



# Effects of alkaline fertilizer and rice cultivation (*Oryza sativa* L.) on remediation of soils polluted with cadmium (Cd)

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## ABSTRACT

**Objective:** The objective of this study was to develop a simple and feasible methodology which makes possible restoration of soils polluted by cadmium using two types of fertilizers (alkaline and conventional), and the technique of phytoremediation (low rice variety, and hyper accumulator of cadmium).

**Methodology and results:** Its application mode was experimented at Guangdong Provincial Research Center for Environmentally Friendly Fertilizer Engineering Technology in Guangzhou, republic of china. The experiment was carried out in a greenhouse, with an average daytime temperature of 25.5°C, in the city of Guangzhou (China). Polyethylene pots with an inner diameter of 25 cm and a height of 25 cm were each filled with 5 kg of air-dried soil and passed through a 1cmx1cm mesh of a sieve. Four factors were studied, soil contamination level (soil contaminated with Cd, soil with low Cd contamination), pH of the fertilizer (high, pH = 9.5, normal pH 5.8), dosage of the fertilizer applied (low level, medium level, high level) and low Cd accumulating rice variety (Xiangwanxian 12) and hyper Cd accumulating rice (Yuzhenxiang). Soil samples taken from a depth of 0 to 30 cm were delivered to the laboratory for analyses. Results obtained showed that the soil pH was higher with the treatment of alkaline fertilizer compared to that of normal fertilizer. The pH in the soil contaminated with Cd was 5.80 (alkaline fertilizer applied), higher than that of 5.74 (normal fertilizer applied), alkaline fertilizer improve pH soil, cure Cd pollution, bring to rice specific nutrients, at specific moment that rice need to growth and achieve the effect of inhibiting soil pollution, more in hyper accumulation rice than that low accumulation one.

**Conclusion and application of results :** The results should be helpful in determining appropriate amounts of alkaline fertilizer rice farmers should use to return farm land to productive food crop use, beyond that it was thought cane would be helpful in cadmium uptake from soil. Some rice farmers were reluctant to follow this transition and insisted on growing their rice for survival, alkaline fertilizers can better stop soil pollution and increase the soil pH value. The application of alkaline fertilizer achieves the effect of "controlling Cd pollution with fertilizer".

**Key words:** alkaline fertilizer, pH, Cd, normal pH fertilizer, accumulation