

MECHANICAL RECYCLING

The influence of the sample preparation on the properties of pre-treated polyolefin waste

¹ Competence Center CHASE GmbH, Altenbergerstraße 69, 4040 Linz, hassan.akhras@chasecenter.at

² Johannes Kepler University Linz, Altenbergerstraße 69, 4040 Linz



Introduction and Objective

- How to perform a proper QC on incoming materials in the recycling industry?
- The inherent heterogeneity of plastic waste hinders the acquisition of accurate material data
- Milling and compounding increase the homogeneity of the materials.
- How do such processes affect the accuracy of the acquired data?



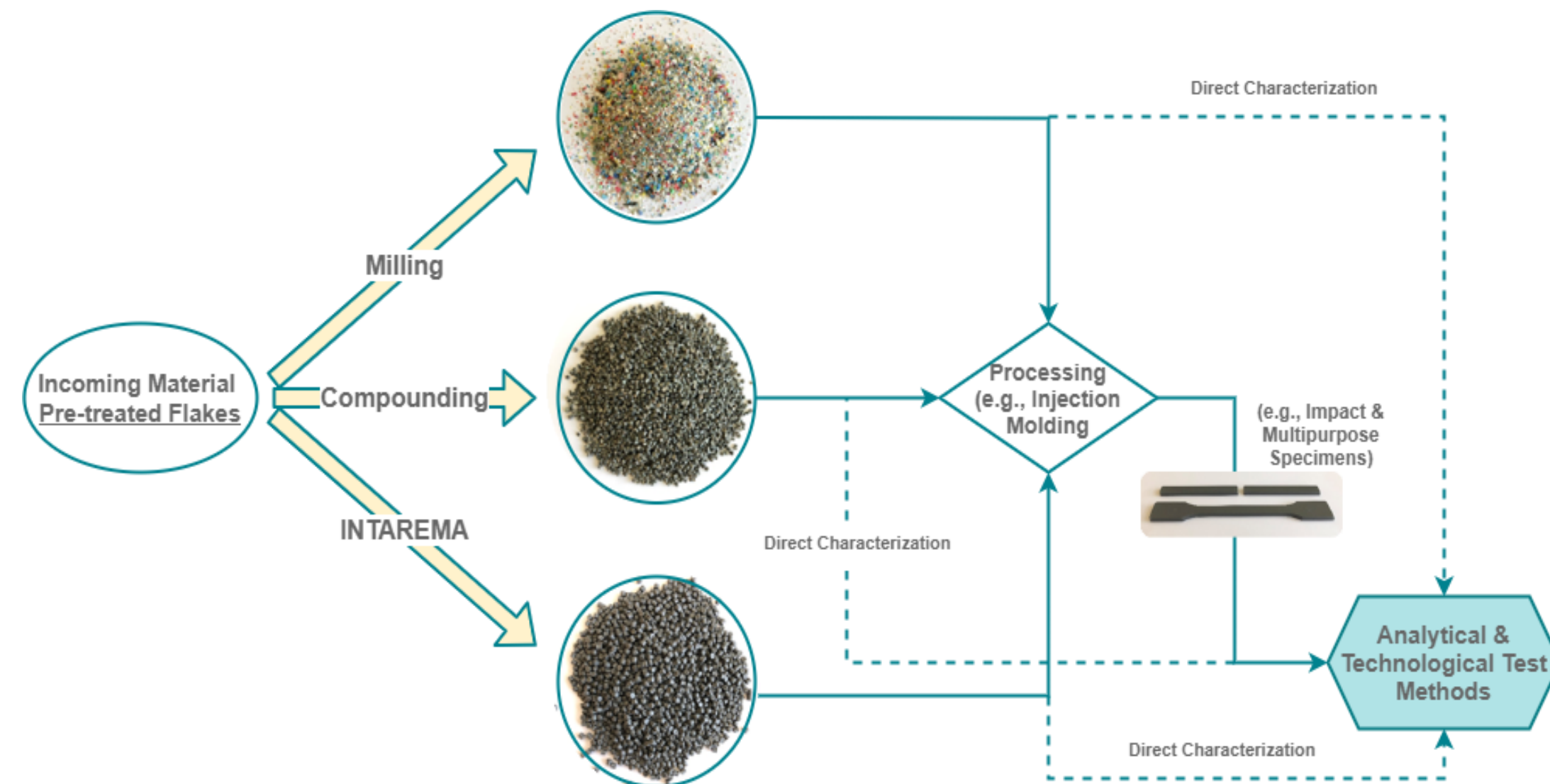
Plastic waste



Pre-treated waste

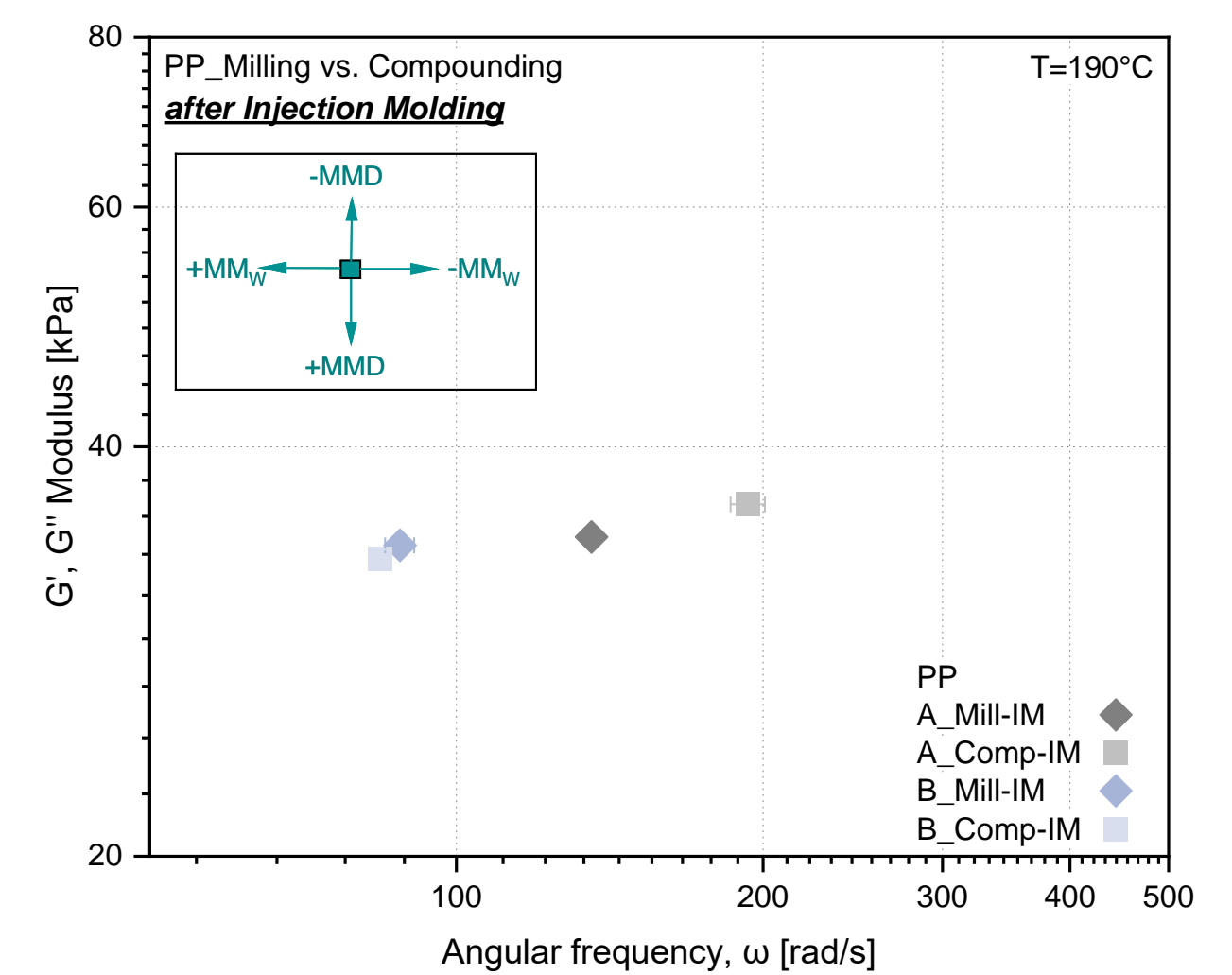
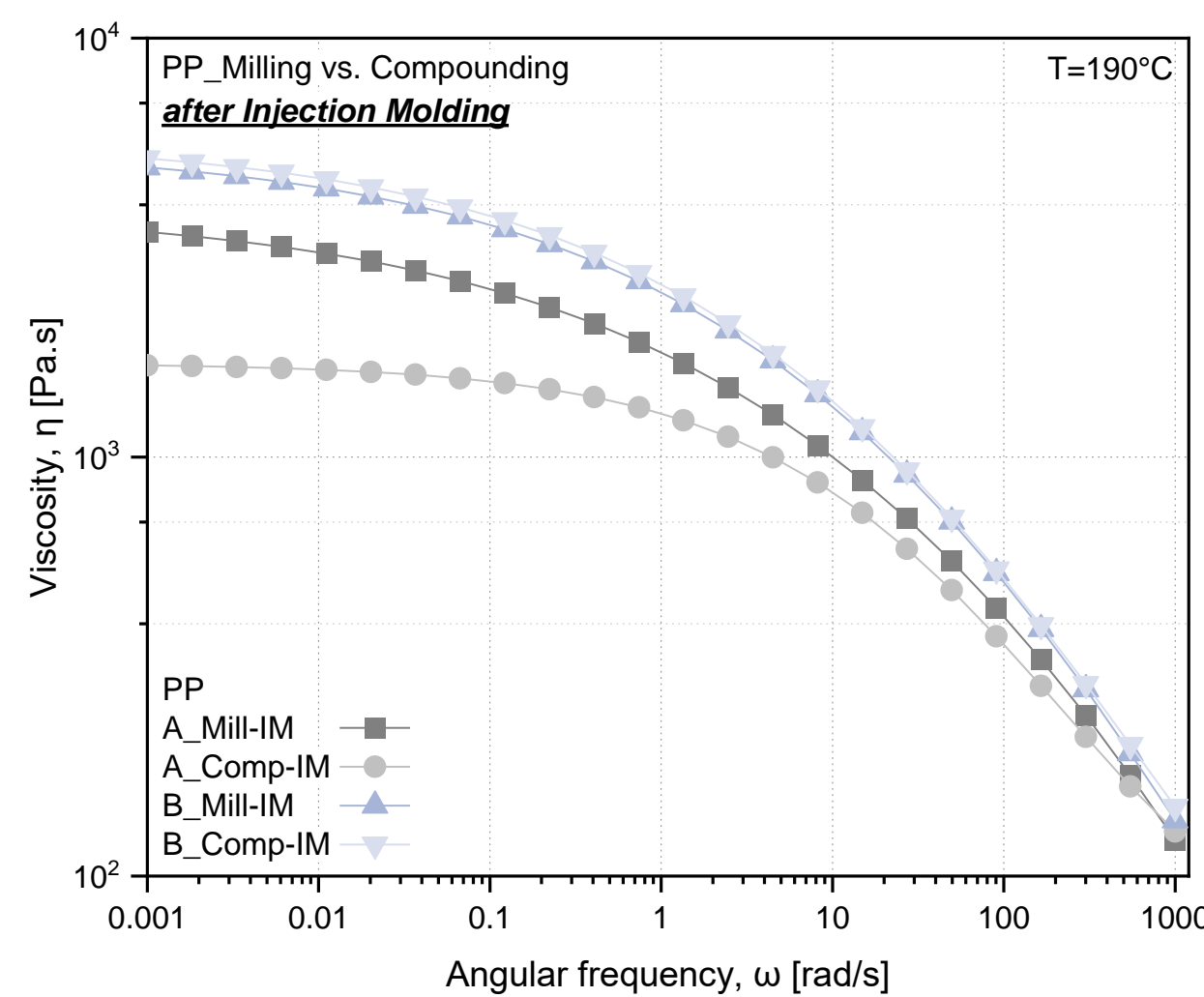
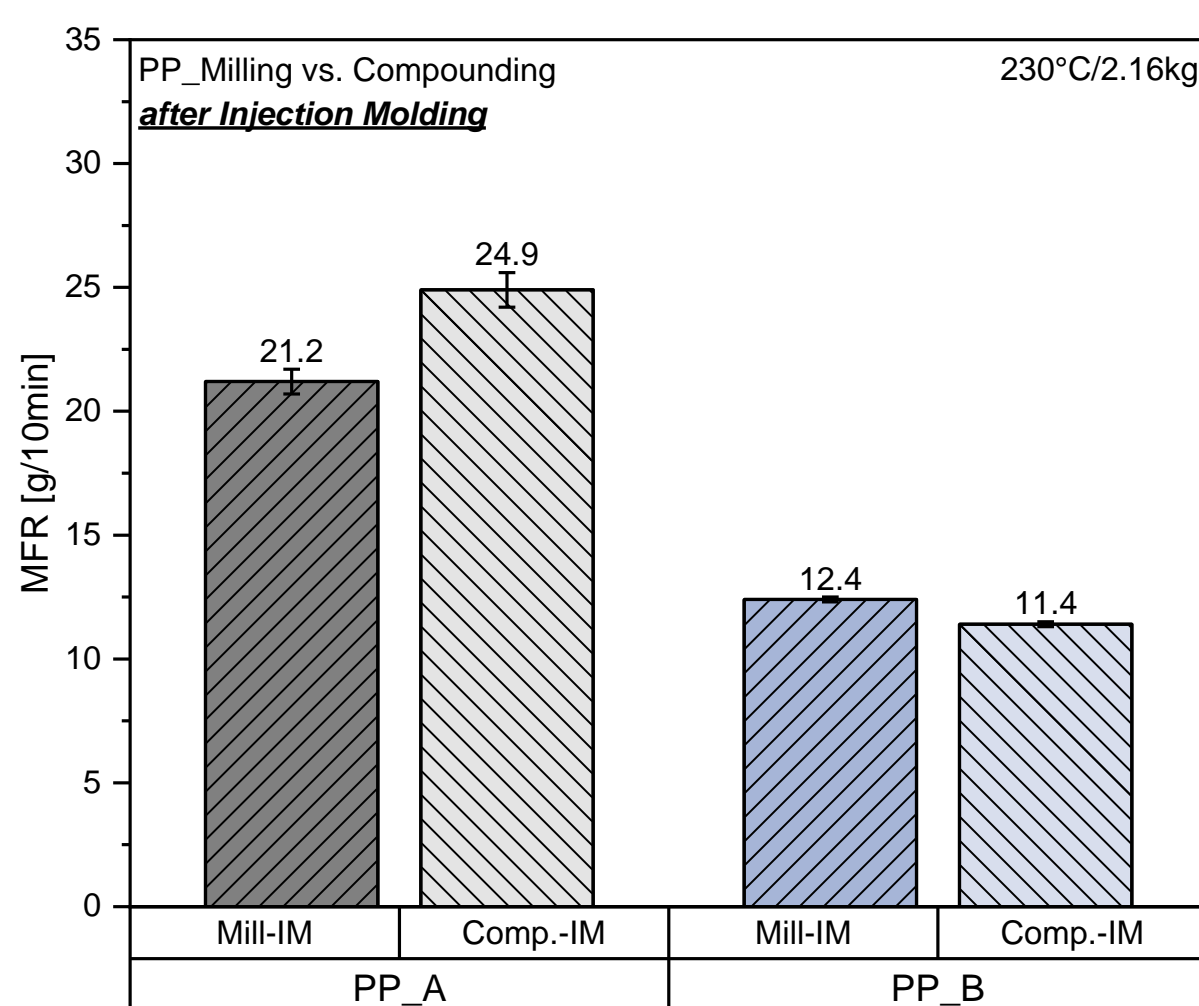
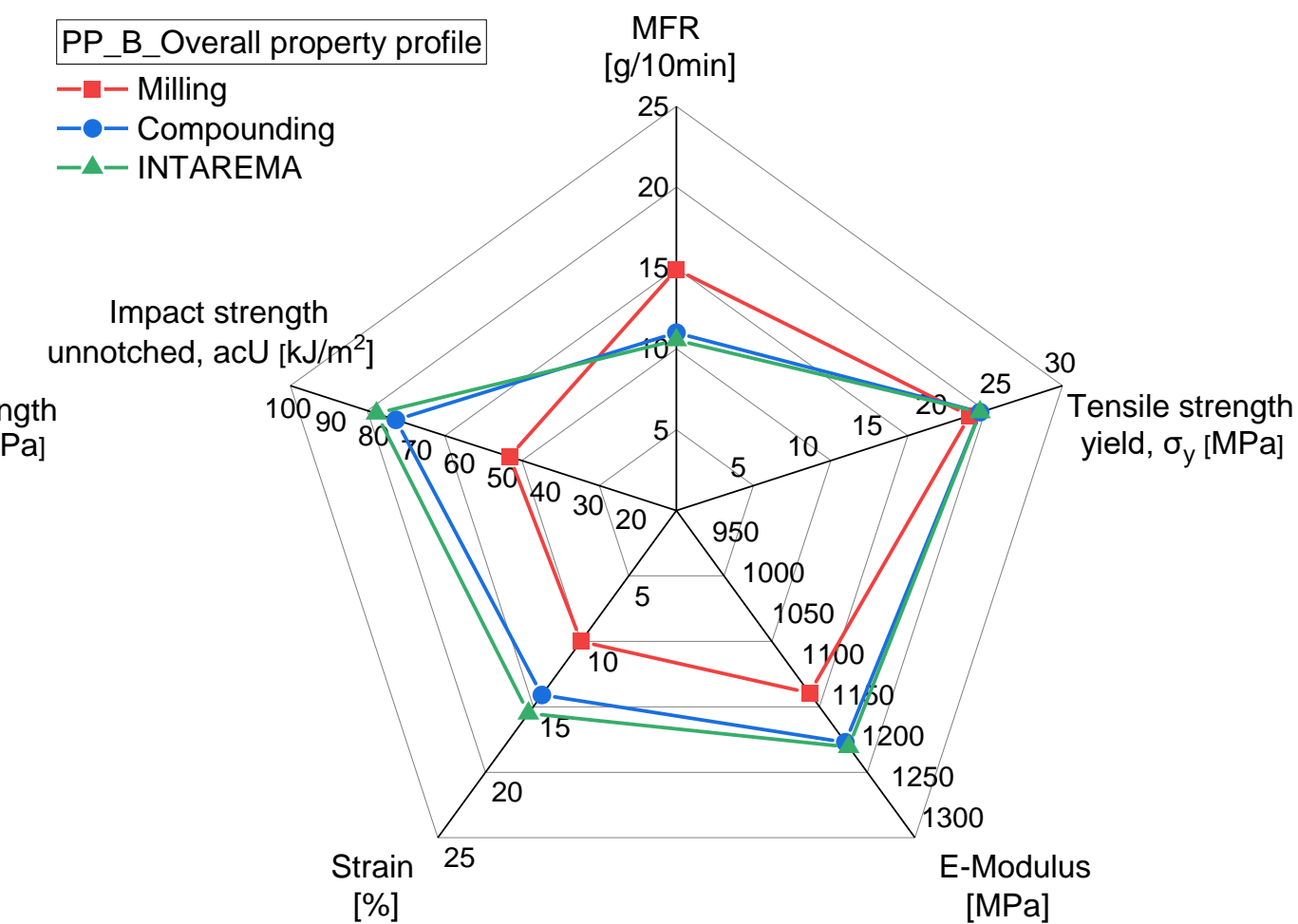
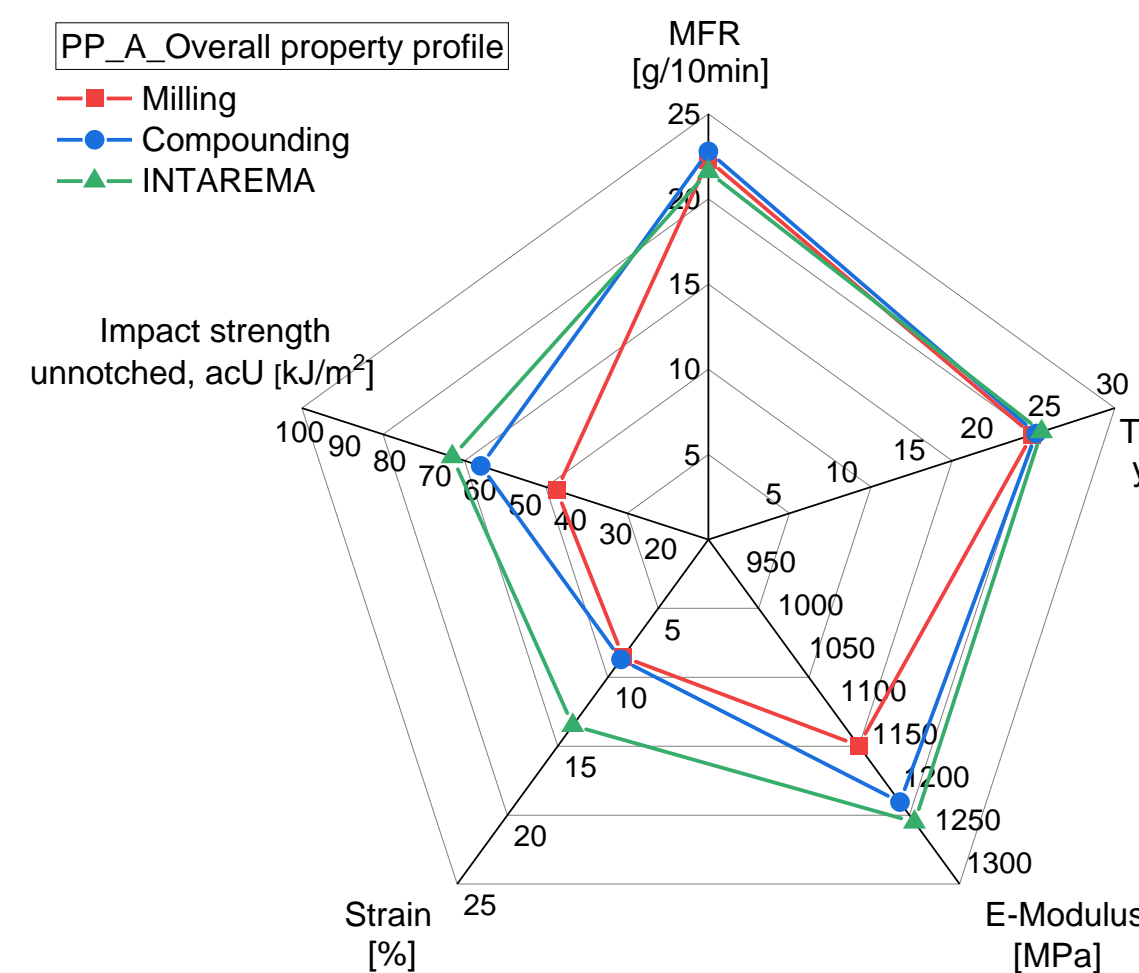
Experimental

Sample Preparation for Off-line Measurements



Results and Discussion

- Similar effects are observed in both zero-shear viscosity and the MFR measurements
- Higher MFR value reflects a lower mean molecular weight, hence material degradation
- Compounding has a higher impact on the rheology of the materials
- With the exception of strain at break, no significant difference between compounding and INTAREMA in terms of the technological material properties



Summary & Conclusions

- To evaluate the property profile of waste stream throughout the recycling process, both milling and compounding are useful, and necessary in some cases.
- **Milling** can be used to provide the **waste material properties** (e.g., data sheets of PO waste). Whereas **compounding** can be used to predict the **resulting recyclate material properties** on a lab scale (i.e., pilot compounder).

Acknowledgement: This work was performed within the Competence Center CHASE GmbH, funded by the Austrian Research and Promotion Agency (grant number 868615).