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**Active packaging : Incorporation of polyphenols in polyhydroxyalkanoate (PHA) : Thermal stabilization and antioxidant properties**

Chloë Bonnenfant¹, Nathalie Gontard¹, Chahinez Aouf¹
¹UMR IATE, INRAe Supagro, 2 place Pierre Viala 34000 Montpellier, France
chloe.bonnenfant@supagro.fr

**Introduction**

Pollution of environment by plastic is a worldwide issue. Today, packaging is mainly produced from conventional petroleum-based plastics especially in food industry. Plastic is everywhere, that is why ongoing research are attempting to develop biobased and biodegradable polymers. Polyhydroxyalkanoates (PHA) seem to be good candidates. The aim of this study is to enhance their thermal properties and confer antioxidant properties to PHA by adding polyphenols.

**Polyhydroxyalkanoate (PHA)**

- Polymer under study: Poly(3-hydroxybutyrate-co-hydroxyvalerate) = PHBV
- Biobased polymer produced by bacterial fermentation
- Biodegradable [¹]
- Processability window very tight (175°C < Tprocess < 210°C)

**Polypehols**

- Family of organic molecules mainly coming from plants
- (+)-Catechin

**Interesting properties:**

- Antioxidant properties
- Improvement of thermal stability of materials

**Properties expected:**

- Better thermal stability ➔ Possibility to consider mechanical recycling
- ➔ Wider processability window
- Antioxidant effect in contact with food

**Underlying issues:**

- Effect of the polyphenols on the biodegradability of the polymers
- Ability to food contact ?

**References**


**Conclusion:** We expect that this PhD research will lead to a new formulation of PHA derivatives with enhanced thermal stability. Polyphenols could be the answer to these issues and furthermore, they, could confer interesting properties as antioxidant ones to polymers dedicated for food industry’s application.