THE WOOLMARK COMPANY

WOOL IS BIODEGRADABLE

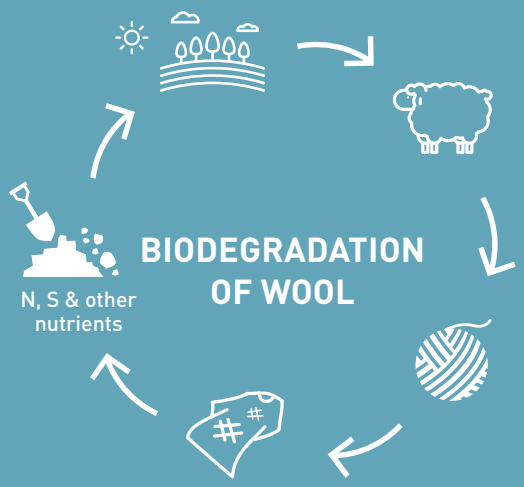
Wool is a natural and renewable resource. Sheep grow wool naturally and continuously – it is part of their biological anatomy. When 100% Merino wool fabrics are disposed of, they will naturally decompose in soil in a matter of months or years, slowly releasing valuable nutrients back into the earth. Synthetic fibres, on the other hand, can be extremely slow to degrade and significantly contribute to the world's overflowing landfills.

Wool fibres also biodegrade in a marine environment and do not contribute to microplastic pollution. In contrast, microplastics from synthetic textiles accumulate in marine environments, as well as terrestrial environments, where they damage ecosystems.

WHAT IS THE DIFFERENCE BETWEEN MICROFIBRES AND MICROPLASTICS?

Microfibres: Minuscule fibres that have a linear density of less than 1 decitex. All fibres shed microfibres but depending on the materials they are made of, some microfibres biodegrade whilst others do not. Microfibres shed from natural fibres such as wool will biodegrade whereas microfibres from synthetic fibres will not biodegrade.

Microplastics: Microfibres made from synthetic materials such as acrylic, polypropylene, polyester and polyamide that have a diameter less than 5mm (0.2 inches). Microplastics are not biodegradable and result from the disposal and breakdown of consumer products and industrial waste.



HOW DOES WOOL BIODEGRADE?

All materials of animal and vegetable origin have some degree of biodegradability, meaning that they are capable of being decomposed by the action of living organisms, such as fungi and bacteria.

Wool is composed of the natural protein keratin, which is similar to the protein that makes up human hair. When keratin is broken down naturally by microorganisms, the products do not pose any environmental hazard.

WOOL BIODEGRADES QUICKLY

100% Merino wool fabrics can biodegrade by 95% after 15 weeks of burial in soil, but the rate varies with soil, climate and wool characteristics. This releases essential elements such as nitrogen, and sulphur back to the soil, able to be taken up by growing plants. Some studies found more rapid degradation after only four weeks' burial in soils. When wool fabrics biodegrade they also release carbon back into the soil as part of the natural carbon cycle.

Research has shown that processing treatments such as dyeing and anti-shrink treatment can affect the rate of biodegradation in soil. Dyeing may cause an increase in the initial resistance of wool fabric to degradation, but this is typically a short term effect not persisting beyond eight weeks. On the other hand, recent research has shown that the Chlorine-Hercosett anti-shrink treatment applied to wool (which enables wool garments to be machine-washable) can accelerate biodegradation. It does this by removing some of the fibre's cuticle (its armour plating) rendering it more susceptible to microbial degradation.

WOOL READILY BIODEGRADES IN MOIST, WARM CONDITIONS

On disposal, if wool is kept warm and moist or buried in soil, fungal and bacterial growths develop which produce enzymes that digest wool.

On the other hand, thanks to the unique chemical structure of keratin and wool's tough, water-repellent outer membrane, clean and dry wool fibres do not readily degrade. This allows wool products to be resilient and long-lasting in normal conditions.

WOOL RETURNS ESSENTIAL NUTRIENTS TO THE SOIL

On burial in soil, wool becomes a slow-release fertiliser providing nutrients for uptake and growth by other organisms. Some have even used wool fertiliser to foster herb and vegetable growth. This is known as natural closed-loop recycling, restoring the initial inputs of soil and grass. Other beneficial effects of adding wool to soils include enhanced water holding capacity, improved water infiltration, soil aeration and reduced erosion. Ground-up wool carpet, when used as a fertiliser, increased the dry matter yield of grass growth by 24% to 82%.

WOOL DOES NOT ADD TO LANDFILL VOLUMES OR MICROPLASTIC POLLUTION

Wool fibres biodegrade naturally in a relatively short period in soils and marine systems and therefore do not accumulate in landfill and oceans. Results from two 2020 Ag Research studies demonstrated this and, furthermore, found no evidence that the polyamide resin used as part of the machine washable wool treatment forms microplastic pollution. Additionally, the polyamide resin used in the machine-wash treatment for wool is very different from common commercial polyamides. It is lightly cross linked, so the wool-polymer matrix on the surface of the fibre is not a plastic sheath and does not interfere with wool's inherent moisture and odour management properties. In contrast, synthetic textiles do not biodegrade and will persist for many decades and disintegrate to small fragments. Commonly known as microplastics, these fragments accumulate in aquatic environments and land disposal sites where they have negative effects on ecosystems when consumed by organisms. A single polyester fleece garment can produce more than 1900 fibres per wash. Ingestion harms organisms, sometimes causing death through starvation as plastic replaces food in the stomach. Once in the food chain, microplastics potentially also affect human health via seafood consumption. Microplastics have also been found in drinking-water, both bottled and tap water.

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