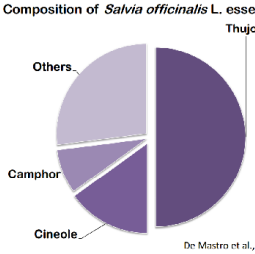
INTRODUCTION

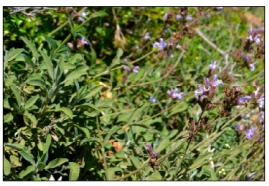
Copper formulations are the most common pesticides used to fight fungal illnesses in organic crops

However, many studies signalize the copper as persistent and damaging for the environment (Flemming and Trevors 1989)

Composition of *Salvia officinalis* L. essential oil



De Mastro et al., 2006

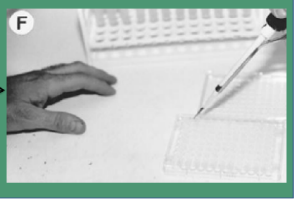


Salvia officinalis L. *ssp. vellerea* naturalized in the Catalan Mediterranean mountains

IN VITRO EXPERIMENTS: Positive results

Author/s	Fungus inhibited	Kind of extract
Wilson et al., 1997	*Botrytis cinerea*	Essential oil 1,25%
Yanar et al., 2011	*Phytophtora infestans*	Methanolic
Pansera et al., 2013	*Sclerotinia sclerotium*	Hidro-ethanolic 0,15%

Dilution of extracts and spores being pipetted into wells of microtiter plate (Wilson et al., 1997)



IN VIVO EXPERIMENTS: Negative results

Dorn et al., 2011: the control of late blight in organic potato production under field conditions was evaluated

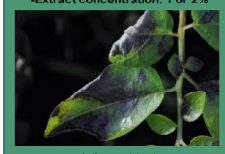
-Kind of extract: ethanol

-Location: Zürich-Reckenholz, Switzerland

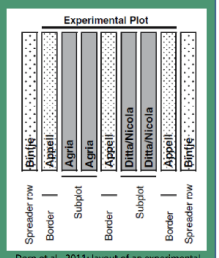
-Number of applications:12

-Volume: 500l/ha

-Extract concentration: 1 or 2%



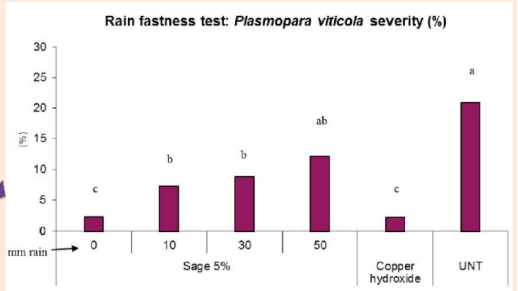
www.cropandsoil.oregonstate.edu



Dorn et al., 2011: layout of an experimental plot in the field trials

LOW PERSISTANCE

Its efficiency can be cut down depending on the environmental conditions, mainly due to the lixiviation produced by the rain (Forbes, 2001)



Angeli et al., 2012. Persistence of the efficacy of the crude sage extract at a concentration of 5% in the leaf against *Plasmopara viticola*; evaluation (%) of the severity and the incidence of the illness (*ANOVA p<0,05*).

OBJECTIVES

The evaluation of *Salvia officinalis* L. essential oil capability to control fungal illnesses in organic crops *in vivo*

MATERIALS AND METHODS

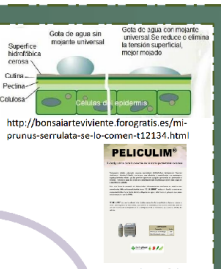
- Hydrodistillation

Extraction

Formulation

- Solutions
- Water
- Ecologycal soap
- Peliculim©

1:1.000 broth → Fungicide



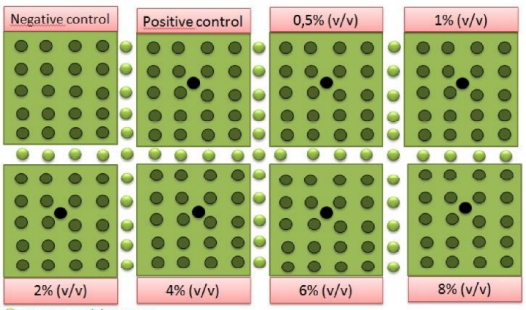
http://bonsaiartetviviente.forogratis.es/mi-prunus-serrulata-se-lo-comen-t12134.html

Fact sheet of the commercial product Peliculim©

From 14th of April

Administration

- 1.000L/ha
- 10 applications
- Total via foliar administration
- Once a week



Scheme of the micro plot field trials

Around 7th of May

Inoculation

- Semi-natural
- Infected plant transplantation
- Rainy weather

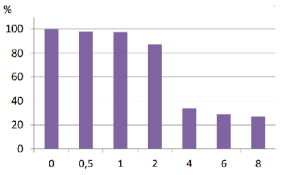
Evaluation of the incidence

- Weekly tracing of leaves
- Analysis through GC to quantify the remaining essential oil on the leaf
- ANOVA test

EXPECTED RESULTS

1. I expect that the GC analysis will indicate that more than 70% of the essential oil will remain on the leaf

2. Percentage of leaves affectation



DISCUSSION

- The different results would mean that what determines the success of the experiment is its mode of administration so that the extract, when administered, is not leachated by rain
- This aspect was already remarked by Dorn et al. (2007)
- I expect a reduced effectivity in field conditions compared to the assays carried out in the laboratory as a consequence of:

-Photolability (Lange et al., 1993)

-Degradation of the compounds by the microorganisms of the rhizosphere (Spurr, 1990)

-The lack of protection of the lower epidermis

-The loss of biological activity when the action of the fungicide is not evaluated under the controlled conditions in a laboratory (Benner,1993)

http://www.alvita.com/herbal-teas/salvia-officinalis.html#.VVoNaldOSfY

CONCLUSION

✓The administration of the sage extracts is useful to decrease loses caused by potato mildew

✓Sage and other vegetal extracts can be a good substitute to the use of copper

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