

## Food Contact Assessment of PLA/NR/ TPS Ternary Blend Films for Food Packaging Applications

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Bio-based and biodegradable plastics have gained attention as sustainable alternatives to petroleum-based food packages. In the past, tough biobased and biodegradable packaging films produced by the blends of polylactic acid (PLA) and natural rubber (NR) have been reported [1] and the migration levels of all films were found to meet the EU standard for all food simulants under both short-term and long-term food contact conditions at 40°C [2]. Recently, ternary blends of polylactic acid (PLA), natural rubber (NR), and thermoplastic starch (TPS) has been proposed to reduce stickiness of PLA/NR films at high NR loading and to expedite biodegradation of the films under composting condition [3]. The addition of TPS raised a question of food-contact migration due to high hydrophilicity of TPS. In this work, the migration behavior of PLA/NR/TPS ternary blend films is assessed, focusing on the effect of TPS content and peroxide modification.

The TPS content was investigated at 10%wt (PNT10) and 30%wt (PNT30), while the effect of peroxide modification was investigated in PNT10 at 0 and 0.5%wt. Migration tests were conducted over time using 10% ethanol, 95% ethanol, and 3% acetic acid as food simulants for aqueous food, fatty food, and acidic food, respectively. The presentation will cover the effect of TPS content and peroxide modification on overall migration and the specific migration of TPS into food simulants over the periods outlined by OM0 and OM2 in Commission Regulation (EU) No 10/2011 standard for plastic materials and articles intended to come into contact with food.

Overall, this study highlights the critical role in controlling food-contact migration. These findings provide important insights for the development of sustainable food-contact packaging materials.

### References:

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### Research Keywords

Thermoplastic starch (TPS), Polylactic acid (PLA), Natural rubber (NR), Migration study, Food contact materials