

# P16. THE EFFECT OF GAMMA-RADIATION ON BIODEGRADABILITY OF SYNTHETIC PHB STRUCTURAL FOAMS PP/HMSPP BASED

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This research was carried out to evaluate how gamma-radiation affected PP/HMSPP structural foams filled with biodegradable synthetic polyester PHB, in terms of thermal properties, biodegradability and infrared spectrum. Polymers are used in various applications and in different industrial areas providing enormous quantities of wastes in environment, contributing with 20 to 30% of total volume of solid residues. Besides, shortage of plastics resins obtained from oil and natural gas is addressing research and development toward alternative materials; environmental concerning in litter reduction is being directed to renewable polymers for manufacturing of polymeric foams. Biodegradable polymers, a new generation of polymers produced from various natural resources, environmentally safe and friendly, can contribute for pollution reduction. Poly[(R)-3-hydroxybutyrate] (PHB), one of the typical natural bio-polyesters produced by many microorganisms as an intracellular carbon and energy storage material was chosen to be blended with PP/HMSPP and further inducing biodegradation. High density structural foams are specially used in civil construction, in replacement of metals, woods and concrete, but contribute for environmental pollution, due to components nature; the incorporation of PHB in PP/HMSPP polymeric matrix was studied, after gamma radiation applied within zero, 50, 100, 150, 200 and 500 kGy doses. Soil burial test pointed toward a partial biodegradation of irradiated PHB-PP/HMSPP foams. Thermal analyses involving TG/DTG techniques were accomplished to study behavior changes. Infrared spectrum of foams using FTIR detected resulting bands after 12 months soil burial foams previously irradiated.

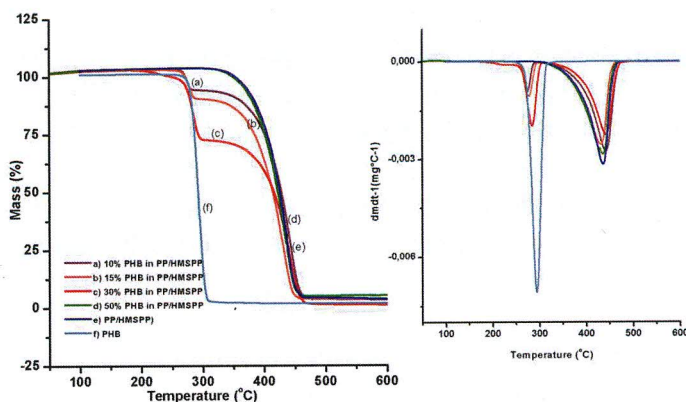


Fig. 1: Thermal behavior of PP/HMSPP – PHB composites, prior to gamma-radiation.

## References

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