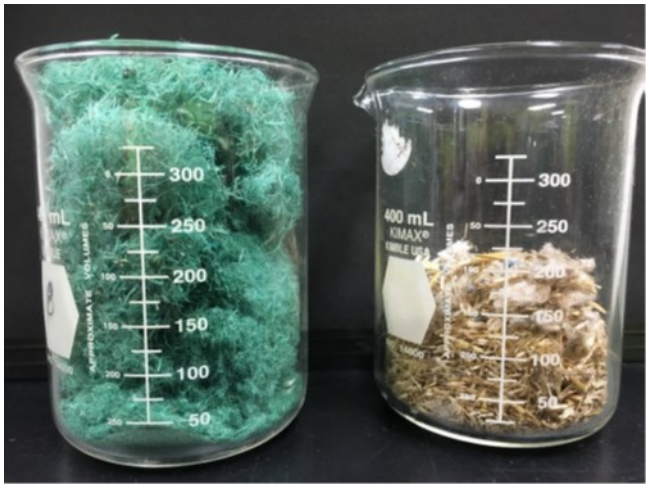
TECHNICAL COMPARISON

Dispelling Myths: "Water Savings" of Straw-Based Hydraulic Products

Manufacturers of inferior products may innocently cloud the issues regarding yield and coverage – by proclaiming their loading "advantages" – touting they can get more material per load through a hydroseeder. While this may sound attractive to those focused on how rapidly they can pump dry weight material through a machine, low yield products compromise performance! Invariably these materials hold less water, provide less fiber interlock, and simply do not afford as much cover per application rate. Lower yield directly results in reduced erosion protection, slower vegetation establishment and shorter service life (functional longevity). Indeed, higher loading rates are really an indicator of lower yield and performance.

By contrast, while they may require more water during mixing, high yield Hydraulically-applied Erosion Control Products (HECPs) and Biotic Soil Media (BSM) develop a more cohesive matrix with sufficient structure and thickness; critical for absorption of kinetic energy from raindrop impact as well as resistance to shear forces developed during overland sheet flow. Water retention and vegetation establishment are enhanced by more lofty, high yield matrices that optimize thickness.

Yield is an important factor when comparing hydraulically-applied products. To simulate field applications, dry, representative samples of ProMatrix™ EFM™ and a straw-based "Bonded Fiber Matrix" (BFM) product were placed in separate beakers. Ten (10) grams of each product were classified for 5 minutes with a Rotap Sieve Shaker, then removed and placed into a beaker. The photo below demonstrates dramatic volumetric differences in the two materials before they would be mixed, then applied in a hydroseeder.



ProMatrix EFM (left) nearly doubles the dry volume of the straw-based "BFM" (right)

Hydraulic media are only as good as their base components. Profile Products' line of wood and bark based materials contain 100% recycled, Thermally-Refined® fibers processed from clean, virgin whole wood chips. These unique fibers create greater surface area, when compared to lower quality fibers present in straw-based products; providing increased coverage, erosion control performance and water holding capacity. Thermal refining subjects wood chips to high temperature and pressure during the defibrating (grinding) process, resulting in thin and fine-textured, phyto-sanitized, weed-free fibers.

Manufacturers of low yield hydraulically-applied products may also make claims that their products save water versus high yield hydraulic mulches. Such claims are absolutely inaccurate when one assesses water used to apply the materials combined with their ability to capture and retain water throughout their performance lifecycle. While the low yield straw-based products require less water for mixing and application, their inability to capture and retain water is quite revealing. Exhaustive testing has demonstrated a direct correlation between Water Holding Capacity (WHC) and vegetation establishment – greater WHC leads to faster and more complete vegetative growth and development. Mechanically processed straw fibers hold only a fraction of water compared to that held by thermally refined wood fibers and, as a result, offer reduced improvements in vegetation establishment.

The following materials were evaluated for their published mixing and application requirements versus their WHC as determined by ASTM D7367 methodology via independent third party testing.

Verdyol® Biotic Earth Black™ Biotic Soil Amendment (BEB)
HydroStraw® All In 1 BFM Bonded Fiber Matrix (HS AIO)
HydroStraw® BFM Bonded Fiber Matrix (HS BFM)
ProGanics™ BSM™ Biotic Soil Media (BSM)
ProMatrix™ EFM™ Engineered Fiber Matrix (EFM)
Flexterra® HP-FGM High Performance - Flexible Growth Medium™ (HP-FGM)

Table 1 compares Water Budgets of the selected low and high yield HECPs and Biotic Soil Technology (BST) products with their efficacy in conserving water during product lifecycles.

TABLE 1.

Parameter	Units	BEB	HS AOI	HS BFM	BSM	EFM	HP-FGM
Loading Rate (50 lb/22.4 kg bale)	gal	40	50	66.7	66.7	83.3	125
Water Holding Capacity[1]	%	246%	415%	529%	900%	1,400%	1,700%
Water Application Requirement[2]	gal/ac	2,800	3,500	4,669	4,669	5,831	8,750
Water Retained[3]	gal/ac	1,031	1,740	2,217	3,772	5,868	7,126
Water Lost Upon Application[4]	gal/ac	-1,769	-1,760	-2,452	-897	37	-1,624
Water Gain in Subsequent Event(s)[5]	gal/ac	-738	-21	-234	2,876	5,906	5,501

1. Water Holding Capacity determined by third party testing 2. Loading rate x 3,500 lb/ac / 50 lb/bale 3. Based on an Application Rate of 3,500 lb/acre (3,920 kg/ha) and converted to gallons / 8.35 lb/gallon. 4. Water Retained (initial) – Water Application Requirement. 5. Water Lost Upon Application + Water Retained (Subsequent Event(s)).

Although more water is required to mix and apply high yield HECPs and BSMs, these products quickly erase their initial water loss during the first significant precipitation event(s); while continuing to absorb and conserve greater quantities of water in the long term versus low yield, lower moisture retaining straw-based products. *Naturally*, water holding capacity will decline as decomposition of biodegradable BST and HECP materials progresses. Comprehensive testing following ASTM D5338 protocol has confirmed advanced wood and bark based materials can persist for 12 to 18 months while straw-based products only persist for 3 months or less.

Why on Earth would you risk the success of your project on lower performing, rapidly degrading straw-based mulches that fall well short of legacy superior wood and bark-based materials? The claims made by low yield product manufacturers regarding water use/water savings are quickly dismissed when one considers performance over the life of the installation. Such arguments just don't hold water!