Post-harvest evaluation of dimethoate, chlorothalonil and chlorpyrifos by CG-ECD in Peruvian varieties of *Chenopodium quinoa* Willd.

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INTRODUCTION

Quinoa is an important Andean grain with high nutritional and functional value mainly produced in the Andes and coast from Peru. In recent years, pesticides were reported in quinoa grains cultivated in the Peruvian coast, and their increase of use to control pests and fungus can be detected as residuals. The determination of this analytes can be made with chromatographic method like CG-MS. However, is necessary to validate other detectors to evaluate pesticides of economical importance in the crop of quinoa. The aim of this study is to determine the concentration of dimethoate, chlorothalonil and chlorpyrifos in quinoa coast crops at two different harvest times (at 0 and 3 month), using an alternative analytical method by extraction in solid phase and gas chromatography with electron-capture detector.

MATERIAL AND METHOD

Four quinoa varieties from organic and conventional field were analyzed in the research. Sample treatment was carried out with SPE using C18 cartridges and eluting with ethyl acetate 2 mL. GC-ECD was used to quantify three pesticides: dimethoate, chlorothalonil and chlorpyrifos. Method validation was according to the European Commission Guidelines.

RESULTS

Method validation met all the parameters stated by the European Commission at precision, linearity, LOQ, and recovery (%).

The analysis of samples from organic field did not show evidence of pesticides. However, varieties from the conventional field (Salcedo INIA and Quillahuaman INIA) had presented chlorothalonil concentrations above the maximum residual limit (10 µg/kg). After three months post-harvest chlorothalonil and chlorpyrifos diminished their concentration.

CONCLUSIONS

Salcedo INIA and Quillahuaman INIA varieties, both from conventional field, had chlorothalonil concentrations above the maximum permitted residual limits.

Three months post-harvest, concentrations of the three pesticides were found below the maximum residual limits.

Seeds of the organic field did not present pesticide residues.

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Pesticide quantitation by GC-ECD in quinoa grains

Variety	Conventional field						Organic field		
	Month 0 (ug/kg)			Month 3 (ug/kg)			Month 0 (ug/kg)		
	Di	Ct	Cy	Di	Ct	Cy	Di	Ct	Cy
Salcedo INIA	ND	31.4	8.1	ND	ND	3.6	ND	ND	ND
Quillahuaman INIA	ND	19.1	24.8	ND	5.0	9.8	ND	ND	ND
INIA 433 Santa Ana/AIQ FAO	ND	7.1	24.0	ND	6.2	8.5	ND	ND	ND
INIA 431-Altiplano	ND	6.6	40.2	ND	ND	3.7	ND	ND	ND

Pesticide quantitation by GC-ECD in quinoa grains. (Di: Dimethoate; Ct: Chlorothalonil; Cy: Chlorpyrifos; ND: No detectable)