Materials for poop bags and their environmental impacts

Comparison of PE-based, bio-based, and cellulose-based material types

PE virgin granulate

Components: 100% petroleum-based polyethylene

Certificates: -

Degradability: Not biodegradable

Disposal: 🔥 Residual waste (always!)

Advantages: Robust; lightweight; good combustion properties of PE

Disadvantages: Fossil-based; high energy consumption and carbon footprint during production; microplastic formation upon environmental release; very long environmental persistence

Conclusion: Not recommended – conventional & fossil-based

Oxo-degradable plastic

Components: 97-98% polyethylene, 2-3% oxo additives (e.g. metal salts)

Certificates: -

Degradability: Not biodegradable, fragmentation into microplastics

Disposal: 🔥 Residual waste (always!)

Advantages: -

Disadvantages: No biodegradation; microplastic formation upon environmental release; high energy consumption and carbon footprint during production (see disadvantages of PE); **banned from sale in the EU** since 3 July 2021 (Directive EU 2019/904, Art. 5)

Conclusion: Banned & not recommended – ecological risks

PE + Thermoplastic starch

Components: Mixture of fossil-based PE and bio-based starch

Certificates: -

Degradability: Not biodegradable, fragmentation into microplastics

Disposal: 🔥 Residual waste (always!)

Advantages: Partially bio-based

Disadvantages: No biological degradation; microplastic formation upon environmental release; misleading description as 'biodegradable' by some suppliers

Conclusion: Not recommended – ecological risks

PIR (post-industrial recyclate)

Components: Recycled polyethylene from production waste from plastics

Certificates: -

Degradability: Not biodegradable

Disposal: 🔥 Residual waste (always!)

Advantages: Significantly lower CO_2 emissions during production than PE virgin granulate; reduces the consumption of new raw materials; robust; lightweight; good combustion properties of PE

Disadvantages: Microplastic formation upon environmental release; possibly slight inhomogeneities in film colour, appearance and feel

Conclusion: Recommended – resource-efficient

PCR (post-consumer recyclate)

Components: Recycled polyethylene from end-consumer waste, e.g. plastic packaging from household recycling collections

Certificates: e.g. Blue Angel (for ≥ 80% PCR content)

Degradability: Not biodegradable

Disposal: 🔥 Residual waste (always!)

Advantages: Significantly lower CO_2 emissions during production than virgin PE granulate; reduces waste & the consumption of new raw materials; promotes circular economy; good combustion properties of PE

Disadvantages: Microplastic formation upon environmental release; possibly slight inhomogeneities in film colour, appearance and feel

Conclusion: Recommended – PE material with the lowest environmental impact in our comparison

Bio PE

Components: Bio-based PE made from up to 100% renewable raw materials (e.g. sugar cane), chemically identical to conventional PE

Certificates: e.g. OK biobased (TÜV Austria)

Degradability: Not biodegradable, same material properties as PE

Disposal: 🔥 Residual waste (always!)

Advantages: Lower fossil content due to plant-based components

Disadvantages: No degradation possible; high energy consumption during production; land use

Conclusion: Limited – bio-based, but not biodegradable

Polyvinyl alcohol (PVA)

Components: Polyvinyl alcohol (high proportion, usually ≥ 80%), mostly fossil-based

Certificates: -

Degradability: Degradation possible as it is water-soluble, but not weather-resistant

Disposal: 🔥 Residual waste (always!)

Advantages: Water-soluble; biodegradation possible

Disadvantages: Not weather-resistant; dissolves in moisture

Conclusion: Limited – degradable, but not practical

OK compost INDUSTRIAL

Components: Typically renewable raw materials (e.g. corn starch) and biodegradable copolymers (e.g. PBAT)

Certificates: OK compost INDUSTRIAL (TÜV Austria), acc. to EN 13432

Degradability: Only biodegradable in industrial composting facilities; must be converted to at least 90% CO_2 at 58-60 °C within 6 months

Disposal: 🔥 Residual waste (always!)

Advantages: Lower fossil content due to plant-based components; tested for ecotoxicity

Disadvantages: Filled dog waste bags do not end up in composting facilities; no degradation tested at low temperatures

Conclusion: Limited – only degradable at high temperatures

OK compost HOME

Components: Typically renewable raw materials (e.g. corn starch) and biodegradable copolymers (e.g. PBAT)

Certificates: OK compost HOME (TÜV Austria)

Degradability: Biodegradable at low temperatures (tested at 20-30 °C, must be converted to at least 90% CO_2 within 12 months, home composting conditions)

Disposal: 🔥 Residual waste (always!)

Advantages: Degradation and decomposition tested at 20-30 °C; lower fossil content due to plant-based components; tested for ecotoxicity

Disadvantages: More expensive than PE-based materials

Conclusion: Recommended – practically biodegradable

OK biodegradable SOIL

Components: Typically renewable raw materials (e.g. corn starch) and biodegradable copolymers (e.g. PBAT)

Certificates: OK biodegradable SOIL (TÜV Austria)

Degradability: Biodegradable in soil at low temperatures (tested at 20-25 °C, degradation to at least 90% in 2 years)

Disposal: 🔥 Residual waste (always!)

Advantages: Degradation in soil tested (dog waste bags often end up in bushes); lower fossil content due to plant-based components; tested for ecotoxicity

Disadvantages: More expensive than PE-based materials

Conclusion: Recommended – practically biodegradable

Paper / cardboard

Components: Cellulose fibres (fresh fibres or recycled material), possibly starch or glue additives

Certificates: e.g. FSC®, PEFC

Degradability: Naturally degradable, but possibly slow, depending on material thickness and coating

Disposal: 🔥 Residual waste (always!)

Advantages: Plant-based; biodegradable; recycled material can be used

Disadvantages: Low tear resistance; sensitive to moisture; disproportionately high material and transport costs; up to 10 times heavier than plastic bags; unwieldy

Conclusion: Limited – wood-based, high material consumption

Our recommendation

OK compost HOME & OK biodegradable SOIL:
Regarding the problem of littering, dog waste bags can fulfil an important 'airbag function' if they are biodegradable at low temperatures and at a significant rate.

Post-consumer recycled material (PE):
Lowest climate impact, provided the bags are always disposed of correctly (in residual waste) and as long as fossil raw materials are used for energy production. The higher the proportion of PCR, the better it is.

Important evaluation criteria for dog waste bags:
Biodegradability at low temperatures; resource consumption; origin of raw materials; location, energy source and working conditions of production; use of additives, printing inks and packaging materials; actual disposal behaviour and benefits of thermal recycling; suitability for mass production, quality and price; material certification; transparency and credibility of environmental communication.

Sources: Ellen MacArthur Foundation (2019); European Parliament (2019); Fraunhofer UMSICHT (2019); CONVERSIO (2022); Endres & Siebert-Raths (2009); TÜV Austria (2025); RAL gGmbH (2025); PETBOOK.de (2023); ZZF (2024); The Sustainable People GmbH (2015–2026)

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