

# Preparation and properties of biodegradable composite materials based on polyvinyl alcohol and starch

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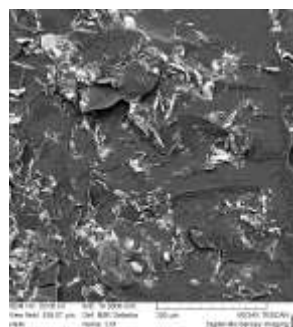
The development of biodegradable composite polymers is considered a solution for solid waste storage problems. Polyvinyl alcohol (PVA) is a biodegradable synthetic polymer, non-toxic, soluble in water. PVA exhibits excellent mechanical properties and is compatible with the starch. But PVA is high-cost material; hence a potential solution to decrease the cost of packaging and to enhance the hydrophobicity lies in preparing of composites with cheaper fillers, such as starch and cellulose with addition of hydrophobizing components.

In this presentation, the preparation methods and properties of PVA-starch and PVA-starch-wood flour completely biodegradable composites are presented. The preparation process of powder mixture is following: PVA powder, modified potato starch, plastificators and polydimethylsiloxane are mixing in blender at the temperature  $90\pm 5$  °C, mixing time 30 minutes, speeds of rotors 300 rpm. The melting of blends and band preparation was performed using a Haake Rheocord 90 extruder in the following conditions: temperature of 170 – 180 °C, band thickness of 0.5 mm (Fig. *a*).

For composite properties modification the corn starch and wood flour (Fig. *b*) were introduced into initial mixture. The results show that the addition of starch and wood flour into blends leads to decrease both tensile strength and elongation at break of so prepared composition.



*a*



*b*

**Fig.** Composite band PVA-starch-wood flour (*a*); SEM-picture of this band structure (*b*)