



Thermochemical Fluids in Greenhouse Farming

First Results of Liquid-Desiccant use for Climate Control in Tunisian Greenhouses: A Tunisian Case Study

Within the framework of TheGreefa project, a liquid-desiccant climate control system demonstrator was deployed in Tunisia, utilizing a brine-based solution sourced from the Tunisian Salinas of Sfax, located in the southern region of the country. This brine solution, which contains diluted magnesium chloride, served as a thermochemical carrier fluid. The system operates by circulating this fluid in counterflow with the air drawn from the greenhouse environment.

The primary mechanism for heat and moisture exchange between the air and the desiccant occurs within the absorber device, the core component of the demonstrator. The Absorber incorporates an innovative design that enables climate control within greenhouses by regulating both air temperature and humidity. It operates by converting latent heat into sensible heat and absorbing air humidity. This regulation is expected to optimize the growing environment, leading to enhanced crop quality and increased yields for grower. Initial results from several weeks of experimentation indicate the promising potential of the brine-based climate control system as a sustainable solution for creating a balanced and controlled greenhouse environment.



Figure 1. The Liquid-Desiccant Air-conditioning System installed at TheGreefa Tunisian demonstrator



Figure 2. The Absorber device – main component of the system



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