A review of the major growing media components

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The major role of a growing mix is to support the plant, while holding water and nutrients for the plant to use during growth. The components selected to make the growing mix will have an impact on its physical and chemical properties (with emphasis on physical properties). We will look at the most common components added to growing media and their impact on properties of the medium produced.

There are five main components commonly used in making growing media: peat moss, bark, coir, perlite and vermiculite. They are combined in various amounts as a percentage of the mix. These five components are compared in Table 1 and will be the components discussed in this article. There are a number of other components that can be used, but these tend to be less common or regional components. These include peanut hulls, rice hulls, pumice, wood chips and composts. Table 2 outlines some of the uses of the components.

Peat Moss

Peat moss is the partially decomposed plant material derived from the sphagnum moss plant. This material is the most common component used in most greenhouse mixes due to its physical and chemical properties. Peat moss will provide good aeration and moderate to high water and nutrient holding capacity to a mix. The pH of peat moss is generally in the range of 3.0 – 5.0.

Bark

The most common bark used is southern pine bark. In the west, fir bark is more common, while northern barks could include a combination of pine, spruce and fir. Bark used in greenhouse media is generally either aged or composted, and often referred to as processed bark. It is less acidic than peat moss, with a common pH range of 4.5 – 6.5. Bark has high air space, but lower water- and nutrient-holding capacities than peat moss. Bark will draw nitrogen from the mix. This is often compensated for by addition of slow-release nitrogen.

Coir/Coconut Coir Pith

Coir, or coconut coir pith, is a byproduct of processing coconut fiber. It is the finer "dust" particles that have historically been considered waste material. Coir is used mainly as a partial substitute for peat moss. Coir provides very good air space as well as good water holding. It tends to be higher in soluble salts (mainly potassium and/or sodium, depending on how it was processed). It will have lower nutrient holding capacity than peat and may, at times, draw some nitrogen as bark does. The pH range is 5.5 – 7.5.

Perlite

Perlite is derived from volcanic rock that is expanded at high temperatures. The expanded product is used to add air space to mixes. It does not impact pH of the mix and is stable in maintaining its aeration properties.

Vermiculite

Vermiculite is also an expanded ore. Once expanded, it mainly adds air space to a mix. However, it does have some water- and nutrient-holding properties, especially in comparison to perlite. Unlike perlite, it will tend to break down somewhat over time, thereby reducing its aeration properties.

Putting it All Together

Growing mixes, whether made by the grower or a commercial mix company, will rely mainly on the five components described above. These components are combined in varying percentages with other additives such as wetting agent, starter nutrient charge and limestone. Coarseness properties will determine the best use of the components in greenhouse production. Table 3 includes desired properties of mixes for various areas of greenhouse production.

A combination of, at most, three of the above components at any one time will provide the necessary physical and chemical properties needed to successfully grow a crop. Mix blending does not have to be very complicated, as long as the starting components are of good quality. The components will have their greatest impact on physical properties, while the grower's water quality and fertilizer selection will have the greatest impact on pH and nutrition.

Table 1 Properties of the 5 major growing media components

Raw Materials	Total Porosity	Water Holding Capacity	Air Capacity	pH	CEC (me/cc)
Peat	89-94	74-77	12-20	3.0-5.0	7.0-13.0
Bark	75-80	56	19-24	4.5-6.5	9 - 12
Coir	92-94	82-83	9-12	6.5-7.5	6.1
Perlite	68	36-40	28-32	7.0-7.5	0.15
Vermiculite	78-80	70-72	6-10	5.0 - 7.5	1.9-2.7

Table 3 Desired properties of mixes for various uses in greenhouse production

Attribute	Propagation Mix	Peat-Lite Growing on Mix	Bark-Based Growing on Mix
Particle Size	Fine	Medium to Coarse	Medium to Coarse
Air Space	Low to Moderate	Moderate to High	Moderate to High
Water Holding	High	Moderate	Moderate to Low
Longevity	Short	Short to Medium	Short to Long
Nutrient Needs	Low	Moderate	Moderate to High[1]

[1]Nutrient needs in a bark based mix may be offset by the use of slow release nitrogen.

Table 2 Uses of the regional growing media components

Component	Common Use	Concerns	Comments
Peanut Hulls	Substitute for bark	Customer fear related to peanut allergies	• The composting process removes the possibility of allergic reactions.
Wood Chips	Substitute for bark or perlite	Nitrogen drawdown	More of a regional component
Rice Hulls	Substitute for perlite	Rodents are attracted to rice hulls and rice hull mixes	In large quantities, they can provide some silicon for plants
Pumice	Substitute for perlite	None	Common in the west
Yard Waste Compost	Small percentage addition to mix	Source of waste may sometimes have undesirable contaminants	• Can increase nutrient and water holding in a mix • Need to make sure there are no herbicide contaminants
Vermicompost	Small percentage addition to mix	None	• Excellent results when added at 5 – 10% of the mix.