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Optimising Lemna cultivation for food applications

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Now EFSA approval has been obtained for the introduction of Lemna minor and Lemna gibba as vegetable for human consumption we concentrated research activities on methods to obtain stable plant biomass production, adhering to the EC legislation. As we foresee an indoor (vertical) farming system as most successful and controllable, we tested artificial lighting strategies to reach lowest energy input as possible. To determine required light intensity and spectra we studied different light intensities resulting in good plant growth. High light intensity showed more plant stress and anthocyanin accumulation which was slightly modulated by fertilization. Next, we analysed different photoperiods resulting in a linear correlation of cumulative production and photoperiod without clear growth saturation at longer photoperiods. Fertilization had a small effect on plant biomass and root growth, but a large effect on cyanobacteria and microalgae contamination which will be a major risk determinant to increase yield and high-quality fresh products. As artificial light will be the main cost determinant for year-round plant production in vertical farming system, we tested the effect of intermitted light regimes, showing that commercial cultivation can make use of flexible hours with a low energy rate. Dynamic light strategies with far red did not show any effect on plant biomass. An objective for the future is to product organic certified Lemna plant products, currently based on Regulation (EU) 2018/848. We tested several currently available fertilizers for their potential use in Lemna cultivation. Next steps include analysis of plant composition and adherence to EU set specifications.

Corresponding author email

ingrid.vandermeer@wur.nl

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Applications

Keywords

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References

COMMISSION IMPLEMENTING REGULATION (EU) 2025/153 of 29 January 2025 authorising the placing on the market of Lemna minor and Lemna gibba plants as novel food and amending Implementing Regulation (EU) 2017/2470 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32025R0153)

Primary author(s) : Dr. VAN DER MEER, Ingrid (Wageningen University and Research)

Co-author(s) : Dr. VAN HOOGDALEM, Mark (Wageningen University and Research, Greenhouse Horticulture Research); Dr. MES, Jurriaan (Wageningen Food and Biobased Research; Food, Health and Consumer Research)

Presenter(s) : Dr. VAN DER MEER, Ingrid (Wageningen University and Research)

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