

阳离子助剂1227和C₈₋₁₀及有机硅助剂Breakthru S240对三种杀虫剂的增效作用

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Synergistic action of cationic adjuvants 1227 and C₈₋₁₀ and the silicone adjuvant Breakthru S240 to three insecticides

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摘要 为提升杀虫剂防效, 减少杀虫剂用量, 提高农产品安全, 本研究采用虫体浸渍法研究了阳离子助剂1227和C₈₋₁₀及有机硅助剂Breakthru S240对高效氯氟菊酯、毒死蜱和溴虫脲在甜菜夜蛾*Spodoptera exigua*幼虫和棉铃虫*Helicoverpa armigera*幼虫上的增效作用, 并测定了3种助剂对清水物理性状的影响。结果表明: (1) 供试助剂在两试虫上对3种杀虫剂均有显著增效作用, 且增效比与助剂浓度存在显著相关关系。相同浓度下, 除Breakthru S240对毒死蜱在棉铃虫上增效作用高于1227外, 3种助剂在两试虫上对3种杀虫剂增效作用均为C₈₋₁₀>1227>Breakthru S240。3种助剂在甜菜夜蛾上对3种杀虫剂的最佳增效浓度均为900 mg/L。3种助剂在棉铃虫上对3种杀虫剂的最佳增效浓度分别为900, 300和900 mg/L。(2) 3种助剂对清水物理性状均有显著影响。相同浓度下, 供试助剂对清水表面张力的降低能力、对扩展直径和最大稳定持留量的增强能力均为Breakthru S240>1227>C₈₋₁₀。综上所述, 阳离子助剂1227和C₈₋₁₀对3种杀虫剂在两试虫上的增效作用显著高于有机硅助剂Breakthru S240, 但后者对于提高杀虫剂在叶表沉积量的能力高于前者, 研究结果为3种助剂在杀虫剂领域的应用提供了一定的依据。

关键词: 杀虫剂 阳离子助剂 有机硅助剂 Breakthru S240 甜菜夜蛾 棉铃虫 增效作用 增效比

Abstract: In order to increase the control effects, reduce the use of insecticides, enhance the safety of agricultural products, the synergism of two cationic adjuvants (1227 and C₈₋₁₀) and one silicone adjuvant (Breakthru S240) to three insecticides beta-cypermethrin, chlorpyrifos and chlorfenapyr against 3rd-instar larvae of the *Spodoptera exigua* (Hübner) and *Helicoverpa armigera* (Hübner) were studied by dipping method, and the influence of the three adjuvants on physical properties of water was determined. The results showed that: (1) all of the tested adjuvants showed significant synergism to those insecticides, and the synergism ratio was significantly correlated to the concentration of adjuvant. The synergism ability of tested adjuvants to those insecticides against *S. exigua* and *H. armigera* was C₈₋₁₀>1227>Breakthru S240 under the same concentration, except that Breakthru S240 showed higher synergism ability to 1227 against *H. armigera*. The optimum synergistic concentration of tested adjuvants to those insecticides against *S. exigua* was 900 mg/L, while against *H. armigera* it changed into 900 mg/L (1227), 300 mg/L (C₈₋₁₀) and 900 mg/L (Breakthru S240), respectively. (2) All of the tested adjuvants showed significant influence on the physical properties of water. Reducing ability of surface tension, as well as the increasing ability of expanded diameter and the maximum retention of tested adjuvants to water were Breakthru S240>1227>C₈₋₁₀ under the same concentration. In conclusion, the synergism of tested cationic adjuvants (1227 and C₈₋₁₀) to three insecticides against both *S. exigua* and *H. armigera* was significantly higher than that of silicone adjuvant (Breakthru S240), while the latter showed better ability to enhance insecticide deposition on plant leaves than the former. These results provide theoretical proofs for the application of the tested adjuvants.

Key words: Insecticide cationic adjuvant silicone adjuvant Breakthru S240 *Spodoptera exigua* *Helicoverpa armigera* synergism synergism ratio

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