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Pelletizing of digestate-based mineral-organic fertilizers: effect of die L/D ratio and utilization of frictional heat

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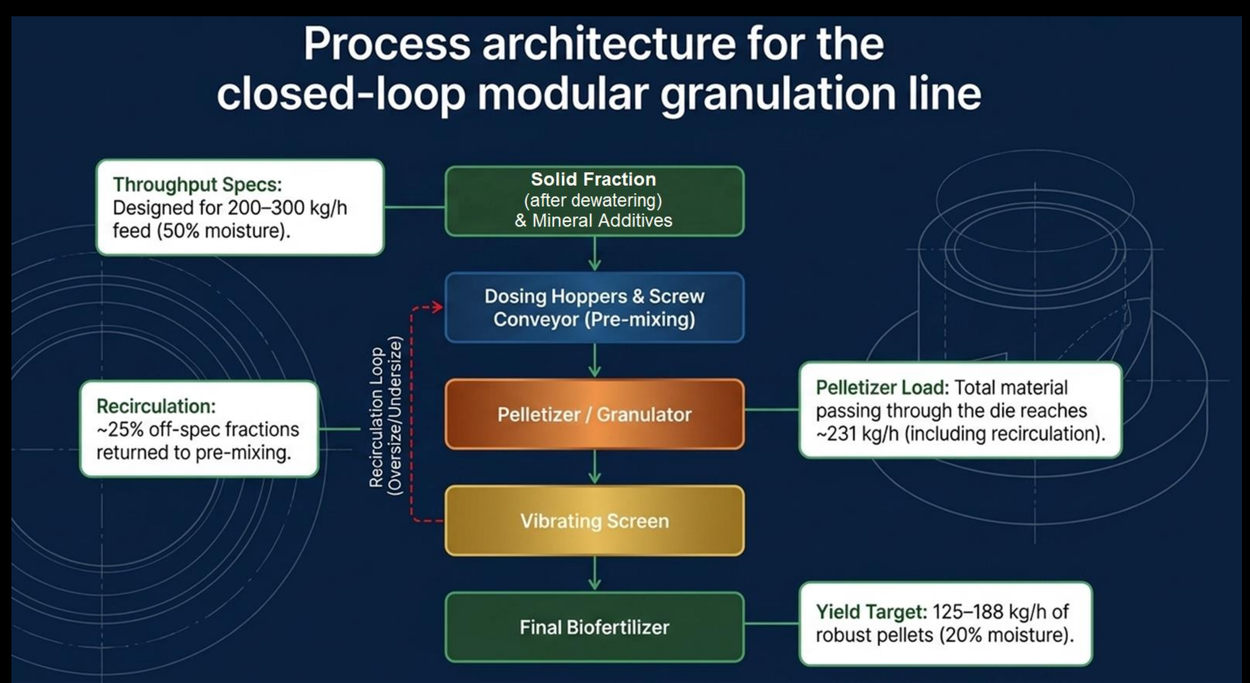
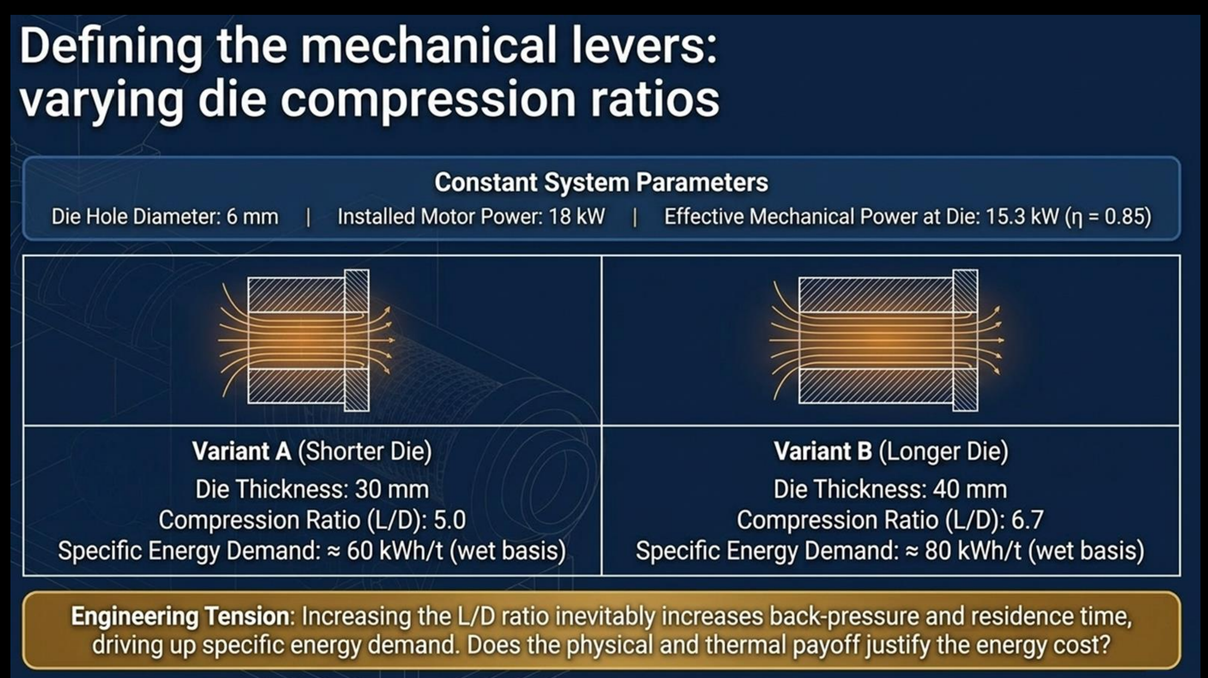
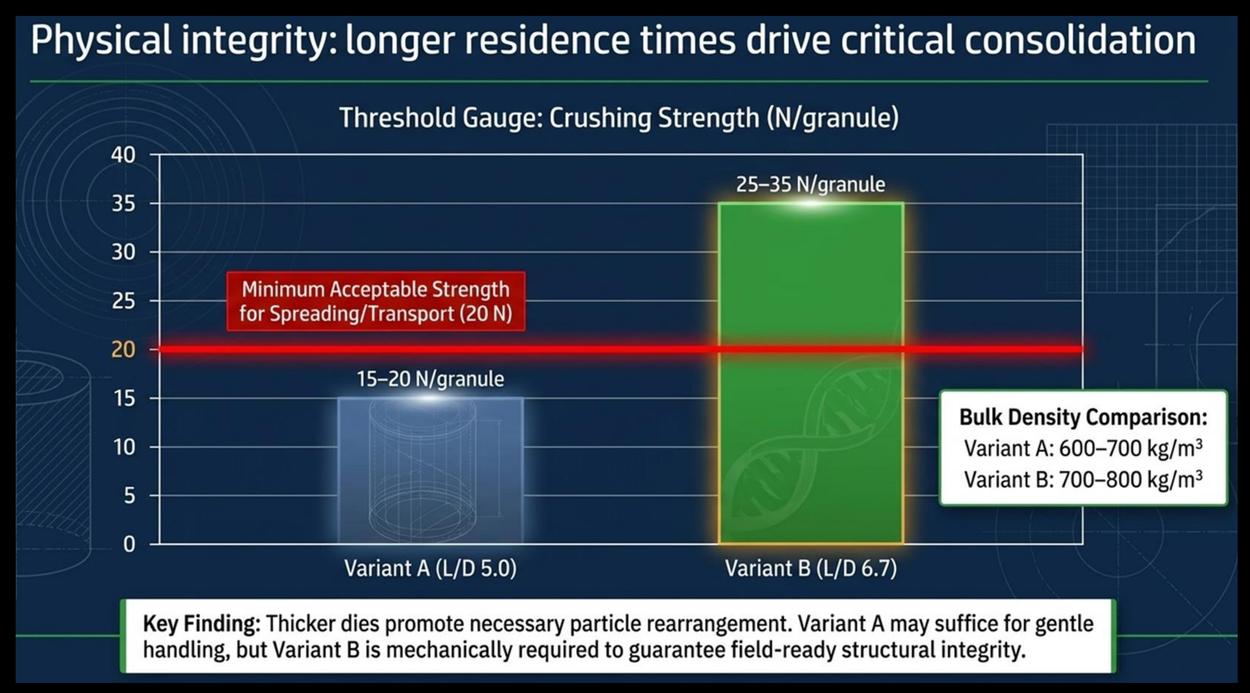
Introduction

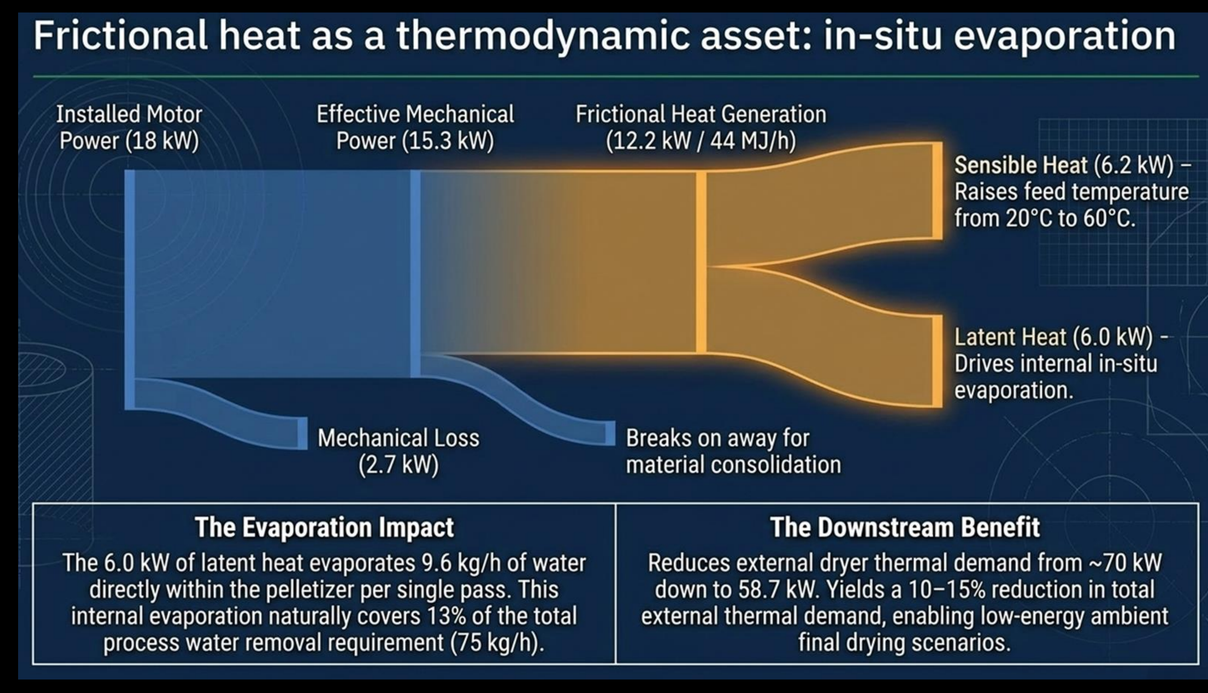
The LIFE DIMITRA project develops technological routes for valorising anaerobic digestates into solid and liquid bio-fertilisers for climate-friendly agriculture. Among tested granulation methods, pressure pelletizing proved most effective, as other techniques did not provide sufficient mechanical strength for digestate-based fertilizers. A modular mobile granulation line was therefore designed around a Nawrocki flat-die mini pelletiser (18 kW), equipped with interchangeable dies to study the effect of compression ratio (L/D) and frictional heat on pellet formation.

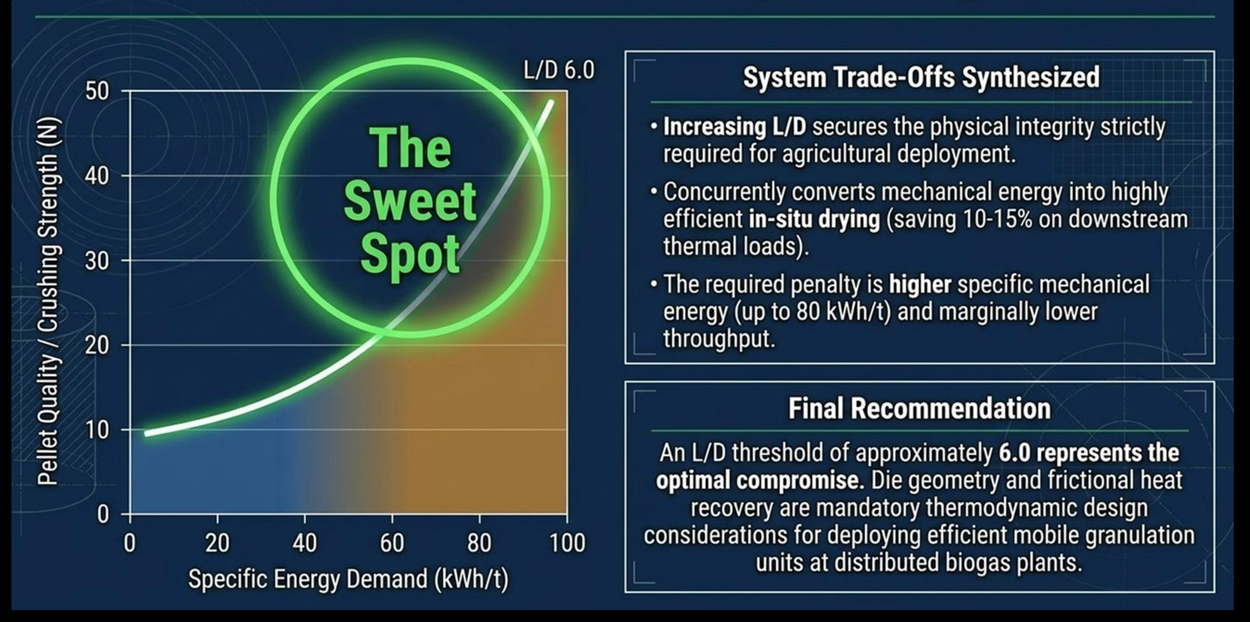
This work focuses on the pelletizing step, analysing how increasing die thickness from 30 to 40 mm (L/D 5.0–6.7, at 6 mm diameter) influences pellet quality and energy balance. Feedstock consisted of dewatering digestate fractions with mineral additives. Key questions addressed were whether higher L/D improves pellet strength and density, and to what extent frictional heat can support in-situ water evaporation, reducing external drying demand.











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