

# Environmental Toxicology 2018: Post-Harvest evaluation of dimethoate, chlorothalonil and chlorpyrifos by CG-ECD in Peruvian varieties of *Chenopodium quinoa* Willd

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## ABSTRACT

**Statement of the Problem:** *Chenopodium quinoa* is an important nutritional Andean grain produced by farmers in Peruvian highlands and Plateau. In the last years, new crops like quinoa in Peruvian coast have been cultivated due to increasing of worldwide demand of quinoa. However, the growing under this agro climatic condition, quinoa was more sensitive to plague attacks, and fungus infection, for those reasons farmers increasing the use of pesticides, which in many cases exceeded the maximum residue limits established by International Organizations in food and feed. The purpose of this study was the post-harvest evaluation of dimethoate, chlorothalonil, and chlorpyrifos by gas chromatography coupled with electron capture detector (GC-ECD) using a solid phase extraction in seeds of four varieties of Peruvian quinoa. **Methodology:** The study began with the development, optimization, and validation of the method for determining the levels of dimethoate, chlorothalonil, and chlorpyrifos in the post-harvest stage of Salcedo, Quillahuaman, Santa Ana, and Altiplano quinoa varieties, which were harvested in conventional and organic field at the central coast of Peru (Lima). **Findings:** Validation by CG-ECD shows pesticides recovery percentages between 98.98 and 118.44% with relative standard deviation up to 10.5%, significant correlation coefficients ( $\geq 0.9979$ ) and limits of quantification ( $\geq 5.402$  ppb) were observed in the quinoa seeds, which meet the standard validation parameters of the European Commission. The evaluation of chlorothalonil in Quillahuaman and Santa Ana at conventional field exceeded the maximum residue level allowed, however three months later the concentration of the pesticides used in the culture decreased significantly. In the case of organic field the pesticides were not

observed. **Conclusion:** The gas chromatography coupled with electron capture detector can be used to determine the levels of dimethoate, chlorothalonil, and chlorpyrifos in quinoa seeds. Recommendations are to determine the levels of these pesticides in the Peruvian market.

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