# ASSESSMENT OF HEAVY METAL CONTAMINATION IN IRISH POTATOES AND SOILS FROM AN ABANDONED MINING SITE IN JOS-SOUTH, USING AAS AND XRF TECHNIQUES.

**BY**

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# A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA

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# DEPARTMENT OF PHYSICS, FACULTY OF SCIENCE

**AHMADU BELLO UNIVERSITY ZARIA, NIGERIA**

# JUNE, 2015.

I hereby declare that this thesis entitled: **ASSESSMENT OF HEAVY METAL CONTAMINATION IN IRISH POTATOES AND SOILS FROM AN ABANDONED MINING SITE IN JOS-SOUTH, USING AAS AND XRF TECHNIQUES,** has been written by

me and that it is an DFFRXQW RI P\ RZQ UHVHDUFK H[FHSW WK

which have been duly cited . No part of this thesis was previously presented for another degree or diploma at any university.

**Yusuf Sadau SANDA Date**

# (Student)

This thesis titled: **Assessment of Heavy Metal Contamination in Irish Potatoes and Soils from an Abandoned Mining Site in Jos-South, Using AAS and XRF Techniques** by Yusuf Sadau Sanda meets the regulations governing the award of Master of Science (M.Sc.) of Ahmadu Bello University, Zaria and is approved for its contribution to scientific knowledge and literary presentation**.**

Dr. Z. I. Yusuf

Chairman Supervisory Committee Signature Date

Dr. S. Umar

Member Supervisory Committee Signature Date

Dr. S. Umar

(Head, Department of Physics) Signature Date

Prof. A. Z. Hassan

(Dean, School of Postgraduate Studies) Signature Date

I dedicate this work to my family for all they have done to me in the course of my studies here in ABU, zaria.

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This study was undertaken to assay the elemental concentration in some Irish potatoes and soils from farmlands in an ex-mining area at Dahwol-vwana village, Jos-south L.G.A, Plateau state, Nigeria. The total heavy metal concentrations (for Irish potato and soil samples) were obtained using Atomic Absorption Spectrometer. It was observed from the soil sample concentration values gotten at the end of the AAS analysis (Pb, ranges from 0.0445-3.9343ppm; Cd, from 0.0086- 0.1200ppm and Zn, from 0.0751-39.0302ppm) are higher than the concentration values obtained from control area (Pb- 0.0088ppm, Cd-0.0029ppm and Zn-0.0101ppm), but lesser than the international threshold values (**EU**:- Pb-300ppm, Cd-3.0ppm and Zn-300ppm. **USA**: - Pb- 300ppm, Cd-3.0ppm and Zn-250ppm. **UK**:- Pb-70ppm, Cd-1.4ppm and Zn-200ppm). While that of Irish potatoes: - Pb, ranges from 0.0741-1.5042ppm; Cd, from 0.0081-0.0931ppm and Zn, from 0.1038-88.0503ppm). A modified sequential extraction procedure of Tessier et. al., (1979) was used in separating the total metal concentrations into four operationally defined fractions (exchangeable and carbonate, Fe and Mn oxides, organic matter, and residual fractions). Where it was discovered that the bulk of metals were partitioned to the