The Science of Wool: Why It is great for the garden!

At Great Lakes Natural Fibers, we don't just claim our wool pellets work; we rely on decades of agricultural research and horticultural trials to prove it. When you use our pellets, you are applying a scientifically-backed system for soil health and plant protection**.**

Wool pellets are a **botanical powerhouse**, delivering a **triple-action boost** to your garden by combining slow-release nutrition, soil conditioning, and superior water retention. And to boost, a pest barrier when used on top of the soil.

1. Slow-Release Superfood
The Claim: Wool pellets provide a full season of nutrition. The Science: Wool contains keratin protein. As soil microbes break down the wool over 6 months, they release a steady stream of Nitrogen (N) and Potassium (K). Unlike synthetic fertilizers, there is zero risk of "root burn." Your plants get a consistent "drip-feed" of nutrients. In a heavy rainstorm, synthetic nitrogen washes away into the groundwater; wool pellet nitrogen stays trapped in the fibers until the plant actually needs it.

The N-P-K Breakdown

While exact numbers vary slightly based on the sheep's diet and the amount of "coat grease" (lanolin) left on the wool, the standard analysis for wool pellets is:

Nutrient	Average Content	Benefit to Plant
Nitrogen (N)	**9% – 11%**	Essential for lush, green leaf and stem growth.
Phosphorus (P)	**0.1% – 1%**	Supports root development and flower/fruit production.
Potassium (K)	**2% – 3%**	Improves overall plant health, disease resistance, and water regulation.

Beyond N-P-K: Secondary Nutrients

Wool pellets are also rich in secondary and micronutrients that synthetic fertilizers often miss:

Sulfur: Wool is naturally high in sulfur (part of the keratin protein). Sulfur helps plants form important enzymes and proteins and can slightly help with soil pH balance.

Carbon: Wool pellets are roughly **50% Carbon**. This feeds the "good" microbes and fungi in your soil, building a healthy underground ecosystem.

Calcium and Magnesium: Trace amounts of these minerals help strengthen cell walls and prevent issues like blossom end rot in tomatoes.

Sodium (Salts): As mentioned in the pest section, the residual salts (suint) help repel slugs but are in low enough concentrations that they don't harm the plants.

Wool pellets act as a high-protein, slow-release fertilizer. Unlike conventional fertilizers that are prone to nitrogen volatilization (off-gassing), wool requires biological activity for nutrient release, ensuring a sustained feed over the growing season while protecting air and water quality

SOURCES AND REFERENCES

The Sustainable Agriculture Research and Education (SARE**)** program, funded by the USDA, has investigated wool as a sustainable alternative to peat and synthetic fertilizers. *SARE Project Reports (GNE13-066 / FNE21-974).* "Wool Pellets as an Organic Fertilizer and Soil Amendment."

Trials at the *University of Northumbria* showed that plants grown with wool pellets had a significant increase in biomass (size and strength) compared to those grown in a standard potting mix. *University of Northumbria & Leicester University (2014)*

University of Vermont Extension / Northeast SARE (Project FNE21-974).

2. "Built-in" Water Management

The Claim: You can water your plants up to 25% less often. The Science: Wool fibers can absorb and hold up to 20 times their weight in water. As the soil dries out, the wool slowly releases that moisture back to the plant roots, acting like a buried sponge.
Research funded by the *USDA-SARE* program found that wool pellets significantly increased the "water-holding capacity" of soil, particularly in hanging baskets and containers prone to drying out.
Reference: *USDA-SARE Project Report FNE21-974.*

3. Natural Soil Aeration
The Claim: Your soil stays fluffy and oxygen-rich. The Science: Because wool pellets expand and contract as they wet and dry, they perform a "micro-plowing" action. This creates tiny air pockets in the soil, preventing compaction and allowing roots to breathe.

Reference: *National Center for Appropriate Technology (NCAT/ATTRA). Publication: "Building Healthy Pasture Soils" & "Livestock as a Tool: Improving Soil Health." (NCAT frequently documents how animal-based fibers like wool contribute to the "porosity and tilth" of garden soils)*

4. The Ultimate Pest Barrier

The Claim: Wool pellets stop slugs and snails without chemicals. The Science: Microscopic scales cover every wool fiber. To a slug or snail, it is like walking through broken glass. When the pellets expand, they create a "felted" texture that is physically abrasive to a slug’s soft

underbelly. Additionally, wool is hygroscopic, meaning it pulls moisture away from the pest's mucus trail, forcing them to retreat to avoid dehydration.

Academic trials using "Choice Tests" place pests in a controlled environment to see which barriers they prefer to cross. Key Finding: There was a statistically significant reduction in leaf area consumed when a 10cm wool pellet ring protected the plants compared to the control group. Unwashed wool contains suint and lanolin, which contribute to its effectiveness as a repellent. Key Finding: The presence of residual salts (potassium salts) in unwashed wool provides a mild chemical deterrent that is non-lethal to beneficial soil organisms but repellent to gastropods

REFERENCES

National Center for Appropriate Technology (NCAT / ATTRA). "Alternative Soil Amendments: Sheep Wool."
*RHS Gastropod Control Trials (2018-2022); Horticulture Research International (HRI).*Behavioral Choice Trials (University Studies)
University of Northumbria & Leicester University (2014). "Wool Pellets: A Sustainable Solution for Slug Control in Small-Scale Horticulture."