



ASTM INTERNATIONAL  
Selected Technical Papers

# Pesticide Formulation and Delivery Systems: 36th Volume, Emerging Trends Building on a Solid Foundation

STP 1595

Editors:

Craig Poffenberger

Justin Heuser



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**SELECTED TECHNICAL PAPERS**  
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## Foreword

THIS COMPILATION OF Selected Technical Papers, STP1595, *Pesticide Formulation and Delivery Systems: 36th Volume, Emerging Trends Building on a Solid Foundation*, contains peer-reviewed papers that were presented at a symposium held October 27–29, 2015, in Tampa, Florida, USA. The symposium was sponsored by ASTM International Committee E35 on Pesticides, Antimicrobials, and Alternative Control Agents and Subcommittee E35.22 on Pesticide Formulations and Delivery Systems.

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# Contents

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|   |     |
|---|-----|
| Overview  | vii |
| <b>Standards</b>  |     |
| OMRI Listing for Pesticides: What You Need to Know<br>Doug Currier  | 1   |
| ASTM Standard Terminology Related to Biorationals Update<br>Lizbeth Rea and Michael C. White  | 15  |
| <b>Adjuvant Technology</b>  |     |
| Polyglycerol Esters as Adjuvants for Enhanced Pesticidal Activity<br>Justin Heuser, Craig Poffenberger, Rene Haensel, and Ewald Sieverding  | 18  |
| Lignin-Based Chemicals as Green Dispersants for Liquid Formulation:<br>Better Protection Against Crystal Growth<br>Jerry Gargulak, Stig Are Gundersen, Frédéric Bierre, and Pauline Rolland | 30  |
| The Affect of Dew on Herbicide and Adjuvant Efficacy<br>Donald Penner and Jan Michael   | 42  |
| Crop Oil Concentrates Comparison: Connecting Chemical Features<br>to Performance<br>Fernanda de Oliveira B. Costa, Cíntia Fávaro, Marcelo Catani F. Antunes, and<br>Richard K. Zollinger    | 49  |
| Efficacy of Non-Ammonium Sulfate Water Conditioning Adjuvants<br>Richard K. Zollinger, Bryan G. Young, Mark L. Bernards, and Dallas E. Peterson   | 65  |
| <b>Formulation Development</b>  |     |
| Novel Nonionic Star Polymeric Stabilizer in Aqueous Dispersion Formulations<br>Ron Kayea, Matthew Secrest, and Greg Lindner   | 76  |
| Polymeric-Based Compatibility Agents for High Electrolyte Systems<br>Hannah Bofinger, Sharon Ellis, Susan Sun, and Greg Lindner   | 90  |

---

|  |            |
|--|------------|
| <b>Improved Analytical Method Study of the Determination of Lambda-Cyhalothrin as Premix in Water-Based, Environmentally Friendly Formulations</b> | <b>102</b> |
| Shao'e Chen, Zhen Zhu, Dejian Ni, Lidong Wang, and Zhongwen Gao  |            |

### **Spray Applications and Delivery Systems**

---

|   |            |
|---|------------|
| <b>Mode of Action of Silicone Drift Control Agents</b>  | <b>113</b> |
| Michael Klostermann, Rene Hänsel, Ewald Sieverding, Joachim Venzmer, Craig Poffenberger, Lars Opfer, Ilia Roisman, and Cameron Tropea |            |

---

|  |            |
|--|------------|
| <b>The Effect of Adjuvants at High Spray Pressures for Aerial Applications</b> | <b>133</b> |
| Bradley K. Fritz, W. Clint Hoffmann, and Ryan S. Henry                         |            |

---

|  |            |
|--|------------|
| <b>The Influence of Nozzle Type, Operating Pressure, and Tank-Mixture Components on Droplet Characteristics and the EPA's Drift Reduction Rating</b> | <b>149</b> |
| Ryan S. Henry, Bradley K. Fritz, W. Clint Hoffmann, and Greg R. Kruger   |            |

---

|   |            |
|---|------------|
| <b>Spray Characterization by Optical Image Analysis</b> | <b>162</b> |
| Sounak Sarkar, Surya Kamin, and Greg R. Kruger          |            |

### **Seed Coatings**

---

|   |            |
|---|------------|
| <b>Correlation of the Mechanical Properties of Seed Coating Films and Dust-Off, Flowability, and Plantability Tests</b> | <b>183</b> |
| Alan Halecky, Ning Ren, Jie Lu, Jane Q. Wang, and Frances E. Lockwood   |            |

---

|   |            |
|---|------------|
| <b>Flowable Seed Treatments: A New Polymeric Dispersing System to Increase Active Ingredient Content and to Improve Flowable Seed Formulation Performance and Flexibility</b> | <b>202</b> |
| Rocco Di Modugno, Federico De Pellegrini, Brad Eidem, and Andrea Balestrini   |            |

## Overview

The 36th Symposium on Pesticide Formulation and Delivery Systems was held in Tampa, Florida, on October 27–29, 2015. It was sponsored by ASTM Committee E35 on Pesticides, Antimicrobials, and Alternative Control Agents and was organized by Subcommittee E35.22 on Pesticide Formulations and Delivery Systems. The symposium was titled, “Emerging Trends Building on a Solid Foundation.” Thirty-three contributed papers ranged in content from current topics such as UAVs, pollinator health, and green chemistries to more traditional ones, such as regulatory issues, spray applications, and formulation and adjuvant research.

This symposium varied from previous ones in that there were no traditional keynote speakers. Following the conclusion of the 35th Symposium in New Orleans in October 2014, a brainstorming session provided many insightful conference topics. Consequently, invited speakers covered a broad range of noteworthy topics:

- Precision Ag with Unmanned Aerial Vehicles (presentation by an actual farmer!)
- Irrigation and Water Minimization
- Pollinator Health and RNAi Technology
- Biopesticides
- A How-to on OMRI Listing of Pesticides and Adjuvants

In this publication, the 16 technical papers will be classified as follows: Standards, Adjuvant Technology, Formulation Development, Spray Applications and Delivery Systems, and Seed Coatings.

### **STANDARDS**

Doug Currier presented the basics on how to gain OMRI listings for pesticides and adjuvants, including required documentation. Although not presented, Rea and White submitted a paper on standard terminology for Biorationals, as this is under review by the E35.22 subcommittee.

### **ADJUVANTS TECHNOLOGY**

Heuser et al. described the application of polyglycerol esters as benign tank-side adjuvants, and Gargulak et al. detailed the application of ligninsulfonates as green dispersants in fungicidal SC formulations. Penner and Michael presented his results on how dew effects various adjuvants upon the application of glyphosate on post-emergent weeds. Costa et al. evaluated the performance of four crop oil concentrates for drift

potential and in field trials to: 1) determine the efficacy behavior of a fungicide combination and 2) determine efficacy control of a three-component herbicide blend.

In a collaboration between four universities, Zollinger et al. conducted standardized, uniform studies on several weed species known to show glyphosate antagonism with hard water. The intent is to ultimately develop an ASTM standard for water conditioning agents.

#### **FORMULATION DEVELOPMENT**

A new star polymer surfactant was introduced by Kayea et al. with benefits including improved emulsion stability and resuspension ability as based on evaluations with multiple formulation types and actives. Bofinger et al. described how a family of novel amphoteric polymers compatibilizes high electrolyte formulations containing glyphosate, AMS, and fertilizers.

Chen et al. introduced a high-pressure liquid chromatography (HPLC) method for determination of Lambda-cyhalothrin, which overcomes the limitations of the CIPAC method of quantification by GC wherein the technical is prone to isomerization.

#### **SPRAY APPLICATIONS AND DELIVERY SYSTEMS**

Papers by Klostermann et al. and Fritz et al. reported on the mode of action of silicone adjuvants as drift-control adjuvants and how adjuvants affect high-speed aerial applications, respectively. Henry et al. explained how parameters such as nozzle type, pressure, and tank-mix components influence spray droplet characteristics. Optical image analysis was offered as an alternative to characterize spray droplet size as compared to the traditional laser method by Sarkar et al.

#### **SEED COATINGS**

To address the concerns of dust off of seed coatings, Halecky et al. adapted mechanical methods used to predict paint durability in tribological studies with insecticide and fungicide SC formulations. Di Modugno et al. described a new dispersant approach with a polymeric surfactant which allows for an increased active content in the seed coating and reduced dust off.

The editors wish to acknowledge the sincere efforts undertaken by those who presented at the conference, those who followed with a contributed paper, and those who reviewed the papers. Session chairs were selected to highlight the dynamic of a new generation of researchers taking the reins of Subcommittee E35.22 on Pesticide Formulations and Delivery Systems. Evonik Corporation actively supported the endeavors and time demands imposed on the symposium chairman and editors.

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