**Highlights**

**Evaluating Weathering of Food Packaging Polyethylene-Nano-clay Composites: Release of Nanoparticles and their Impacts**

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1. UV or O3 degradation food packaging composites released nanoclay particles.
2. Properties of nanocomposites changed during accelerated weathering.
3. Nanoclay release was proportional to weathering time.
4. Toxicity of released nanoclay at test concentrations were not significant.