



Sustainability
starts here.



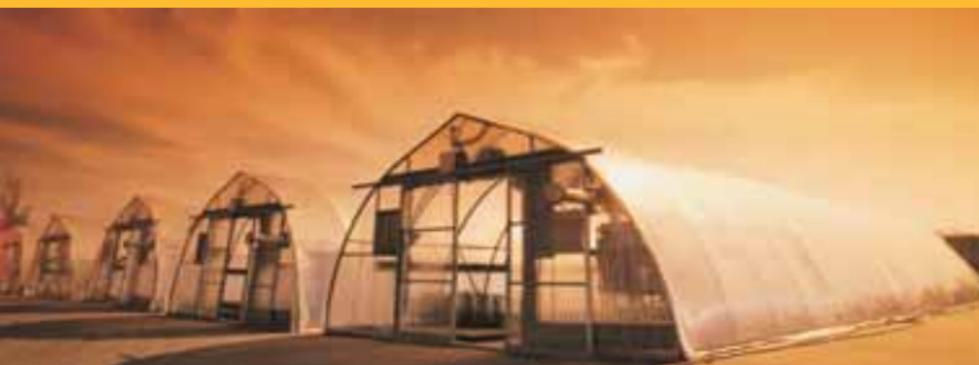


PBH Shines

PBH Nature's Media Amendment is your number one choice for sustainable plant production – and a whole lot more. This uniquely processed **rice hull amendment** from Riceland Foods, Inc. is a readily renewable resource requiring no mining or land disruption to produce. As so many growers have learned, it is a perfect **replacement for perlite** in the growing media – providing a less dusty mixing environment, lower basic cost and decomposition over time, while remaining stable during the typical plant production cycle.



Salvia root growth in 72% *Sphagnum* peat with 28% PBH, shown six weeks after transplant from plug tray.



Extremely lightweight and highly compressed when packaged in your choice of standard or bulk bale, PBH generates **less waste** and reduces storage requirements, handling and freight. Its physical size, shape and bulking properties produce **optimum air-filled pore space, water-holding capacity and drainage**, while its natural color blends with other media components. Uniquely processed to ensure purity, **PBH Nature's Media Amendment** is sized, cleaned and subjected to a series of heat treatments that collectively sterilize the rice hulls and render any residual rice kernels, weed seeds or disease pathogens non-viable. The **innovative parboiling process** includes steeping in water at a temperature higher than 140° F, steaming under pressure to temperatures exceeding 212° F and hot-air drying at 500° F.

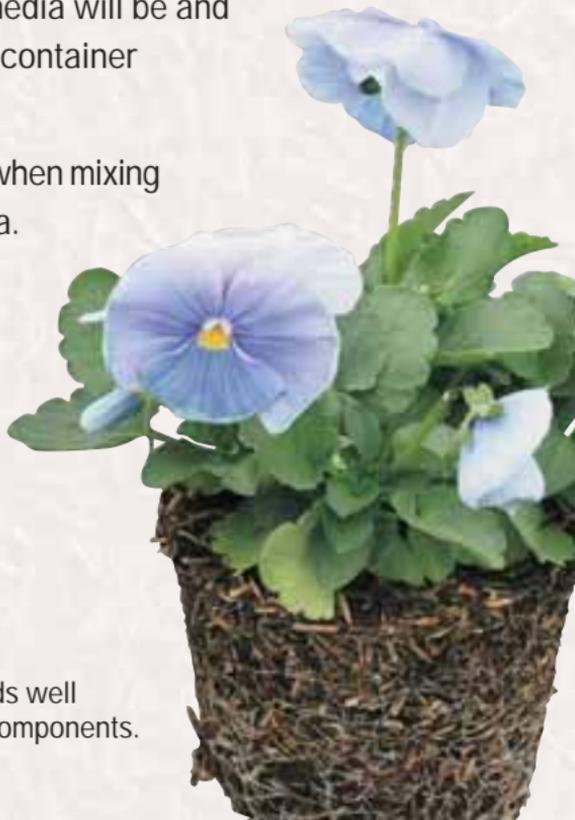
Greenhouse-proven PBH offers **environmental, horticultural and economical advantages**. Growers who rely on it gain sustainability, reduce input costs and sacrifice nothing in terms of plant quality. On the road to **earth-friendly plant production**, there really is no better place to start.



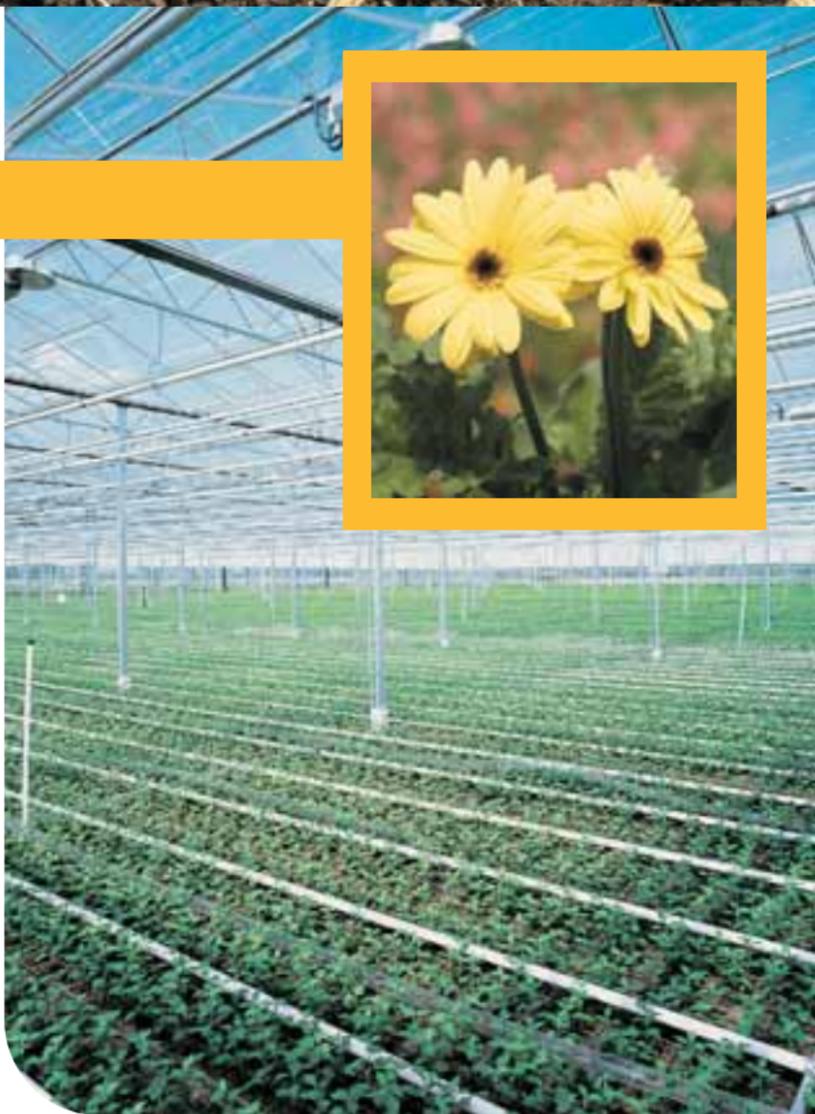
Guidelines

PBH Nature's Media Amendment has been successfully used with peat, bark and coir in a range of growing media applications. Growers should evaluate various component percentages to determine the optimum growing media mix to meet individual cultural conditions and growth requirements. The following information is intended to help insure proper use of PBH.

- ▶ Recommended PBH use rate is 10 to 30% of total growing media.
- ▶ The desired minimum air-filled pore space in a 4 or 6-in. container is 10 to 15%.
- ▶ Growing media with 20% PBH has approximately 10% air-filled pore space.
- ▶ Growing media with 30% PBH has approximately 20% air-filled pore space.
- ▶ The higher the PBH ratio, the lighter the growing media will be and the better the container will drain.
- ▶ Add PBH last when mixing growing media.



Natural color blends well with other media components.



- ▶ When replacing another component with PBH, always conduct side-by-side comparisons to determine desired growing media characteristics.
- ▶ PBH has a 6.2 to 6.6 pH range.
- ▶ PBH is a natural material that will decompose over time, but not during a typical production cycle of greenhouse or container-grown nursery stock.
- ▶ PBH contains natural silicon.



Research

Dr. Michael R. Evans of the Department of Horticulture at the University of Arkansas researched the use of parboiled fresh rice hulls as an alternative to perlite in horticultural substrates and determined the following:

- ▶ Incorporation of parboiled rice hulls into *Sphagnum* peat-based substrates did not result in significant nitrogen tie-up.
- ▶ Parboiled fresh rice hulls were free of viable weed seed.
- ▶ When incorporated into *Sphagnum* peat-based substrates, parboiled fresh rice hulls did not negatively impact the chemical properties of the substrate.
- ▶ When incorporated into *Sphagnum* peat-based substrates, parboiled fresh rice hulls provided equivalent or higher levels of drainage and air-filled pore space than perlite. (See Table 1.)
- ▶ Root and shoot growth was similar for plants grown in *Sphagnum* peat-based substrates amended with equivalent amounts of perlite or parboiled fresh rice hulls.



Technical Data

- ▶ Bulk Density, g/cc (lbs./ft.³)7.0 (+/- .5%)
- ▶ Total Pore Space, %89
- ▶ Air-Filled Pore Space, %.....69
- ▶ Water-Holding Capacity, % w/w65 – 85
- ▶ pH6.2 – 6.6
- ▶ Electrical Conductivity, mmho/cm0.3 – 1.1

Table 1. Physical properties of *Sphagnum* peat substrates contain

Substrate composition (% v/v)			Total Porosity (% v/v)	Air-Filled Pore Space (% v/v)
<i>Sphagnum</i> Peat	Perlite	Rice Hull		
80	20	0	76.9	8.5
70	30	0	79.9	10.
60	40	0	73.9	11.
50	50	0	73.9	10.
40	60	0	71.4	11.
80	0	20	83.2	11.
70	0	30	85.5	20.
60	0	40	86.0	28.
50	0	50	87.7	34.
40	0	60	82.1	35.

Significance	df		
Substrates	9	***	***
20% perlite vs 20% hulls	1	***	NS
30% perlite vs 30% hulls	1	***	***
40% perlite vs 40% hulls	1	***	***
50% perlite vs 50% hulls	1	***	***
60% perlite vs 60% hulls	1	***	***
perlite vs hulls	1	***	***

NS, *, **, *** - Nonsignificant or significant at P=0.05, 0.01, 0.001

Technical Data



ing varying amounts of parboiled fresh rice hulls or perlite media.

led pace (v)	Water-Holding Capacity (% v/v)	Water-Holding Capacity (% w/w)	Bulk Density (g.m ⁻³)
5	67.9	627.4	0.11
8	68.9	680.4	0.10
4	62.6	633.5	0.09
7	62.8	544.4	0.11
9	59.1	488.9	0.12
5	71.7	732.2	0.09
3	64.9	661.3	0.09
8	56.9	587.3	0.09
0	53.9	519.1	0.10
8	45.1	402.8	0.11

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01 respectively.

Accolades

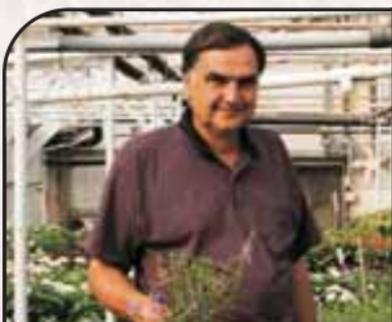


Lucas Greenhouses

"We decided to trial PBH initially because it is a renewable resource and a natural by-product. An added bonus was the fact that it is relatively dust free in the soil mixing process, especially when compared to perlite. Both of these things are very important to us. During the trials, we produced crops that were every bit as good as what we had been growing – or even slightly better. For these reasons, we now use PBH in all of our spring bedding plants, fall crops and our 6" poinsettias. We are seeing very high quality plants and saving roughly \$4 per yard of mix versus perlite. That includes the cost of freight from Arkansas to New Jersey."

Joe Moore, head grower

Lucas Greenhouses – Monroeville, New Jersey



Fahr Greenhouses

"We tried composted rice hulls several years back, but with poor results. Then I heard Dr. Evans from the University of Arkansas speak and decided to try the PBH product. I received a sample in 2005 and by May 2006, we were 100% PBH instead of perlite. Many things attracted me to it. Cost was one, but beyond that was root development and the total lack of Pythium – even in our Vinca crop. We also like PBH because it is a natural product and we can promote its sustainability. Another real advantage is the lack of dust when mixing."

Patrick Bellrose, president

Fahr Greenhouses – Wildwood, Missouri

Advantages

- ▶ Natural co-product of rice provides sustainability, quality and value.
- ▶ Readily renewable resource requires no mining or land disruption.
- ▶ Minimal dust improves mixing environment.
- ▶ Highly compressed standard or bulk bale generates less waste, lowers freight costs and minimizes storage and handling.
- ▶ Biodegradable material decomposes over time, but not during a typical plant production cycle.
- ▶ Lower cost and potential for using less product reduces input costs versus perlite.
- ▶ Ideal size, shape and bulking properties create optimum container porosity and drainage.
- ▶ Natural color blends well with other media components.
- ▶ Unique processing and sterilizing renders weed seeds and disease pathogens non-viable.
- ▶ Nearly neutral pH won't alter plant development.



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PBH Nature's Media Amendment is a product of Riceland Foods, Inc. The information contained in this brochure is believed to be accurate, but is provided only as guidance and does not constitute any representation, condition or warranty regarding the use of this product. Riceland Foods encourages growers to experiment on a small scale in order to identify the best conditions of use in their own operations before making changes on a commercial scale.