University of Zagreb Faculty of Chemical Engineering and Technology

GOAL

FKITMCMXIX





BIOBASED TPS/PHBV BLENDS FOR SUSTAINABLE FOOD PACKAGING

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EXPERIMENTAL

PART

Preparation of biodegradable polymeric material, based on PHBV and TPS using solution casting method and Brabender mixer

 Exploring the compatibility of TPS/PHBV blends

 Exploring the impact of TPS on thermal, mechanical and barrier properties on TPS/PHBV blends Plastification of corn starch (40 mas. % glycerol): Solution casting method-Thermoplastic starch (TPS)
TPS and PHBV (ENMAT Y 1000P) were blended together within a Brabender kneading chamber for 11 min at 175 °C, with rotor speed of 60 rpm
Blends were granulated in pellet form and moulded in hydraulic press at temperature of 178°C, under the

pressure of 25 kPa for 6 min, after 2 min of preheating

Measurements: Thermal properties: DSC and TGA analysis; Mechanical properties; Barrier properties

RESULTS





Figure 5. Mechanical propreties of the TPS/PHBV blends : a)Tensile strength b) Elongation at break c) Young's modulus

CONCLUSION

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• The solution casting method for starch plasticization results in a fully amorphous thermoplastic starch (TPS) structure.

Podrav

- DSC analysis shows that the incorporation of TPS into the blends increases the degree of crystallinity of PHBV, while TGA the addition of PHBV increases in the thermal stability of TPS in blends.
- The tensile results revealed a decrease in blends strength with higher TPS content, while concurrently observing an augmentation in elongation at break with increased TPS presence
- SEM images show partial miscibility between PHBV and TPS phases
- Water vapor permeability analysis shows improvement with the addition of PHBV to TPS.

