**Determination of Insecticide Residues in vegetables
 Collected from Phnom Penh Markets**

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Abstract

In Cambodia, insecticides have been widely used in agricultural crops, especially vegetables, in order to protect them from insect damage. In addition, some farmers think that insecticides can make their crops grow better. Most farmers harvest their crops before the with-holding time to ensure their crops look healthy when they are taken to the market and so can be sold for higher prices. Misuse of insecticides can affect the health of people who consume those vegetables.

This research studied the level of insecticide residues in vegetables collected from wholesale markets in Phnom Penh. New bottles of insecticide were purchased from markets in Phnom Penh and also analyzed.

Two methods were used. Firstly, a general “Test kit” technique, to determine the presence of insecticide residues, and secondly, for samples that tested positive, identification and quantitative determination of the residual insecticides by GC-MS.

The results of test kit tests showed that the following vegetables contained pesticide residues, but they were below dangerous levels (Detect Safe); 26.7% water greens, 26.7% cauliflower, 44.7% cabbage, 20% bok choy, 26.7% short stem kale, 33.3% spinach, 40% black kale, 26.7% tomato, 40% long bean, and 20% lettuce. Some vegetables contained residues at unsafe levels (Detect Unsafe); 7% cauliflower, cabbage, spinach, black kale, and bok choy, and 13% of tomato and short stem kale.

The results of GC-MS analysis identified only two kinds of insecticides; Chlorpyrifos and Methomyl. The concentration levels of chlorpyrifos residue in short stem kale were between (0.4ppm-16ppm), in long bean (04ppm-0.5ppm), in spinach (0.1ppm-13.1ppm), in black kale (0.3ppm-7.6ppm), in cauliflower (15.8ppm-19ppm), in water green (0.2ppm-0.6ppm), and in lettuce was 0.4ppm. Furthermore, the concentration levels of Methomyl residue in cauliflower was 0.1ppm and in tomato is 0.2ppm.

The GC-MS analysis showed that 9 of the 15 new bottles of insecticide (60%) had different composition from the label on the bottle.

The World Health Organization (WHO) recommends a maximum residue level (MRL) for chlorpyrifos in vegetable of 1ppm and 7ppm for Methomyl. The concentrations of chlorpyrifos in samples ranged from below to higher than MRL recommended by WHO. In addition, the concentration level of Methomyl in samples was lower than MRL recommended by WHO.

Only three markets in Phnom Penh were sampled so caution should be used when generalising. However it indicates that there continues to be cause for concern about pesticide residues in locally produced vegetables and there is a need for further monitoring.