



# **Pesticide Formulations and Delivery Systems, 27th Volume: Traditional and Non-Traditional Developments**

**Editors:**

**Craig Martin, Gregory Lindner, and Arlean Rohde**

**STP 1500**

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*Craig Martin, Gregory Lindner, and Arlean Rohde, editors*

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## Foreword

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This publication, *Pesticide Formulations and Delivery Systems, 27th Volume: Traditional and Non-Traditional Developments*, contains papers presented at the symposium with the same name held in Atlanta, GA, October 24–26, 2006. The sponsors of the symposium were ASTM International Committee E35 on Pesticides and Alternate Control Agents and its Subcommittee E35.22 on Pesticide Formulations and Delivery Systems.

The symposium chair was Craig Martin, FMC Corporation. The symposium co-chairs were Gregory Lindner, Uniqema, and Arlean (Medeiros) Rohde, ExxonMobil.

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# Overview

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Agrochemical formulations and delivery systems are evolving to meet the new standards required by their users, producers, and regulatory agencies. Customers are demanding safety, convenience, and increased efficiency of application. Pesticide manufacturers and formulators seek improved cost competitiveness and product differentiation. Regulatory bodies across the globe are insisting on lower dose products and require extensive testing to meet stringent safety criteria. The adept formulator is one who has learned how to address these many challenges in novel ways.

There has been a rise in innovative and nontraditional approaches to deliver pesticide products due to these and other factors. The theme of the 27th Symposium on Pesticide Formulations and Delivery Systems, held in Atlanta Georgia, on October 24-26, 2006, was chosen as Traditional and Non-Traditional Approaches to reflect the novel approaches being taken on both old and new formulation types by researchers around the globe. This gathering is sponsored every year by the ASTM Committee E35 on Pesticides and Alternative Control Agents and its Subcommittee E35.22 on Pesticide Formulations and Delivery Systems.

The 27th Symposium was attended by approximately 150 individuals, representing businesses large and small, universities, and regulatory agencies. There were 6 invited papers and 20 submitted papers presented at this event. Thirteen of the submitted papers have been peer-reviewed and are published in this volume. These papers have also been published electronically in the Journal of ASTM International.

This volume is separated into two sections. The first section, entitled Developments in Formulation Technology, contains eight papers focused on novel formulation types, new ingredients, and formulation evaluations.

This section begins with three papers emphasizing novel formulations and test methods. Devisetty, et al, describe the development of a water-soluble granular formulation of a naturally-occurring plant growth regulator, gibberillic acid. An organic-certified product with a higher load compared to liquid formulations has been successfully launched. The paper by Houghton reviews the development of a slow-release extruded pellet formulation of imidacloprid for use in sugarcane. This material has been shown to be active for 1.5 to 2 years in the field. Keifer and coworkers discuss the long-term stability of a microencapsulated formulation of clomazone, where control of volatility is extremely important to prevent unwanted neighboring crop effects. A novel analytical methodology was required in order to examine this property.

Formulation ingredients are covered in the next four papers. Kirby and collaborators show how foam can be controlled in tank mixes of water-dispersible granules by the use of a combination of fatty acid soaps with chelating agents and a polyacid polymer. At the same time dispersion performance is maintained. The paper by Stern and Elsik introduces a new type of dispersant, based on comb polymers, for use in agrochemical formulations.

Alexander demonstrates that improved performance of suspension concentrate formulations can be obtained when combinations of alkylnaphthalene sulfonate condensates and lignosulfonates are used. Elsik and coworkers describe the novel use of glycerin in glyphosate aqueous formulations.

This section closes with a theoretical modeling approach to the development of new solvents by Zhang. Hansen solubility parameters of the solvents are matched to experimental solubilities of various active ingredients.

Adjuvants and Application Technology contains five papers focusing on materials added to improve the effectiveness of agrochemical formulations and experimental methodologies to understand the actual application.

The section starts off with two papers covering the use of soil surfactants to overcome water repellency of soils. Kostka and collaborators describe how turf density is improved by the use of alkylated propylene oxide-ethylene oxide block copolymer surfactants as the result of improved soil wettability. In the paper by Fidanza, et al, fungicide effectiveness on fairy ring in turf is improved through the use of soil surfactants.

The opposite vein is explored in the following paper by Penner who studied the use of water-repellant adjuvants to decrease foliar retention of a soil-active fungicide. Performance of glyphosate continues to be a very active area of research activity. A group led by DeRuiter used fluorescence imaging to monitor glyphosate performance with and without adjuvants.

This volume concludes with a contribution by Salyani and collaborators in which a GPS system is used to monitor an application of the carbamate insecticide, aldicarb, in order to ensure that the product application is consistent with the label requirements.

The symposium chair and co-chairs gratefully acknowledge the efforts of the many contributors to this work: all who presented at the event, everyone who prepared the manuscripts for publication, and those who reviewed the submitted papers.

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