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Useful Methods 2: Sterilization of Duckweed

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Duckweed



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Protocol status: Working

We use this protocol and it's working

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Abstract

This protocol details about sterilization of duckweed. It contains protocols from the The International Steering Committee on Duckweed Research and Application (ISCDRA) Newsletter. A complete list of these news letters can be found [here](#).

Attachments



[377-833.pdf](#)

51KB

Guidelines

Sterilization of duckweed plants is unavoidable in the lab because many physiological or toxicological properties were influence in an unknown way by microorganisms, be it bacteria or fungi. Thus, the first step isolating clones from natural populations is surface sterilization. Moreover, it happens again and again that an already sterile clone gets infected during handling, even in a safety hood. Wherever axenic clones were kept under in vitro cultivation conditions, sterilization belongs to the routine techniques.

Different species (genera of species) have different sensitivity toward bleaching agents usually used for sterilization. Most sensitive are Wolffiella species followed by Wolffia species. Lemna is much more resistant and Landoltia and Spirodela are the most resistant.

I learned this method from the late Elias Landolt, ETH Zurich during one of my visits in his lab. Before that we kept each clone in 5 copies excluding this way that the whole clone with all copies will be infected. Now we keep usually only two copies from each clone.



Materials

Materials

Eau de Javel

NaOCl

glucose

sucrose

70 % ethanol

Erlenmeyer flasks

Agar

Danklorix (CP GABA, Hamburg, Germany)

Petri dishes

For surface disinfection

- 1 Put the plants in a plastic tube (Falcon), depending on the size of the plants having a volume of  15 mL or  50 mL .
- 2 Dilute the commercial available “Eau de Javel” in water for different concentrations and treat the fronds for different periods by gentle shaking:

2.1 *Wolffia*, *Wolffiella*: 1 – 3%, 2, 3, 4, and 5 min.

2.2 *Lemna*: 3 – 5%, 3, 4, 5, and 6 min.

2.3 *Landoltia*, *Spirodela*: 5 – 10%, 3, 5, 7, and 9 min.

3

Note

“Eau de Javel” is available at least in Switzerland and Germany (producer Floreal Haagen, Wadgassen, Germany). It contains 2.4% NaOCl.

Sterilize *Landoltia* fronds in a 0.24% solution of NaOCl using “Eau de Javel”.

- 4 Transfer the plants into Erlenmeyer flasks with nutrient medium containing sugar ( 50 millimolar (mM) glucose or  25 millimolar (mM) sucrose) (e.g.  180 mL per flask) without further washing in sterile water.
- 5 After a few days, better after 14 days, the medium remains clear when all bacteria and fungi are killed.
- 6 Wash the plants in 70% ethanol before bathing them in “Eau de Javel”. However this does not improve the rate of success.
- 7 Treat the 4 Erlenmeyer flasks with fronds at different times in the bleaching bath.



8 In the cultivation room at  25 °C follow the development of the plants in the Erlenmeyer flasks.

9 Transfer the sterilized plants on Agar in Petri dishes.

Note

The Agar-layer also has to contain sugar to control the success of the sterilization. In this case, some colonies might be unsterile without infecting sterile colonies in the same Petri dish. If this method is used, washing the fronds in sterile water after sterilization is indispensable in order to remove traces of the bleaching solution.

10 We also use other commercially available preparations like "Danklorix" (CP GABA, Hamburg, Germany), available at least in Austria and Germany. This product contains 2.8% NaOCl and can be used in the same way as "Eau de Javel".

11 Limited experience exists with commercial available sodium hypochlorit (NaOCl) solution. However, the concentration is much higher (typically 12%) and dilute it accordingly.

12 Moreover, as it is free of surfactants, it is useful to add a small amount of a mild detergent like 0.5% of Triton X-100 to get the surface of the whole plant body wetted.

13 There are other bleaching agents like "Lizol" (Reckitt Benckisier, Parwanno, Himachel Pradesh, India) having e.g. 0.6% NaOCl. However in this case, a very high concentration of surfactants is included. We were not able to wash the surfactants properly away from the surface of the plants and the recovering rates were very low.