Revealing of Wheat Products Contamination With Flour Beetles Tribolium spp. by Molecular Technique

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Abstract

Molecular technique is an accurate, susceptible, and species-specific method for detection of stored-product pests. The closely related flour beetles, Tribolium spp; red flour beetle, Tribolium castaneum and confused flour beetle, Tribolium confusum cause extensive economic loss of wheat grains and its products due to the contamination with their fragments and toxic secretions. PCR (Polymerase Chain Reaction) has been used successfully to detect DNA insect fragments in different commercial wheat product samples. Specific primers were designed to amplify elongation factor 1-alpha (EFA1) and beta-tubulingene for detection of T. castaneum and T. confusum DNA, respectively. Five types of flour have been examined and two types of local biscuits were tested as final wheat products. The results showed that the two primers, which designed for amplification of the two flour beetles DNA, are effective, sensitive, and species-specific for detection of the insect fragments in all wheat products. It was a pity that bands of the DNA of the two beetles appeared in all types of tested product samples. The contamination with these secondary pests, especially with T. confusum, might be started in the early stage of storing whole grains before milling process.

Keywords: Tribolium castaneum, Tribolium confusum, Primers, PCR, Wheat Flour, and Biscuits.