

ReplacePlas BPA-30 Bioplastics Modifier As A PBAT Toughener In Flexible Bag

BPA-30 Modifier is an elastomeric copolymer impact modifier developed to enhance the tensile strength, processability, compatibility, metal release and impact strength of bioplastic resins. Application fields include bioplastic straw, lunch box, packaging film and sheet, as well as industrial and consumer products.

Here is an application example. PBAT (polybutylene adipate co-terephthalate), is a polyester-based bioplastic commonly used to manufacture flexible packaging films. PBAT-based films have high flexibility but relatively low strength compared to other bioplastics. With the incorporation of 5% of BPA-30 Modifier (EXPERIMENT B) into a PBAT compound, it provides a cost-effective solution for the PBAT bag that can withstand a load of 5kg beyond 6 hours.

EXPERIMENT A: PBAT with PLA as toughener

A polymer compound consisting of 80% PBAT as the main polymer, 10% talc as filler, and 10% PLA as toughener was extruded into film and made into a bag of size 25cm width and 32cm length. 2 holder holes on each side of the bag (front and back) were punched to hook on cable ties. The Punched Holes were used to observe the stretch when the bag was loaded. As most supermarket grocery bags can hold up to 5kg, this experiment was conducted with a load of 5kg. Once the bag was hung, the bag holder holes torn and gave way immediately because of poor tensile strength.



**Diagram 1:
Original PBAT/Talc/PLA Bag**
-Size: 25cm X 32cm
-Holes from top: 5cm
-Distance between holes: 10cm
-Hole diameter:0.6cm

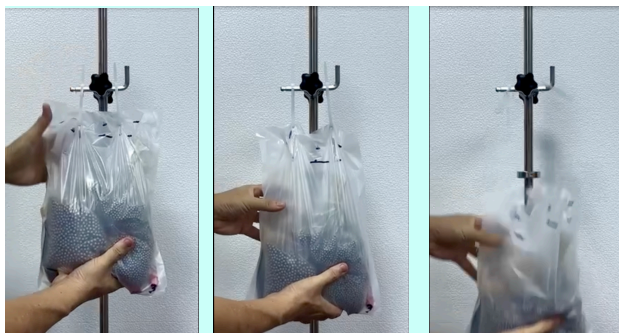


Diagram 2: PBAT/Talc/PLA Bag Load 5kg
The holes of PBAT/Talc/PLA bag elongated and broke once the bag was hung and hands were released.



Diagram 3:
Torn bag holder holes of the PBAT/Talc/PLA Bag.

EXPERIMENT B: PBAT with ReplacePlas BPA-30 Modifier as toughener

A polymer compound consisting of 85% PBAT as the main polymer, 10% talc as filler, and 5% BPA-30 Modifier as toughener was formed into a bag per Experiment A. As most supermarket grocery bags can hold up to 5kg, this experiment was conducted with a load of 5kg. This experiment demonstrated that the PBAT compound incorporated with 5% of BPA-30 Modifier can withstand a 5kg load beyond 6 hours because BPA-30 Modifier was able to increase the bag's tensile strength by 25% without effect to other mechanical or physical properties.



**Diagram 4:
Original PBAT/Talc/BPA-30 Bag**
-Size: 25cm X 32cm
-Holes from top: 5cm
-Distance between holes: 10cm
-Hole diameter:0.6cm

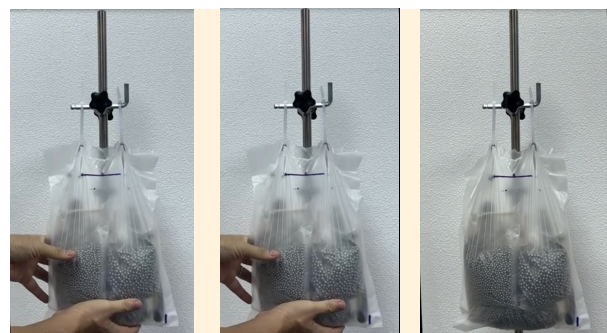


Diagram 5: PBAT/Talc/BPA-30 5kg
The holes of PBAT/Talc/BPA-30 bag though elongated but held on without breaking for 6 hours.

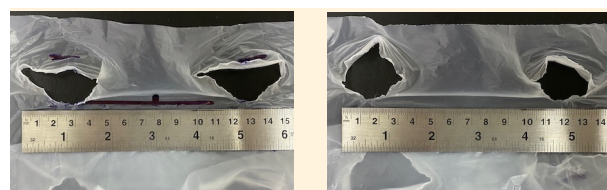


Diagram 6:
The left and right photos above show the 4 bag holder holes of the PBAT/Talc/BPA-30 Bag being elongated but were held intact.