

“Minimizing Drift and Dilution with Microsponge Delivery System”

Over the last 20 years, the Biocar® microsponge system has been used in aquatic weed and algae management since the natural cereal-based sticker has low toxicity and provides a cost-effective method for treating nuisance plants in waterways, lakes and ponds. Being a biological carrier, Biocar® in TopFilm™, provides a delivery matrix that when added to a tank mix, active ingredients are absorbed into the microsponges that effectively coat, adhere, and protect the materials from washing off readily plants and algae. Figure 1 explains the adherence and delivery of the microsponge system found in TopFilm™ when it is sprayed on vegetation. The grain-derived film provides a protective coating over the herbicide/algaecide on the treatment area.

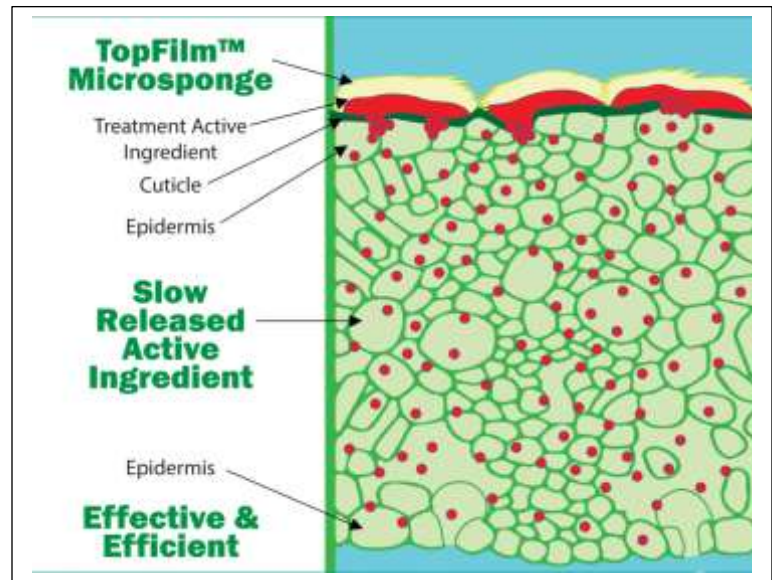


Figure 1: Microsponge System delivering active ingredient through leaf cuticle.

The benefit of the natural microsponge system is that it does not dissolve or burn the cuticle of the plant, which reduces the translocation of materials through the plant cells. Instead the plant continues with its natural metabolism slowly up-taking the herbicide or algaecide without knowing that it is being introduced. On the contrary, surfactants dissolve and burn through the cuticle, inducing natural polymerization of cell materials which block the transport of materials down to the roots.



Figure 2: Standard spray (left) and microsponge containing spray (right) shows the difference of distribution on foliage; the standard surfactant spray (left) will run-off the leaf and has spotty coverage.

Comparing spray patterns of typical surfactants, as shown below in [Figure 2](#), the micro sponge spray pattern provides complete coverage and adherence, differing from standard surfactants, such as methylated soybean oils (MSO) or sugar/gum based hydrocolloid formulations.

In [Figure 3](#), the MSO surfactants tend to run-off and with rainfall, the treatment is easily washed off. In the lower left picture, the sugar-based/gum hydrocolloid surfactant tends to form single bubble-like contact on the surface, allowing areas to not receive treatments, which tend to produce escapes and re-growth of weeds/algae. However, the extended full coverage of the micro sponge system of TopFilm™ is shown on the right where active ingredients can stay on the surface of the vegetation for up to 21 days.



Figure 3: Spray pattern of Methylated Soybean Oil (MSO), Hydrocolloid (gum) and Microsponge Coating

In order to get good weed/algae management, spray solutions need to provide good coverage and adherence to targets, enhancing uniform distribution of materials throughout the vegetation without leaving escapes that provide re-growth of weeds/algae. Good adherence to foliage provides herbicide/algacide containment, so that the plant does not get a diluted dose.

Another benefit of the microsponge system is the low use rates in tank mixes, 4 ounces to 16 ounces per acre. This is especially important in smaller tanks such as in spray-drones where ultra-low volumes (ULV) are required to get effective mixing ratios.

In aerial spray drone ([Figure 4](#)) or helicopter spray applications, reducing drift is important to insure containment of the treatment, avoiding unwanted contamination. Since the droplet size of microsponge spray solutions are larger (around 100 microns) than surfactants (around 0.004 microns), the Biocar® systems minimizes drift and mists.



Figure 4: Spray Drone on Lake Okeechobee

Example of containment is shown below (Figure 5), where the spray drone herbicide application with the microsponge system created a “perfect square,” no dilution of herbicide beyond its sprayed boundaries.



Figure 5: Example of Containment (Minimized drift and run-off) with Microsponge System

In summary, the advantages of using a sustained-release microsponge tank additive to tank mixes for weed and algae control are:

- Adherence of sprayed active materials
- Reducing run-off
- Minimizing drift
- Providing effective dose, instead of dilution
- Containment – preventing untargeted contamination

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