Growstones ideal alternative to perlite, parboiled rice hulls

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In the greenhouse business, organic and inorganic growing substrates are chosen for the physical and chemical properties necessary to support specific crops and growing conditions. One important physical property in substrates is air-filled pore space, a particularly important characteristic that allows for gas exchange between plants' roots and the outside atmosphere. Perlite and parboiled rice hulls are the two of the most common components used to increase air-filled pore space (AFP) in substrates. A study compared these popular components to Growstones, an aggregate produced from finely ground waste glass.

Although they are widely used in horticulture applications, both perlite and parboiled rice hulls have disadvantages and limitations. Perlite, a natural glass of volcanic origin that expands when quickly heated, has become increasingly expensive due to costs of mining, transportation, and production. In addition to its rising price tag, perlite produces a siliceous dust that is an eye and lung irritant. Parboiled rice hulls (PBH) are produced only in specific areas of the United States, making high shipping costs an issue for end-users. And, because it is a plant-based component, PBH may also have limitations with respect to its use in long-term crops because of softening and decomposition.

Michael R. Evans, Professor in the Department of Horticulture at the University of Arkansas, created experiments to compare perlite and PBH with Growstones. Evans' results were published in HortTechnology. According to Evans, aggregates such as Growstones (produced by Earthstone Corp., Santa Fe, NM) have been proposed as alternatives to

perlite and PBH to adjust the physical properties of peat-based substrates.

Growstones, which have been successfully used as a hydroponic substrate, are produced from finely ground waste glass. The ground glass powder is combined with calcium carbonate and heated in a kiln. Carbon dioxide is produced as the glass particles are heated and fused together, trapping air spaces inside the glass. The result is an expanded, lightweight product that is cooled before being ground to the desired size.

Evans' experiments showed that Growstones had an AFP higher than that of both peat and perlite. Additionally, when added to peat at a concentration of at least 15%, Growstones increased the AFP of the resulting peat-based substrate.

"Growstones can be used in a similar manner to perlite and PBH as an aggregate to increase AFP of peat based substrates", Evans said. "The primary differences were that, at concentrations of 25% or more, GS resulted in a higher AFP than equivalent perlite-containing substrates. Also, substrates containing 20% or more GS had a higher water-holding capacity than equivalent perlite- and PBH-containing substrates, and GS-containing substrates had a higher bulk density than equivalent perlite- and PBH-containing substrates."

All GS-containing substrates had physical properties within recommended ranges. Vinca, impatiens, and geranium plugs grown in GS-containing substrates were comparable to plants grown in equivalent perlite- and PBH-containing substrates.

Evans said that the experiments showed that Growstones can be successfully used as a component for substrates used in greenhouse crop production.

More information: The complete study and abstract are available on the ASHS *HortTechnology* electronic journal web site: horttech.ashspublications.org/ … ent/abstract/21/1/30