



# Thermochemical Fluids in Greenhouse Farming

## Energy saving in hot and dry climate regions

Energy savings in hot and dry regions related to protected agriculture are possible in the area of water recovery (replacing energy consuming desalination) and humidity control during winter and midseason (replacing a relevant part of heat energy).

TheGreefa is aimed at solutions for the recovery of water using liquid desiccants within an evapo-condensation cycle. In a precursor project, already a recovery of 85% of water was approved. In TheGreefa, a cycle of heat- and humidity uptake into a desiccant storage volume during daytime is followed by heat release and desiccant regeneration during nighttime with condensation at the inner wall of the greenhouse.



The hygroscopic property of the desiccant allows a higher dewpoint temperature in the daytime phase compared to a system only using water as a storage material. In this way, less cool (generated passively by nighttime temperature) is required for the process and cool is replaced by heat, as more heat is required during the regeneration phase, in order to regain the initial desiccant concentration for the next daytime phase.

If only using the heat from the daytime phase for regeneration, it may appear, that the maximum possible concentration of the desiccant is not reached. This would cause higher electric energy demand for ventilation. Alternatively, additional heat (solar, residual heat) can be used to arrive at the maximum concentration finally. The system requires economic optimisation between these two options.



TheGreefa project has received funding from the European Union's Horizon 2020 Research and Innovation Program under grant agreement No 101000801.

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