The MOOI project SOLIDARITY (Results 3.3)

Experimental setup for measuring drying of molded fiber under near air-less conditions

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Project overview

Impact:

- 45-55% energy in industry consumed for separation
- 80% thermal separations, 31% Drying and dewatering processes

Project focus:

Process efficient Solid and Liquid Dewatering and Drying

Partners:

WFBR, Carbogen AmCIS, Waterfuture, ESKA, Huhtamaki, VNP, TechnipFMC, Pervatech, RUG, TNO

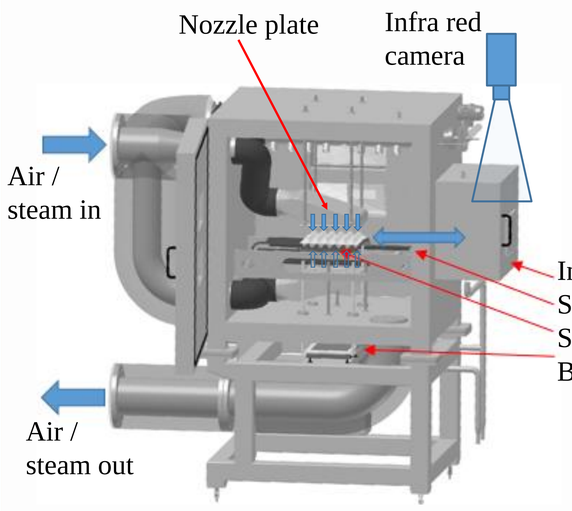
Goal:

Demonstrate cost-effective drying & dewatering in the process industry by combining technology and innovations in liquid-solid and liquid-liquid separations, leading to less use of heat, increased use of (clean) electricity and improved process efficiency

Results & conclusions activity 3.3

- **Field tests** are successful finished
- Almost 250 egg boxes are dried under different conditions. From all boxes the mass of the wet boxes before and partially dry boxes after drying was measured on an external mass balance. Inside the box the real time mass, the humidity rate, the volume flow and temperatures were sampled.
- Drying rate increases with larger driving force (i.e. T_{air}-T_{dew}) as well as with air flow velocity
- Reduced driving force under air-less drying conditions can be compensated by increased air flow velocity
- Results of experiments are used by Huhtamaki to design a new prototype molded fiber dryer with integrated heat pump

Drying chamber:



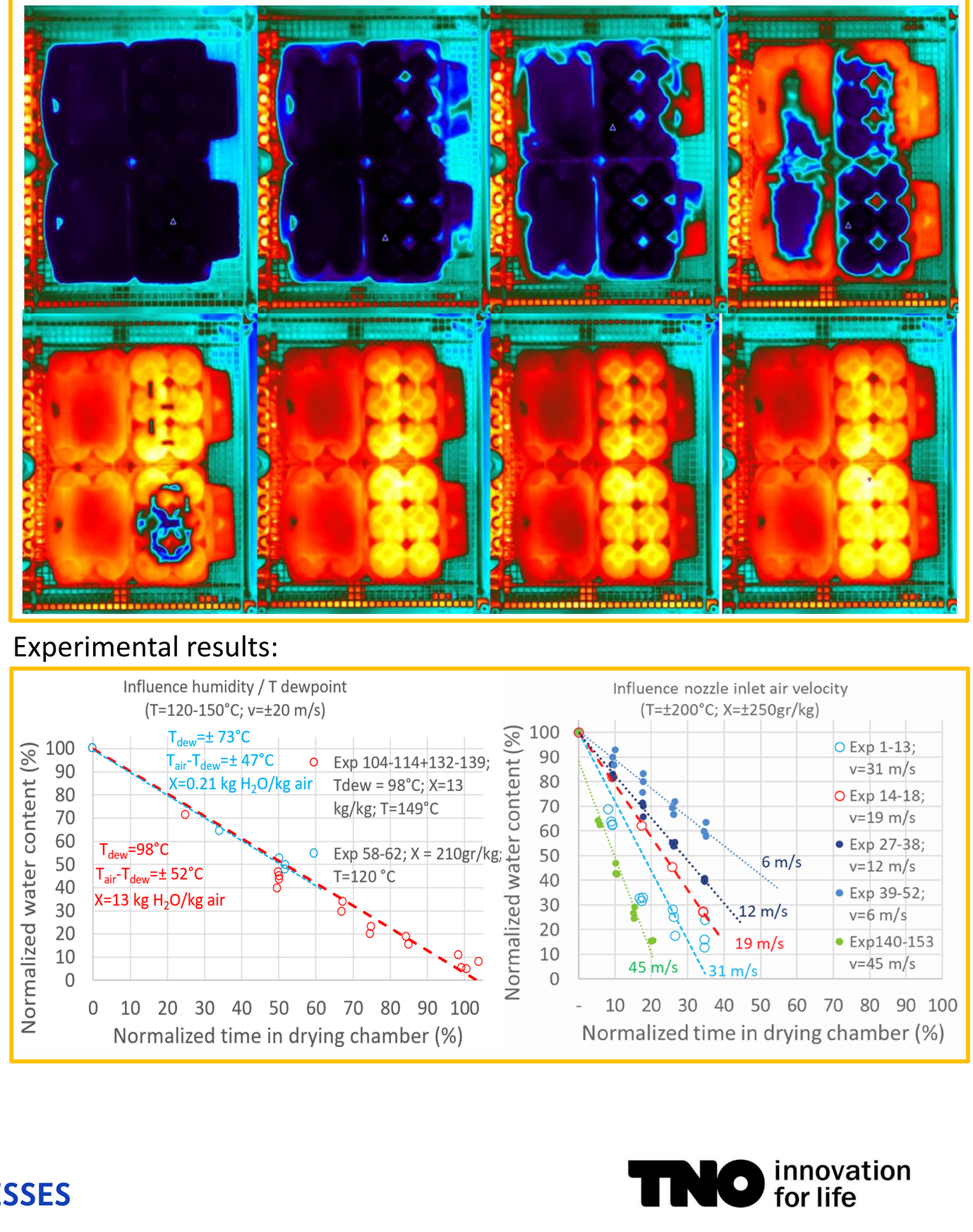
Adjustable parameters:

- Airflow top / bottom (max 1200 m^3/h)
- Temperature air (120-230 °C)
- Humidity rate air (20g to 10kg H_2O per kg of dry air)
- Type and distance of nozzle plate
- Type of carrier
- Type of eggbox (1x10 / 2x6)
- Drying time


Drying skid & drying chamber in TNO Carnot laboratory in Petten


Fieldtest at production site of Huhtamaki in Frankrijk

Infra red view of egg box during drying:



Experimental results:

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