# RESIDUES OF PHOSPHINE FOLLOWING FUMIGATION OF KIWIFRUIT

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New Zealand- and Chilean-grown kiwifruit are economically important export crops to Asia, Europe and the USA. As kiwifruit may harbour quarantine pests (e.g. armoured scale insects, mealybugs and thrips), internationally accepted procedures must be applied to prevent their spread into pest-free areas. Treatment with methyl bromide is a common quarantine treatment. In recent years, pure phosphine has been suggested as a methyl bromide replacement for perishable fruit products (Horn and Horn 2004, Klementz et al. 2005, Brash et al. 2009). In a research collaboration between New Zealand and Germany, ZESPRI® GREEN and ZESPRI® GOLD Kiwifruit were fumigated with phosphine and residues were measured during subsequent storage.

ZESPRI® GREEN and ZESPRI® GOLD Kiwifruit were shipped from New Zealand to Germany and fumigated with phosphine (3.5 mg/L = 2500 ppm vol.) in a 0.5 $m^3$ chamber in the Berlin Laboratory for 4 days at 15°C. Residues were determined by the head space method following the principles of Nowicki (1978). ZESPRI® GREEN Kiwifruit built up higher residues (about twice those of ZESPRI® GOLD Kiwifruit) and released them more slowly. In both cases, the residues of phosphine did not exceed the European Minimum Residue Limit for fruits of 50 µg phosphine/kg after a waiting period of less than 12 h (Figure 1). The gas chromatographic analytical method (GC/MS) for detecting the residue was validated by alternatively determining the unforced spontaneous desorption of phosphine from fumigated fruit in closed vessels (Noack et al. 1983).

Results suggest that phosphine could be a suitable replacement for methyl bromide for quarantine treatment of kiwifruit.

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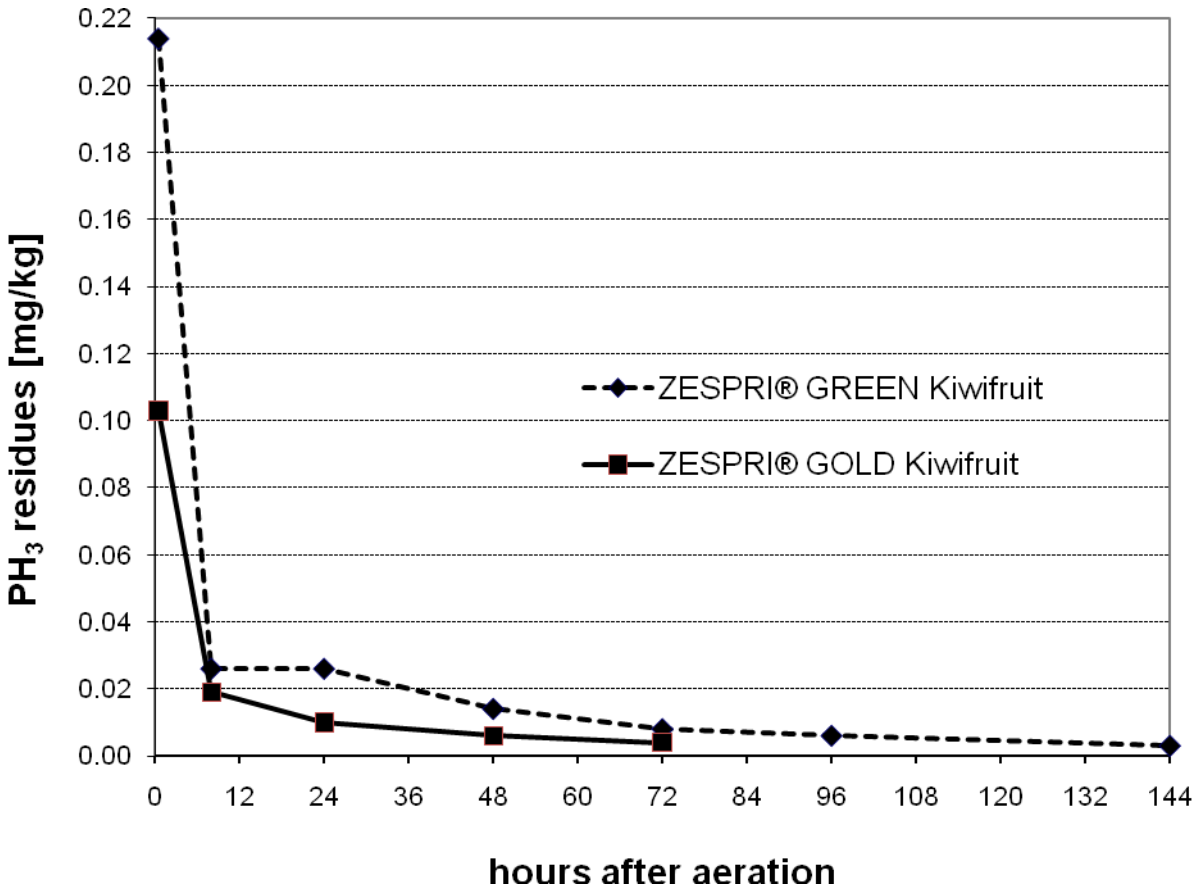


**<u>Figure 1:</u> Decay of phosphine residues in ZESPRI® GREEN Kiwifruit (dotted line) and ZESPRI® GOLD Kiwifruit (solid line) following fumigation with initial dosage of about 2500 ppm vol. phosphine (3.5 mg/L) at 15°C over 96 h;**
**NB European MRL: 50 µg phosphine/kg = 0.05 mg/kg for fruit**