

Influence of rapeseeds dehulling on a screw press operation

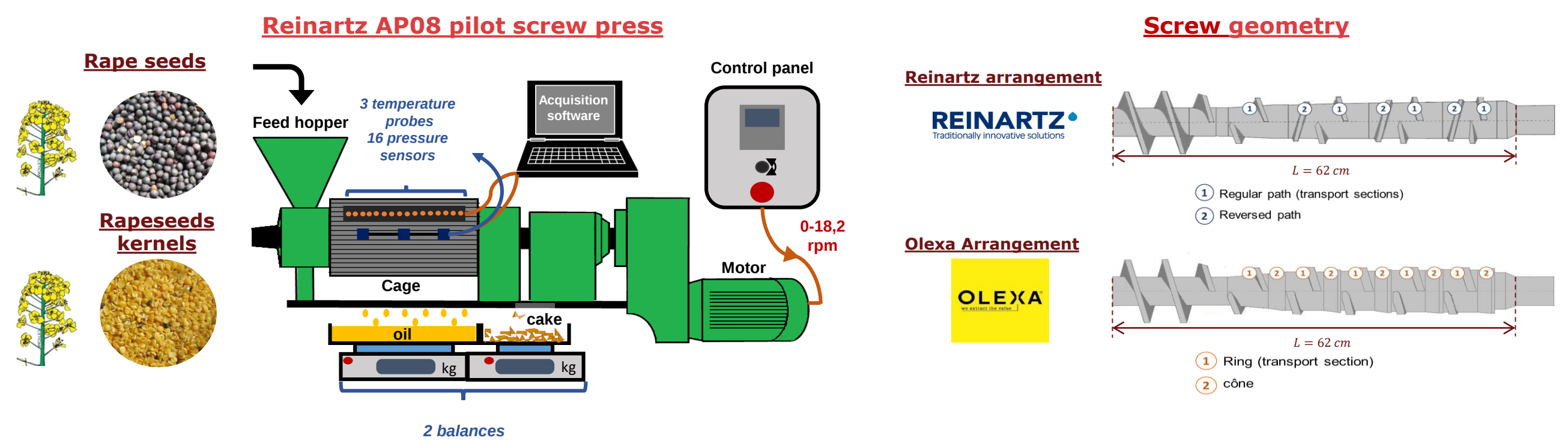
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Objectives

Due to the growing demand for protein, the crushing industry is now focusing on the production of press cakes with highest protein content and quality. This work was devoted to the study of the influence of rapeseeds dehulling on cold pressing performances. Two screw arrangements were studied for extraction yield, capacity and energy consumption.

Experimental setup



Operating performances

Better results were obtained with Olexa arrangement, for both material.

Legend:

- Olexa arrangement - kernels
- Olexa arrangement - whole seeds
- Reinartz arrangement - kernels
- Reinartz arrangement - whole seeds

Dehulling results in:

❖ Lower extraction yield

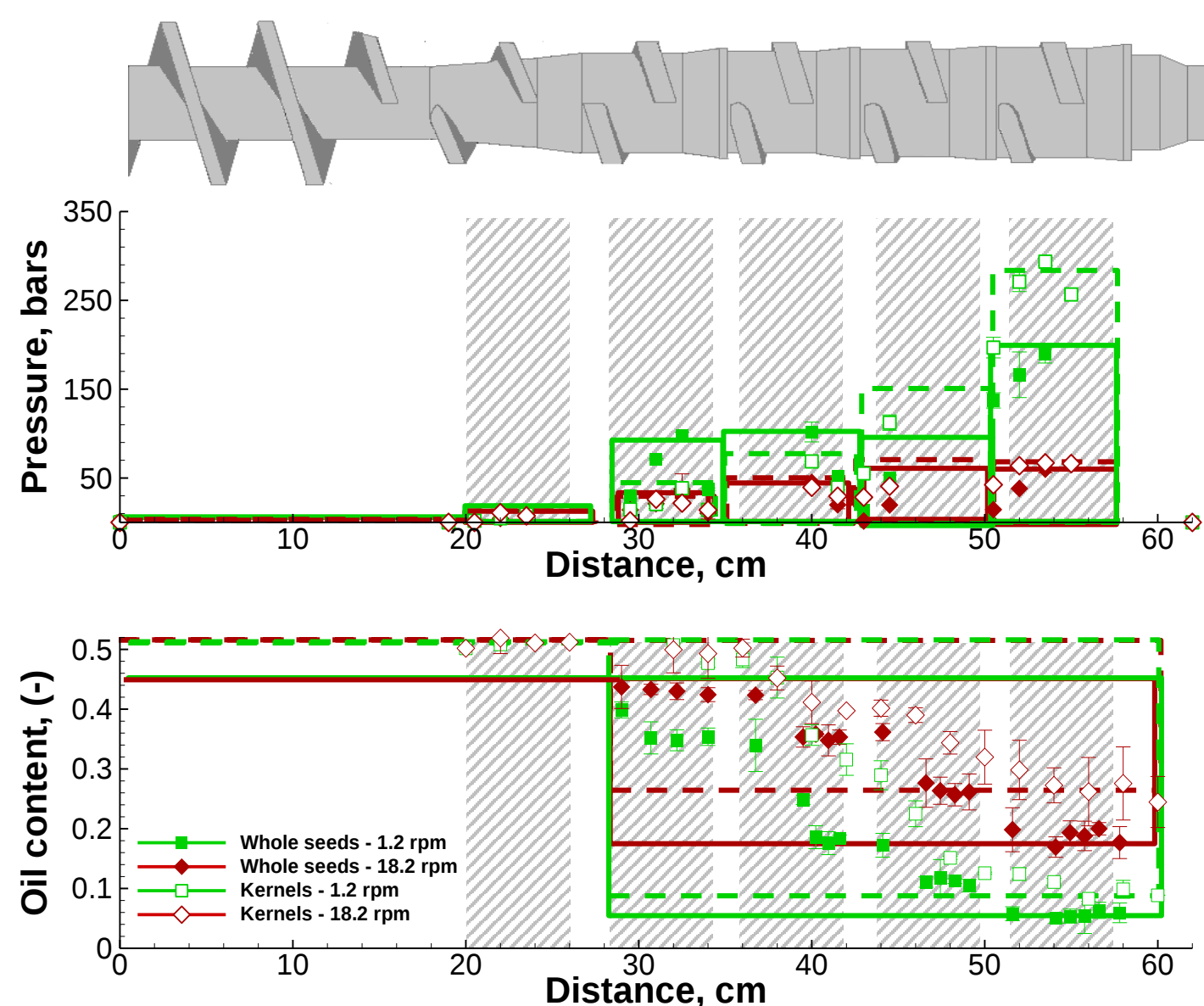
Kernels are softer than whole seeds
(higher deformation → lower oil expression)

❖ Higher capacity

Oil acts like a lubricant : Greasy press cake leads to lower frictions and facilitates the transport from the entry to the exit of the press

❖ Lower specific energy consumption

Characterization study

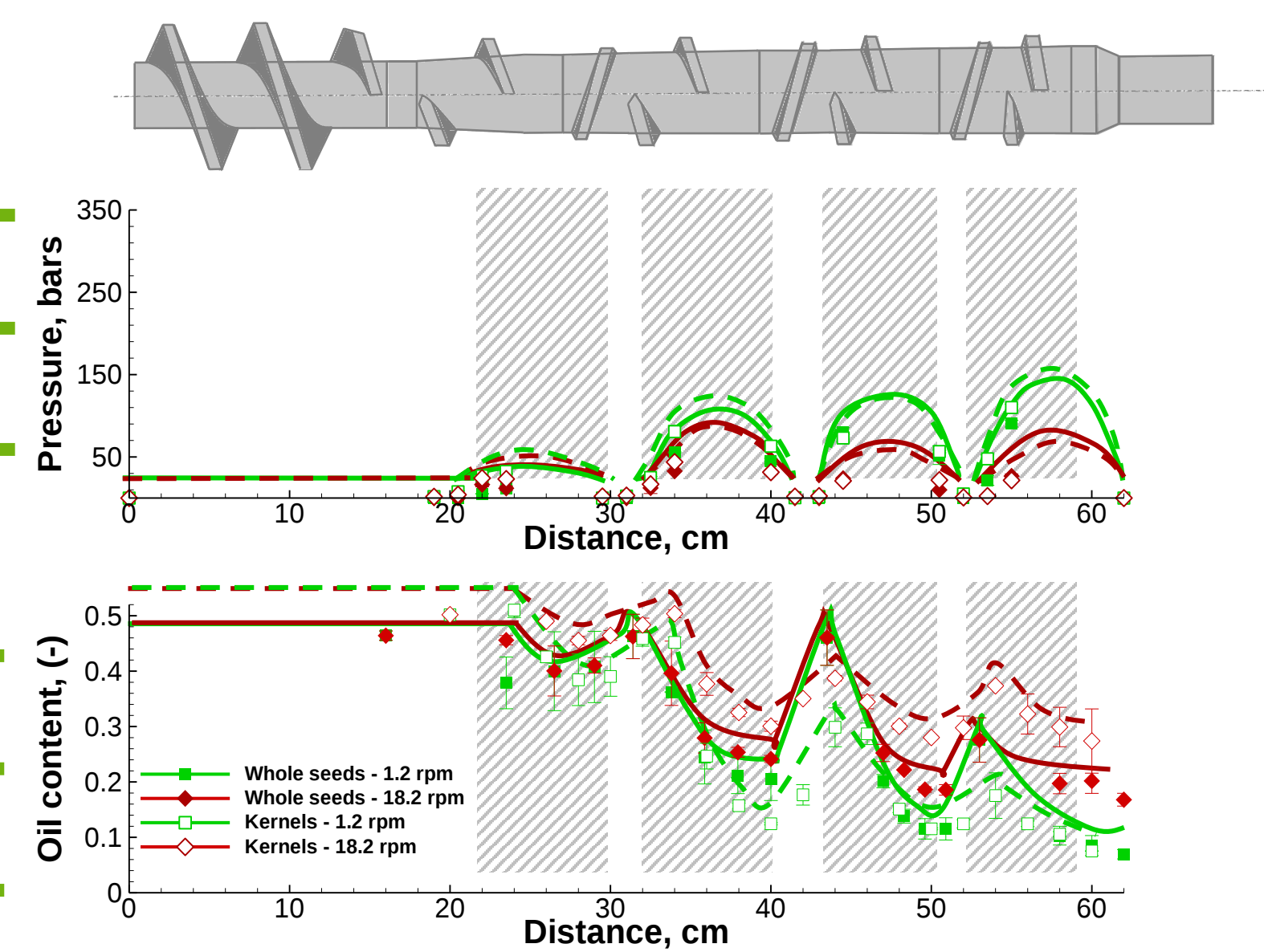


Pressure profile

- High rotation speed → low pressure
- 5 compression steps
- 4 compression steps
- Dehulling → Higher pressure

Oil content profile

- High rotation speed → Low deoiling
- No increase = No reflux
- Local increase = Oil reflux
- Dehulling → Higher residual oil



Conclusion

The two screw arrangements studied gave similar results : dehulling resulted in an increase of the press throughput and a decrease of the specific energy consumption but also a decrease of the oil extraction yield.

The characterization study provided information on the pressure and oil content evolution along the screw. For all rotation speeds, kernels processing led to equivalent (Reinartz screw) or higher (Olexa screw) pressures and higher residual oil contents.

These observations can be attributed to the mechanical properties of the kernels, in particular their deformability, which facilitates the flow inside the press but decreases the press cake permeability and therefore, the oil extractability.