Perchlorate occurs naturally in the environment in deposits of nitrate and can be formed in the atmosphere and precipitate into soil. However, little is known about the occurrence and levels of perchlorate in soils and fertilizers in Chile and its impacts on agricultural systems and food safety. In this study, concentrations of perchlorate were determined in 101 surface soils and 17 fertilizers [nitrogenous (n = 8), nitrogen-phosphorous-potassium (NPK; n = 3), phosphate (n = 2) and non-nitrogenous (n = 4)] collected across Chile from 2017 to 2018. Our results show that perchlorate was detected mainly in agricultural soils (mean: 0.32 ng g\(^{-1}\)), grassland rotation sites (0.41 ng g\(^{-1}\)) and urban locations (0.38 ng g\(^{-1}\)). Interestingly, elevated concentrations of perchlorate (9.66 and 54.0 ng g\(^{-1}\)) were found in agricultural soils. All fertilizers contained perchlorate: nitrogenous fertilizers (mean: 32.6 mg kg\(^{-1}\)), NPK (mean: 12.6 mg kg\(^{-1}\)), non-nitrogenous fertilizers (mean: 10.2 mg kg\(^{-1}\)) and phosphates (mean: 11.5 mg kg\(^{-1}\)). Only one type of nitrogenous fertilizer (KNO3: 95.3 mg kg\(^{-1}\)) exceeded the international regulation limit (50 mg kg\(^{-1}\)). For two agronomic practices, the content of perchlorate in lettuce increased as the fertilizer application rate increased, with fertigation promoting a more significant accumulation. However, the concentrations generally remained below regulatory values. Our results suggest that fertilizers constitute an important source of perchlorate in soils. © 2020 Elsevier Ltd
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