Effect of different seed treatment methods against Acidovorax valerianellae and Peronospora valerianellae on corn salad

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INTRODUCTION AND AIM

» Seed-borne diseases cause major problems in organic farming.
» Production of pathogen-free seeds is not always possible.
» Methods or agents for seed treatment which efficiently eliminate seed-borne pathogens are needed.

The aims of this study:
» Evaluation of 4 selected seed treatment methods against two seed-borne diseases Acidovorax valerianellae and Peronospora valerinaellae on corn salad (Valerianella locusta).
» Recommendations for the use of these methods in practice.
Two naturally infected seed lots (80% *A. valerianellae* and 1.5% *P. valerianellae*) were treated with:

- Steam disinfection (90sec 65°C) - Reference method
- Hot water treatment (10min 53°C) - Reference method
- Ethanol (70%)
- Caustic potash - KOH (7g/l)
- Encrustation with compost powder
- Sodium hypochlorite - NaClO (bleach, 3%)

Detection of *P. valerianellae* was performed according to ISTA-ISHI grow-out test.
Detection of *A. valerianellae* was performed with a combination of a grow-out test and polymerase chain reaction (Grimault et al., 2015).
Germination capacity according to the ISTA standard method.
**RESULTS**

**Figure 1:** Germination capacity of the seed treated with the different seed treatment methods.

**Figure 2:** Effect of the seed treatment methods against *Acidovorax valerianellae*.

**Figure 3:** Effect of the seed treatment methods against *Peronospora valerianellae*.

- Germination capacity: The germination capacity of the seed coated with compost powder was significantly lower than the germination capacity of the other treatments (Figure 1).
- An infestation under 1% has been achieved with the treatments:
  - *A. valerianellae*: steam disinfection, hot water treatment, caustic potash, sodium hypochlorite (Figure 2).
  - *P. valerianellae*: steam disinfection, hot water treatment, sodium hypochlorite (Figure 3).
The following treatments are recommended:

- **Aerated steam** disinfection: to control *P. valerianellae* and to substantially reduce *A. valerianellae*.
- **Hot water** treatment: to eliminate *A. valerianellae* and *P. valerianellae*.
- **Sodium hypochlorite** treatment had a very good effect against both pathogens. However, sodium hypochlorite is undesired in organic farming, because of potential chlorinated disinfection byproducts (Speiser et al., 2015).
- **Caustic potash** treatment (partially recommended): Although very effective against *A. valerianellae* there was only a limited efficacy against *P. valerianellae*.

The following treatments are not recommended:

- **Ethanol** treatment: no effect against both pathogens.
- **Compost** treatment: in the tested formulation it caused a strong reduction of germination capacity.