

Sorting of bioplastics

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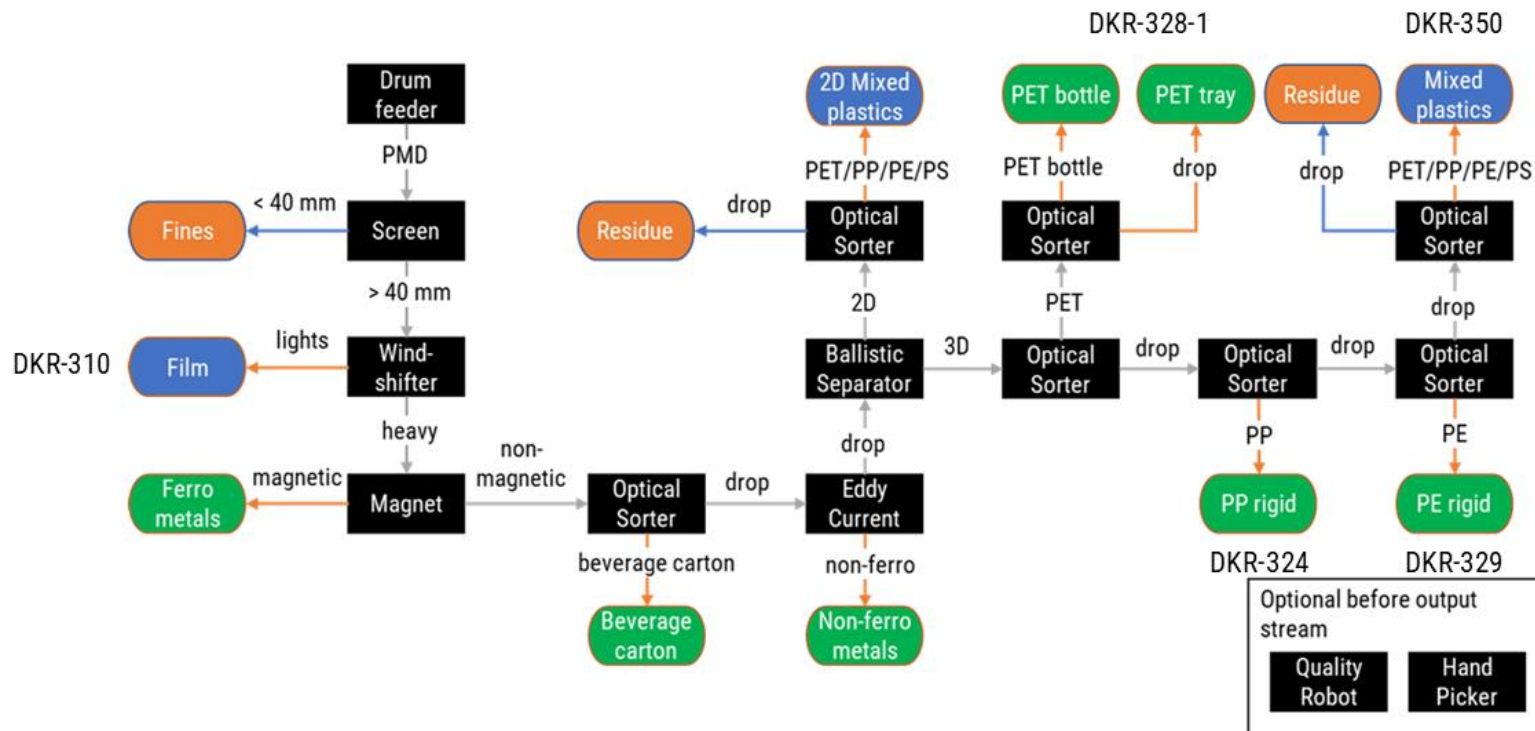


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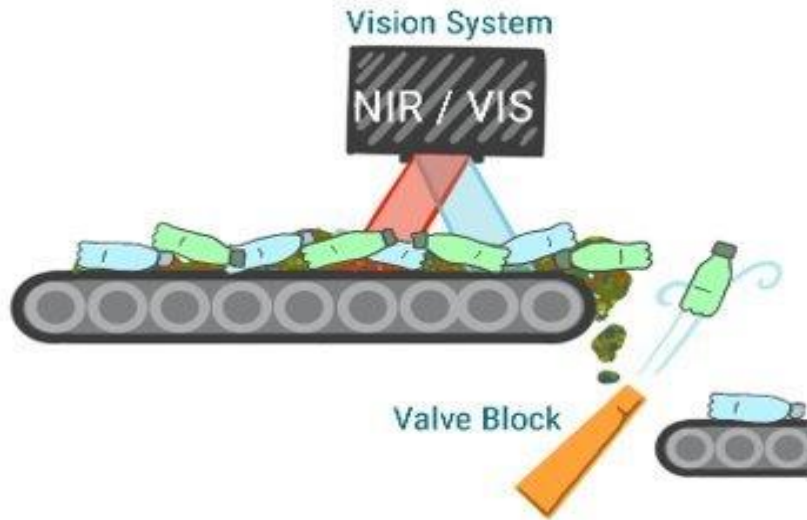
Why sort bioplastics?



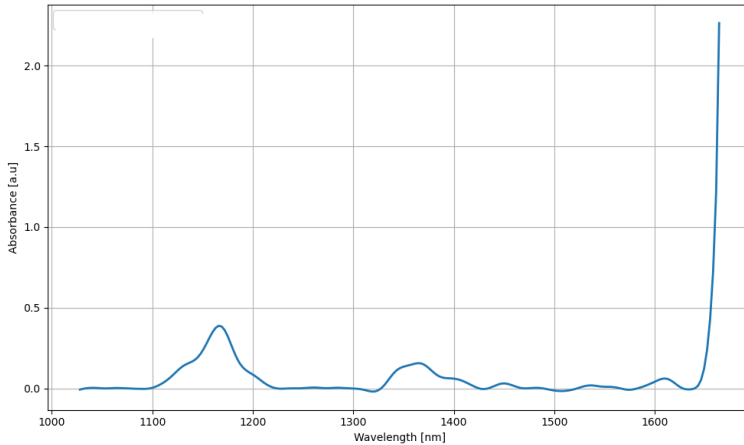
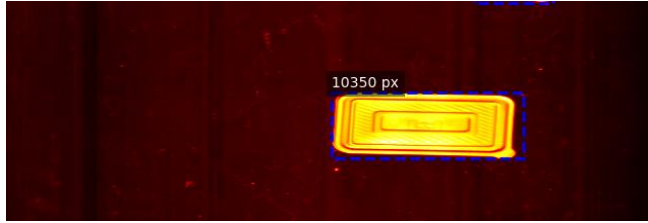
Green = high value
 Blue = needs further sorting
 Orange = incinerated

Not identified → not sorted → residue → incineration

NIR optical sorter



How does the NIR sorter work?



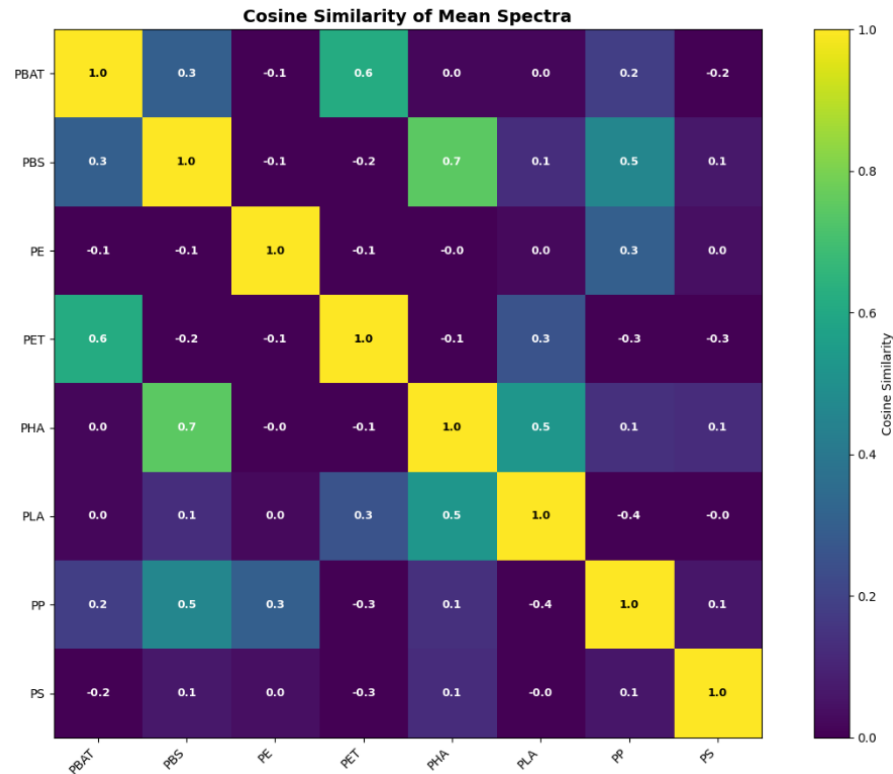
Material	Fit
PE	0.12
PP	0.36
PET	0.43
PVC	0.21
PLA	0.98



Sorting
decision

Spectral similarity of bioplastics

- Can bioplastics be separated from each other & other plastics?
- > 0.7 – to some extent similar
- > 0.95 – Strongly suggests two plastics are indistinguishable
- Bioplastics can be separated from each other & other plastics



Scanning trial with Dutch waste

- Around 600 kg of mixed film and 800 kg of sorting residue stream processed
- **0.44%** (area) bioplastics in sorting residue
- **0.12%** (area) bioplastics in mixed film



Sorting trial with bioplastic spiked streams

Input

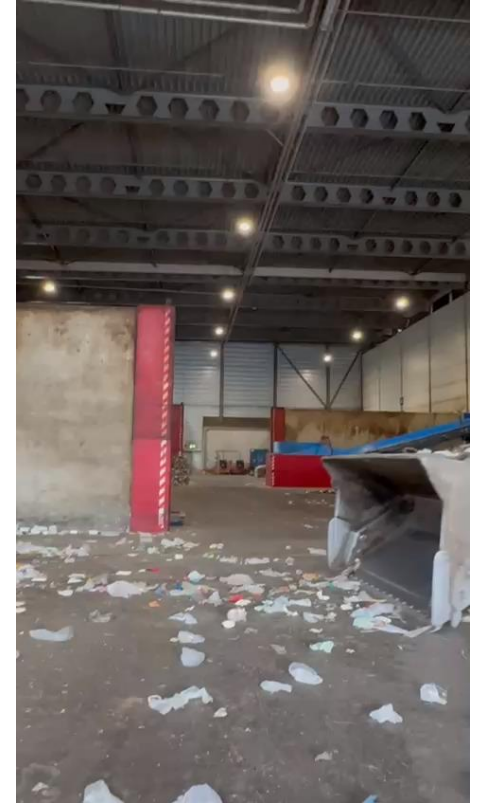


1. PLA cups, trays + lids
2. Biopolyester seedling pods
3. Biopolyester film



Sorting trial with bioplastic spiked streams

- Mixing and compression of bioplastics with 3.6 ton of LWP
- Share of bioplastic artificially increased to 10%



Sorting trial with bioplastic spiked streams

Results

- Successful demonstration of sorting of rigid and flexible bioplastic materials
- Around 93% purity and 75% yield for PLA rigid stream
- > 90% yield with purity around 80% for biopolyester rigid stream
- 45% yield at around 75% purity using a single optical sorting step for biopolyester film fraction



Conclusions & Next steps

- Conventional plastics do not interfere with the detection of bioplastics
- Most bioplastics have distinct NIR spectra that makes it possible to separate them from each other
- Bioplastics both in rigid and flexible form, can be sorted out from real waste, which is demonstrated at an industrial scale with trials at NTCP
- In the upcoming period, focus on pretreatment of bioplastics to prepare for further recycling



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Thank you.

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