



**RHEOLOGY AND MORPHOLOGY OF EXTRUDED THERMOPLASTIC FLOUR/ PBAT BLENDS :
INFLUENCES AND INTERACTIONS OF SPECIFIC ENERGY, PLASTICIZER CONTENT AND
BOTANICAL ORIGIN.**

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Blends of thermoplastic starch (TPS) and synthetic polymers have been largely studied for mulch film or plastic bag applications. The morphology of these blends is a key point for the end-use properties of the films. Previous studies have shown the influence of plasticizer content or coupling agents on the morphologies of such blends. On the other hand, starch rheological behaviour is known to be energetic dependent.

In the present study, different kinds of flours were processed and blended with PBAT into a twin screw extruder, with the addition of a quantity of water and two levels of glycerol. The screw rotation speed was changed in order to vary systematically the specific mechanical energy (SME). After selective dissolution of PBAT and flour, the blend morphology was characterized. For low glycerol content, the morphology is globular and the reduction of the droplet size with the SME is observed. The flour type has an effect on the droplet size and its distribution. For higher glycerol contents, a transition from co-continuous to thin globular morphology is observed, with an intermediate morphology containing lamellas and fibrils. The transition does not take place at the same SME for the different kinds of flour. Droplet break up and coalescence can change with the flour type, due to their different rheological behaviour. This study shows the importance and the interactions of three parameters on flour/PBAT blends, which are the plasticizer content, the flour origin and the specific mechanical energy.