

CASE STUDY

Different package, different microplastics?

Testing how milk packaging format changes microplastic fingerprints

Key Takeaway

Similar particle counts, different composition—packaging format shapes polymer profile more than magnitude.

The Question

Milk packaging comes in many forms, and each has different plastic contact surfaces—liners, caps, bottle walls. This study isolates the baseline contribution of the packaging itself, independent of handling, by testing only the first pour.

The Impact

A paperboard carton and an HDPE plastic jug, same product, same first pour—but two very different microplastic fingerprints. Our results found that the packaging format shapes polymer profile more than magnitude.

The Study

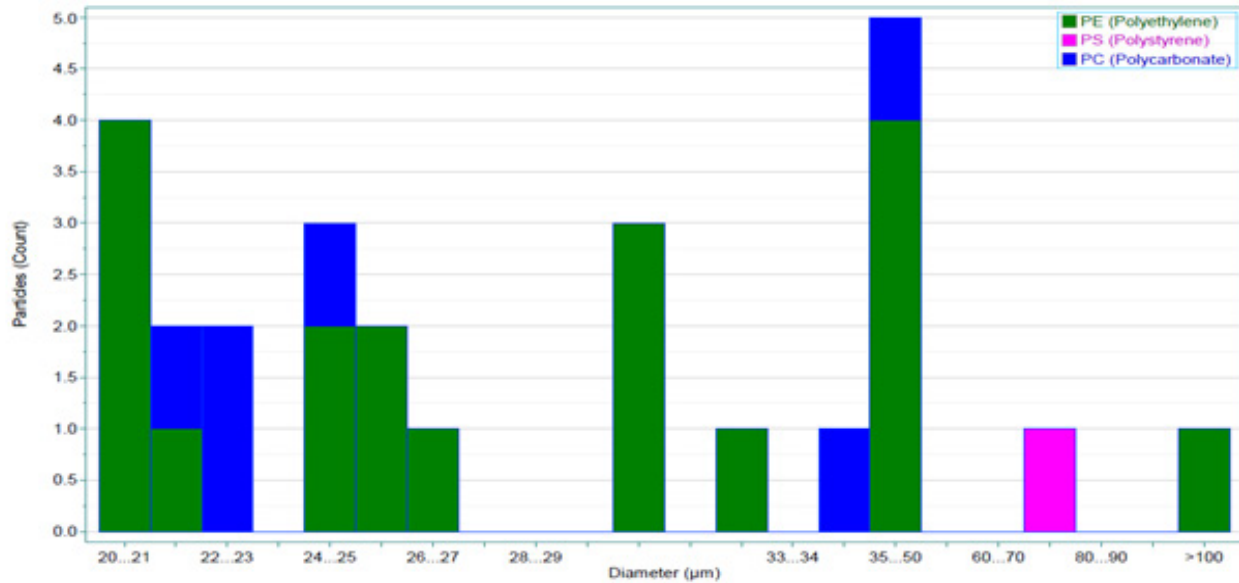
- First pour filtered by stacked sieving through a 500 μm sieve onto a 20 μm sieve.
- Particles retained on the 20 μm sieve were subjected to oxidative digestion and then filtered onto the final filter/substrate for Raman analysis.

The Results

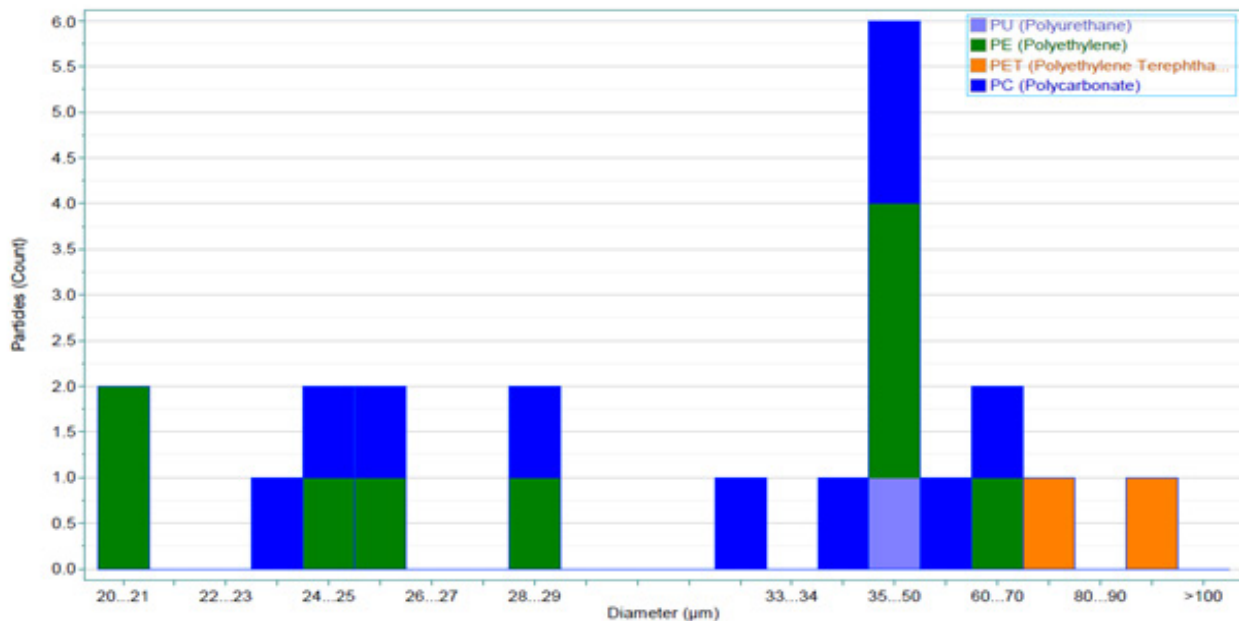
HDPE jug particle count	22 mixed profile, PC slightly exceeding PE, plus minor PET and one PU particle.
Carton particle count	26 PE-dominant, consistent with its PE liner
HDPE jug mean particle size	~40 μm
Carton mean particle size	~33 μm
Dominant polymers	PC-leaning mix (jug) • PE (carton)

Charts on following page

HDPE Jug



Carton Box



NOTE | First-pour, single-run design per format intended to isolate baseline packaging contribution, not to simulate a product's full handling life.