

Questions from Versar, Inc. and responses from the University of Hawai'i for the Western IPM Center regarding copper use and potential alternative copper species

1. Is there a specific reason why growers would have to use the copper species active ingredient that carries a 48 hour REI ? Could they potentially use a less toxic copper species that carries a 12 or 24 hour REI requiring minimal early entry PPE plus protective eyewear?

According to the coppers RED:

Products that will require a 24-hour REI	
Copper Species	Suitability as an alternative
Copper, metallic (022501)	There are no agricultural sites on the labels for products licensed for sale in Hawai'i.

Products that will require a 12-hour REI	
Copper Species	Suitability as an alternative
Copper ethylenediamine (024407)	The products licensed for sale in Hawai'i do not include the sites for which a 48-hour REI would pose a problem. Labels for products licensed for sale in Hawai'i state, "For use in Slow Moving or Quiescent Bodies of Water, including Golf Course, Ornamental, Fish, and Fire Ponds; Fresh Water Lakes, Fish Hatcheries and Potable Water Reservoirs."
Cupric oxide (042401)	The uses we are concerned about are food and ornamental crop production uses. Cupric oxide seems to be only for use as a wood preservative. Therefore, this pesticide would not be appropriate for our growers.
Copper octanoate (023306)	While some of the crops, for which a 48-hour REI is a concern, are on the labels for products which contain this active ingredient and are licensed for sale in Hawai'i, those labels I have seen are for small package sizes and low percent of the active ingredient (i.e., homeowner products). These are 10% ai in a 1 pint. container, and ; 0.08% ai in 1 quart and 24-ounce containers. The conclusion is that these products are not suitable for commercial production, even in small operations like many of Hawai'i's farms.
Copper triethanolamine complex (024403)	The labels for products which contain this active ingredient and licensed for sale in Hawai'i do not include any horticultural crops. These labels are for application to bodies of water including aquaculture facilities, but no other food or ornamental crops.
Copper salts of fatty and rosin acids (023104)	There are three products containing this active ingredient licensed for sale in Hawai'i. Two of them have the same master EPA registration number. These labels do include <i>some</i> of the crops about which growers are concerned. However, there is very little familiarity with any of these products. One respondent indicated that this form of copper is not as persistent and reapplication would have to be done more frequently. Growers do have a preference for copper hydroxide, copper sulfate or, in the case of ornamentals, copper sulfate pentahydrate. <i>Theoretically</i> , it shouldn't make any difference which form of copper they use, but there are concerns about efficacy and phytotoxicity of forms of copper they are not familiar with. Most importantly, none of these products is registered for use on papaya, bananas or coffee, three very important uses for copper in Hawai'i. Therefore, this form of copper is not an alternative for these and possibly other crops of concern.

2. *Is the bagging of the banana bunch performed immediately after the application of pesticide? Would it be correct to say that this is a necessary part of the application process, thereby classifying it as part of the applicators task?*

Where banana bunches are bagged and sprayed with copper, the standard procedure is to bag each bunch immediately after spraying.

Not all growers use bags, but for those who do, bagging would be considered is a part of the applicator's tasks. Someone else could bag the fruit, but it is most convenient for the applicator/bagger to do so, as he is already on the ladder up at the bunch level and the spray is carried around with the bagger. It is necessary for the bunches to be bagged as soon as possible after the spraying. Otherwise, rain (over 100 inches per year at some farm sites) will reduce the effectiveness of the treatment.

Weather permitting, however, there are growers who would prefer to send workers out the next day to bag banana bunches previously sprayed with copper. Therefore, for those growers, increasing the REI to 48 hours will be undesirable.