



**ORO<sup>®</sup>-HSMOC**  
**HERBICIDE**  
**SPRAY GUIDE**

## ADVANCED ADJUVANT TECHNOLOGY

# ORO-HSMOC

ORO®-HSMOC is a high performance methylated seed oil adjuvant for use primarily with foliar-applied, post-emergent herbicides. It provides product performance, features and benefits not present in other HSMOC and oil-based products.

HSMOC adjuvants contain at least 60% methylated seed oil. Due to their high oil content HSMOC and MSO adjuvants struggle to mix with water and form emulsions that remain in suspension in the spray tank or on the leaf surface (think of a well-mixed oil and vinegar salad dressing that eventually separates). Most HSMOC/pesticide emulsion particles are too large, separate too quickly and do not spread well enough on the leaf surface to optimize the efficacy of post-emergent herbicides.

**ORO-HSMOC incorporates the ORO AGRI proprietary OROWET® and TRANSPHLOEM™ technologies to overcome these shortcomings of other oil-based adjuvants, to optimize herbicide applications, and to deliver a level of weed-killing performance that most HSMOC or MSO adjuvants cannot.**

## WHAT IS TRANSPHLOEM TECHNOLOGY AND WHY IS IT SO IMPORTANT?



*TransPhloem technology accelerates the movement of pesticide active ingredients and nutrients into a plant's phloem for translocation throughout the plant.*

An Oro Agri-commissioned study conducted by the University of Illinois validates that TransPhloem technology improves the translocation of a glyphosate application (Roundup PowerMAX®). Using a C14 radioactive isotope, the study concluded that ORO-HSMOC adjuvant was absorbed into the leaf quicker, and moved a greater percentage of applied herbicide to the roots (the active site for glyphosate's mode of action) faster than the other major types of adjuvants.

**TransPhloem technology, combined with the superior spreading and penetrating properties of ORO-HSMOC, can boost your systemic herbicide's performance and give you a better return on your herbicide program investment.**

## KEY FEATURES OF ORO-HSMOC

**SMALLER PARTICLE SIZE** — ORO-HSMOC, as a result of TransPhloem technology, produces a smaller particle size than competitive products when mixed with herbicides. This allows faster and more thorough translocation throughout the plant and a more stable solution in the spray tank.

**SPREADING** — OROWET technology gives ORO-HSMOC the best spreading and wetting of any HSMOC on the market. Uniform spreading of the spray solution reduces runoff, accelerates penetration, and improves pesticide performance.

**PENETRATION** — Studies at the University of Illinois show ORO-HSMOC penetrates the leaf surface more rapidly and thoroughly than competitive HSMOC and MSO products. This means more herbicide is moved into the plant for translocation and, ultimately, better weed control. This rapid penetration also reduces herbicide loss through rainfall or other environmental factors.

**EMULSIFYING** — ORO-HSMOC forms a stable emulsion with tank mix partners. This contributes to faster absorption and avoids any separation of the oil and water components of the spray droplet. Excellent emulsifying avoids the separation some other HSMOCs experience that can lead to inconsistent herbicide performance or phytotoxicity.

**TRANSLOCATION** — University research has proven ORO-HSMOC translocates more herbicide, more rapidly, to weeds' roots than other widely-used HSMOC and MSO products. This means a faster weed kill and less competition for moisture and nutrients for your crop.

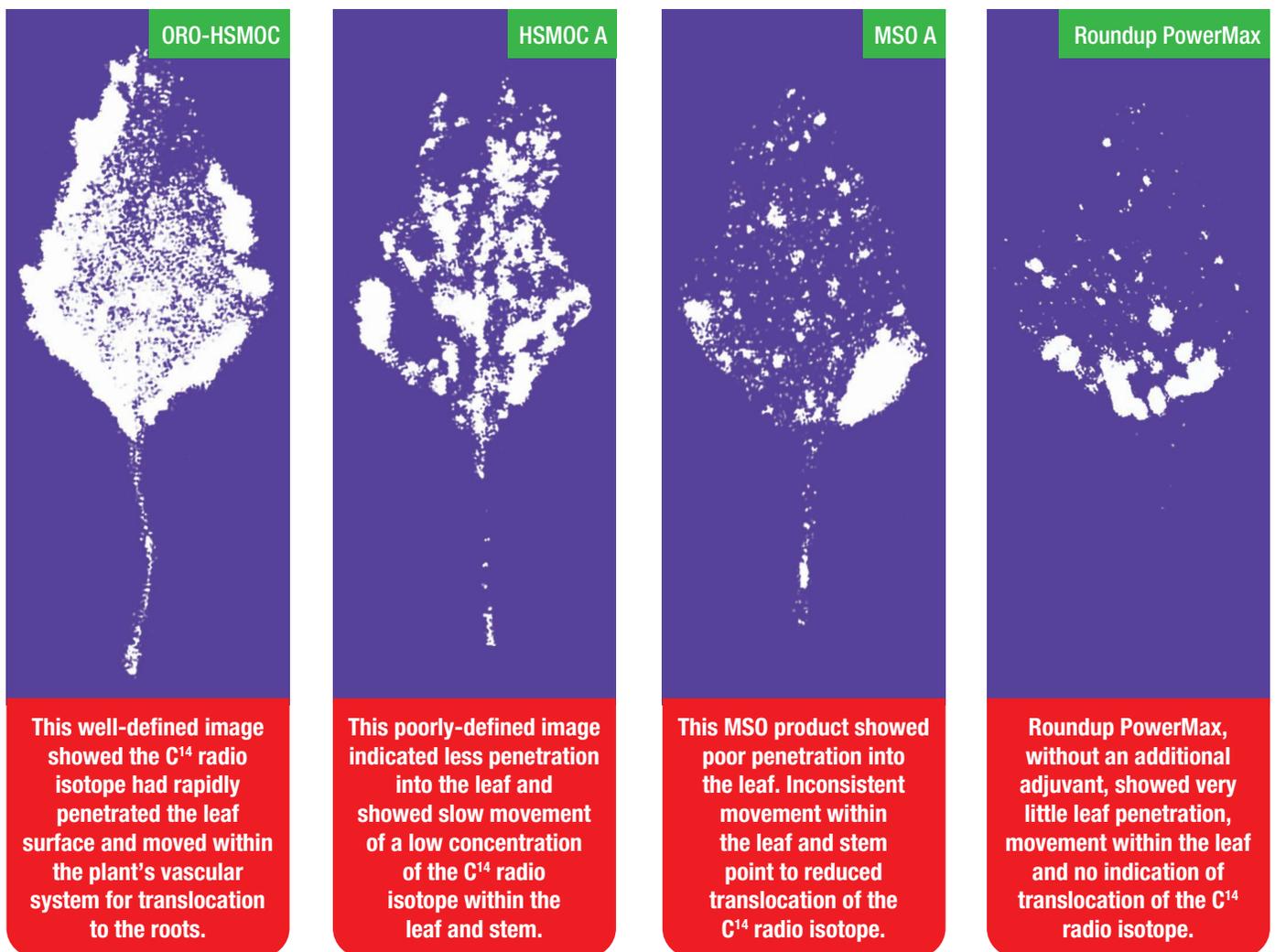
## C14 RADIOACTIVE ISOTOPE STUDY

The University of Illinois study used a C14 radioactive isotope solution to visually document two very important aspects of HSMOC adjuvant performance: penetration and movement of a Roundup PowerMax + adjuvant solution in a lambsquarter leaf; and the level and speed of translocation of the herbicide solution into the roots of a weed. Four (4) Roundup treatments were tested: Roundup PowerMax alone and mixed with ORO-HSMOC and widely-used HSMOC and MSO adjuvants.

In the leaf penetration study, the overall definition of the leaves and the presence or absence of white areas indicate where, and at what concentration, the radioactive solution has moved within the leaf. The better defined the image and the more white areas means more of the C14 isotope solution penetrated and was absorbed within the leaf. The results of this study clearly showed the ORO-HSMOC application moved more Roundup PowerMax into the leaf and, more importantly, into the stem for translocation to the roots.

**These phosphorescent images of the Roundup PowerMax + adjuvant solutions clearly show the superior penetration, movement within the leaf and the rapid onset of translocation with ORO-HSMOC versus other leading seed oil adjuvants and Roundup PowerMax alone.**

### 20 MINUTES AFTER APPLICATION



This well-defined image showed the C<sup>14</sup> radio isotope had rapidly penetrated the leaf surface and moved within the plant's vascular system for translocation to the roots.

This poorly-defined image indicated less penetration into the leaf and showed slow movement of a low concentration of the C<sup>14</sup> radio isotope within the leaf and stem.

This MSO product showed poor penetration into the leaf. Inconsistent movement within the leaf and stem point to reduced translocation of the C<sup>14</sup> radio isotope.

Roundup PowerMax, without an additional adjuvant, showed very little leaf penetration, movement within the leaf and no indication of translocation of the C<sup>14</sup> radio isotope.

The second part of the University of Illinois study compared the ability of HSMOC/MSO adjuvants to accelerate the translocation of post-emergent herbicide applications. The Roundup PowerMax + C14 radioactive isotope solution was again mixed with popular HSMOC and MSO products and ORO-HSMOC and then sprayed on lambsquarter plants. At 4 and 12 hours-after-treatment the plants were uprooted, rinsed and phosphorescent images were taken. **The images clearly show a higher concentration of Roundup PowerMax was absorbed and translocated, more quickly, to the roots of the lambsquarter weed with ORO-HSMOC than with the widely-used HSMOC or MSO adjuvants at both 4 hours and 12 hours after treatment.**

*Note: In these phosphorescent images, red areas indicate a high concentration of the Roundup C14 radioactive isotope.*

