



BY DONALD LESTER

A NATURAL SOLUTION

YUCCA WETTING AGENTS

They improve the effectiveness of pesticides, increase nutrient uptake and help distribute water more evenly in hydrophobic substrates. Saponin-based products are the newest trend in horticulture, plus they're biodegradable, organic and renewable.

News about water pollution and lingering droughts has brought the subject of water conservation into the forefront of resource management discussions lately, especially in the field of agriculture. A number of water-saving products have emerged on the market to address these concerns. Although many of these products use synthetic chemical ingredients to manage water, there are organic alternatives available as well. Arguably the most popular type of water-saving bio-based products are the saponin or Yucca extract products.



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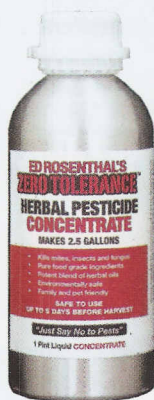
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"The Yucca root contains high levels of saponin, which Native Americans used for centuries to make soap and shampoo."

What are saponins?

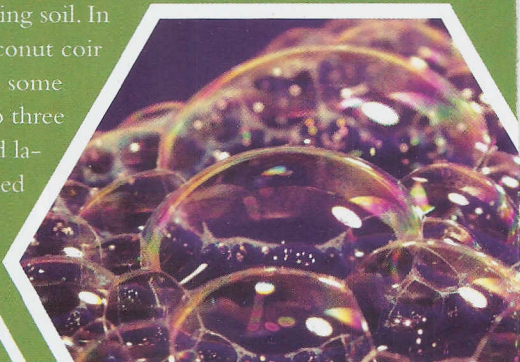
Saponins are natural detergents found in a variety of plant species, especially certain desert plants. Some saponins are derived from marine animals, but the bulk come from plants (and some herbs), with names that indicate their foaming properties—such as soapwort, soaproot, soapbark and soapberry. Commercial saponins are extracted mainly from the desert plants *Yucca schidigera* and *Quillaja saponaria*. *Quillaja* bark has been used as a shampoo in Chile for centuries.

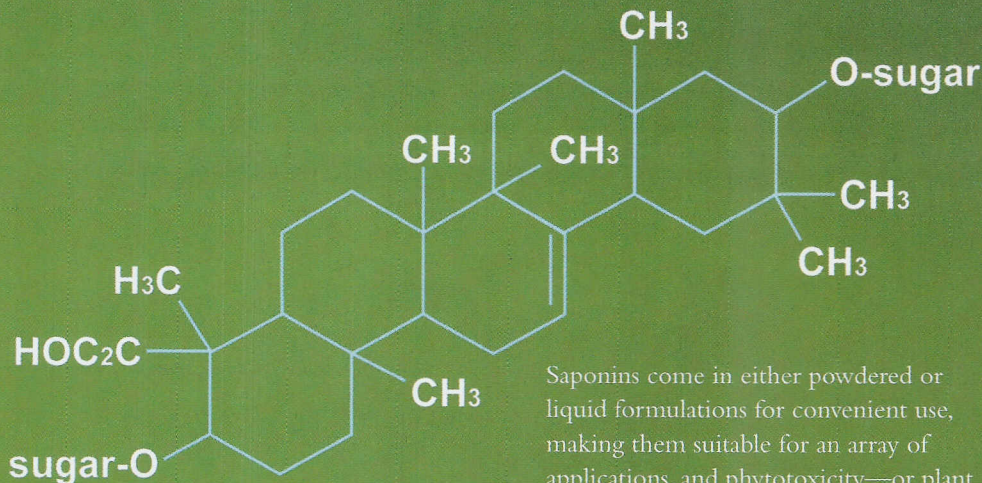
Yucca is native to the Mojave and Sonoran deserts of California, Baja California, southern Nevada and western Arizona. Its needle-sharp tips gave the plant the name 'Spanish bayonet'.

The *Yucca* root contains high levels of saponin, which Native Americans used for centuries to make soap and shampoo. Native Americans washed their hair with *Yucca* to fight dandruff and hair loss and they also used the flowers and fruits for food; the black seeds were dried and ground into flour, while the leaf fibers were used to weave cloth and to make rope and sandals.

The soapy characteristics of saponins make them ideal for use as spray adjuvants (to make pesticides work better) or as additives to help spray solutions stick and spread onto leaf surfaces for better coverage and increased nutrient uptake.

An additional characteristic of saponin-based materials is that they help distribute water more evenly in hydrophobic or hard-to-wet substrates. For this reason potting soil manufacturers are starting to add saponin-based materials to their bulk soils and potting mixes. Rates of use vary, depending on the composition of the media. For example, soil media with a high percentage of peat or wood bark will require more saponin-containing product than a standard potting soil. In hydroponic systems, coconut coir is hard to keep wet, and some manufacturers use up to three times the recommended label rates with no reported ill effects to seedlings.





Environmentally friendly

Because saponins are derived from cactus and other desert plants they are typically certified as organic products and are generally easy to extract using simple, low-cost cold-press methods, without the need for harsh or toxic synthetic chemicals. Since they mostly come from plants they are considered green, natural and renewable, as well as biodegradable.

Saponin uses

Saponins are found in many plants, but they get their name from the soapwort plant (*Saponaria*), the root of which was used historically as a soap (the Latin word 'sapo' means soap).

Saponins are one of a group of glucosides found in many plant species with

known foaming properties when mixed with water. Saponins reduce the surface tension of water, allowing the formation of small, stable bubbles. The amount of foam created by saponins shaken in a jar of water is a good indication of the amount of saponins present in a solution.

As a consequence of their surface-active properties, saponins are excellent foaming agents, forming very stable foams. Saponins have been used in modern times in the manufacture of fire extinguisher foam, toothpaste, shampoos, liquid soaps and cosmetics, and to increase the foaming qualities of beer and soft drinks—Yucca and Quillaja extracts are used in beverages such as root beer to provide the foamy 'head'. Because of their surfactant properties, saponins are also used industrially in mining and ore separation, in preparation of emulsions for photographic films and extensively in cosmetics products such as lipstick and shampoo, where their antifungal and antibacterial

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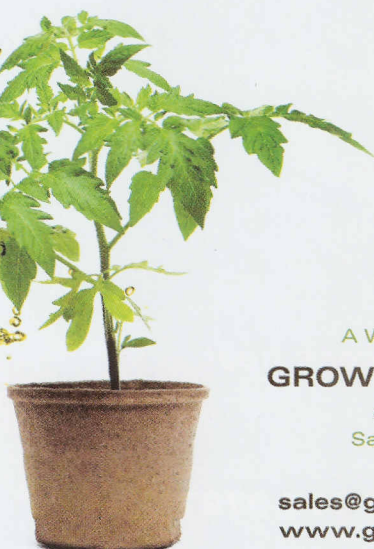
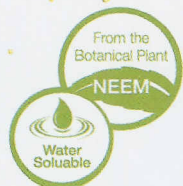
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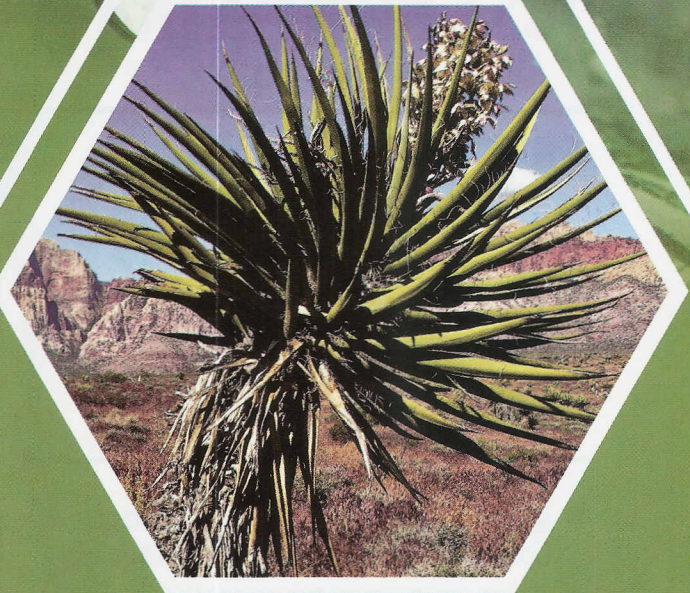


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properties are important in addition to their emollient effects. Yucca has also been used to treat headaches, bleeding, gonorrhoea, arthritis and rheumatism, among other maladies.

Besides being used in agricultural and health-related products, saponins are used as a natural deodorizer or odor reducer in several pet products, feeds and litters. Saponin-based mild detergents are also used in diverse areas of research—in fact, they even are used by the British Museum to gently clean ancient manuscripts and artifacts.

Fish poison

Most saponins readily dissolve in water and are poisonous to fish. Fish absorb saponins directly into their bloodstream through the gills, where a toxin acts on their respiratory organs without affecting their edibility. Saponins also cause the breakdown of red blood cells in fish, helping the toxin to spread quickly. Even though the effects of the poison are powerful, they are not usually fatal, and fish that are washed with or swim through untainted water will soon revive without any lasting ill effects. Because of this phenomenon, fishermen using saponins to gather the stunned fish quickly as they float to the surface.

Because saponins are toxic to fish these types of products are not recommended for use in or around aquaponic systems where fish and plants are grown together, but saponin-based products are still valuable in greenhouses for foliar applications and for the treatment of soil mixes.

Heat stress

Saponins are believed to be responsible for heat and drought resistance (and lower stress under these conditions) in cactus. Anecdotal evidence certainly suggests that saponins help plants deal with heat stress. One customer related a story to me where he applied a Yucca-based saponin product to a steep south-facing

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slope to help his ornamental plants cope with the direct sun and the summer heat. Coincidentally, a wildfire occurred a few days after his application and moved up the hillside toward his plantings. Aerial tankers successfully dropped fire retardant to stop the flames, but the intense heat wilted all of the plants in the area. Only the saponin-treated plants withstood the intense heat and showed no wilting or signs of heat stress.

Consider using yucca saponins

Yucca and saponin-based products are becoming more commonplace in the market. They are often employed as adjuvants, surfactants or 'spreader and sticker' additives for spray solutions, as anti-stress products in hot, dry weather conditions and as wetting agents for packaged soils and potting mixes, among many other things. It might be time for you to consider using one of these valuable products: after all, why would you ever use a synthetic, chemically based product when you could use a biodegradable, organic, renewable counterpart containing natural saponins? **MY**

