

**SESSION 7: OTHERS, SALON F**

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## **Polyethylene-based bio-plastics could be the optimal solution for plastic wastes**

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### **ABSTRACT**

The principle of the sustainability says that for the complete sustainability problem to be solved, all the three pillars of sustainability, i.e., social, economical, and environmental sustainability must be sustainable. Of the three pillars, the most important is environmental sustainability. If this is not solved, then no matter how hard we try, the other pillars cannot be made strong. One of the reasons for this is that they are depended on their environment. Plastics play an important role for many “short live” applications such as packaging disposable gloves, garbage bags etc and these represent the major part of plastic waste. Because of their persistence in our environment, improperly disposed plastic materials are significant source of environmental pollution, potentially harming life. Among the synthetic plastics, one of the most problematic plastic in this regard is polyethylene. Reduce, reuse and replace are the three probable solutions to plastic wastes. Biodegradable plastic opened the way for new consideration of waste management strategies. The primary mechanism for the biodegradation of high molecular weight LDPE is the oxidation or hydrolysis by enzymes to create functional groups that improves its hydrophilic level and/or reducing its polymer chain length by oxidation to be accessible for microbial degradation. In this regard, in the present study, biocompatible, nonhazardous plasticizer Polyethylene Glycol is used as an additive for the modification of properties of LDPE, added in different weight percent. The thin film samples of LDPE + PEG were prepared by solvent casting method. Compostable soil burial technique is used for degradation of the samples for 90, 120 and 180 days. The physicochemical, optical, and mechanical properties were characterized by X-RD, SEM, FTIR, UV tensile strength and weight loss measurement respectively before and after weathering the sample. For 7 wt. percent PEG added LDPE bioplastic, the results we found are excellent and explained in detail.