



Evaluation of Mycotoxins and Microbiological levels in cassava products consumed in Zambia

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Introduction

Cassava (*Manihot esculenta*) is a staple crop after maize in Zambia and requires post-harvest processing before consumption. Microbiological and mycotoxins contaminations of cassava-based products occur mainly during processing and storage (Chiona et al., 2014).

The mycotoxins contaminants have been shown to be linked to cancers, immune system defects, growth retardations, liver diseases, and death (Wu et al., 2004). Hence it is imperative to study mycotoxins in cassava products especially that little or no knowledge is available.



Fig. 1: Open market cassava flour traders, and Household drying of cassava

Materials and Methods

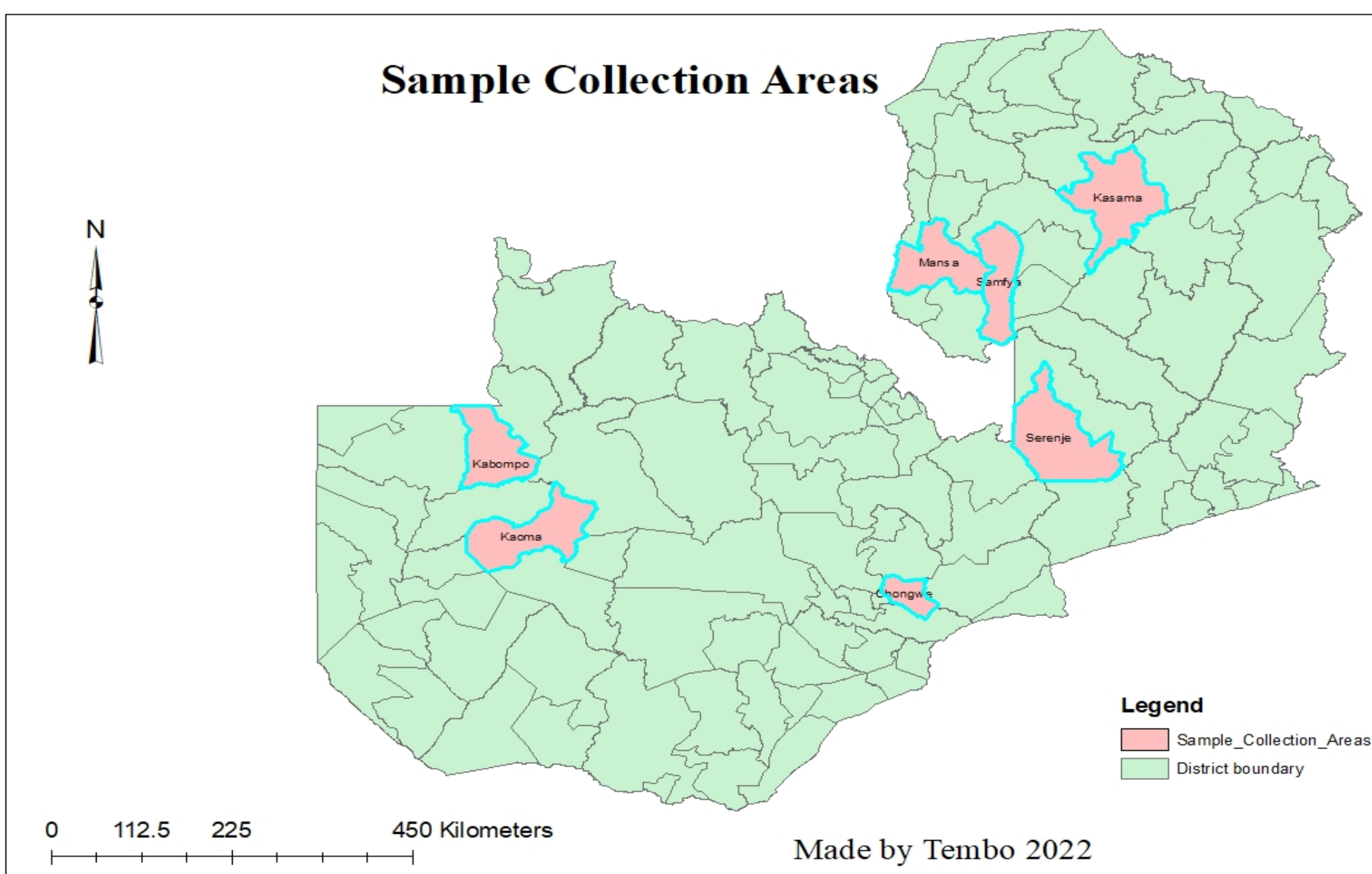


Fig. 2: Map of study areas across Zambia. Seven (7) districts - Lusaka, Kabompo, Kaoma, Serenje, Mansa, Samfya, and Kasama. Sampling sites are among the most cassava-abundant areas (SMEMP, 2003)

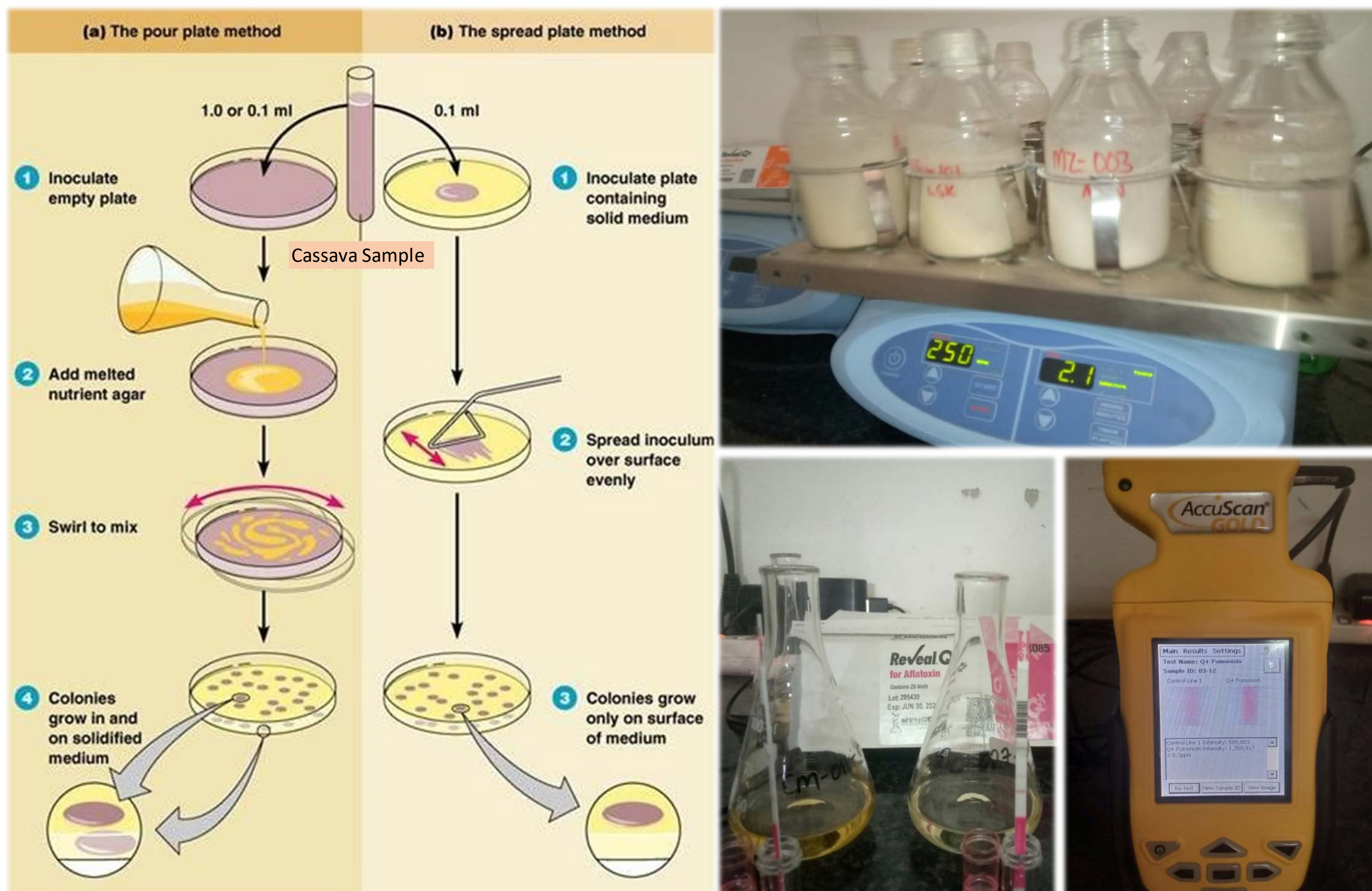


Fig. 3: Microbial analysis using ISO qualitative method 21527-2 (2008), and Mycotoxins analysis using Reveal Q+ quantitative test method.

One hundred and two (102) samples of cassava products were analysed for microbial contamination, and fifty (50) samples were analysed for mycotoxins contaminations.

Objectives

The objective of the study was to analyse the levels of mycotoxins and microbial contamination of cassava products that are in households, markets and available to consumers.



Fig. 4. Cassava flour processor, and Cassava roasted and fried chips trader

Results and Discussion

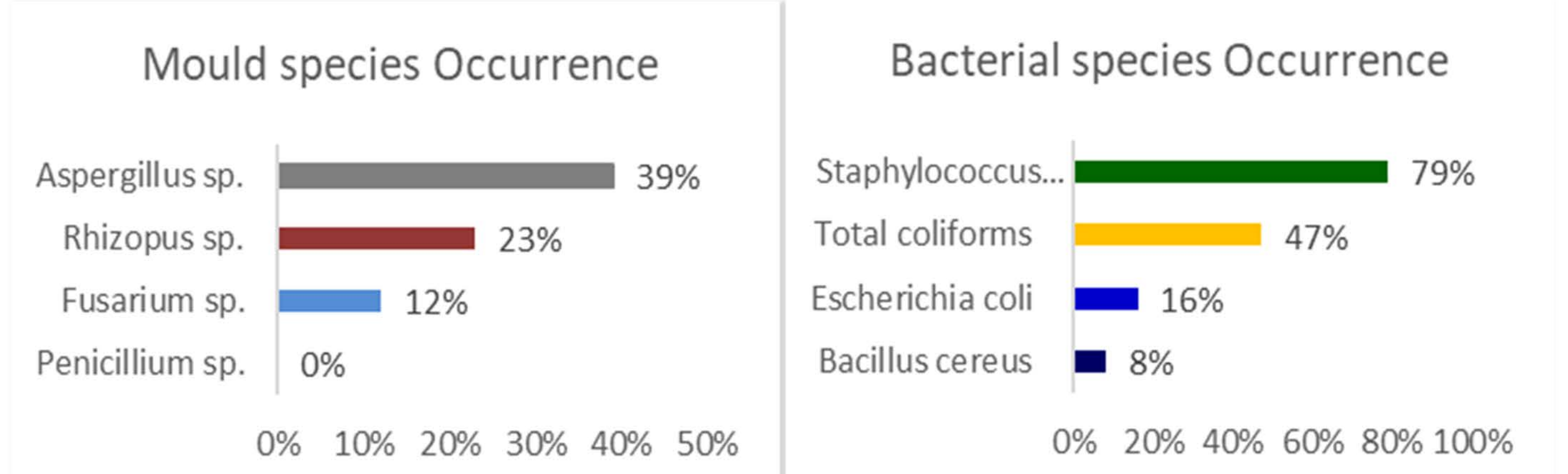


Fig. 4: Occurrence of microbes (mould and bacterial species) in cassava flour and cassava chips in all the locations.

Mycotoxins (*Ochratoxin*, *Aflatoxin*, *Fumonisin*, *DON*, and *T-2/HT-2*) levels were found below the limit of detection as per Food and Drug Administration (FDA, 2018) standards.

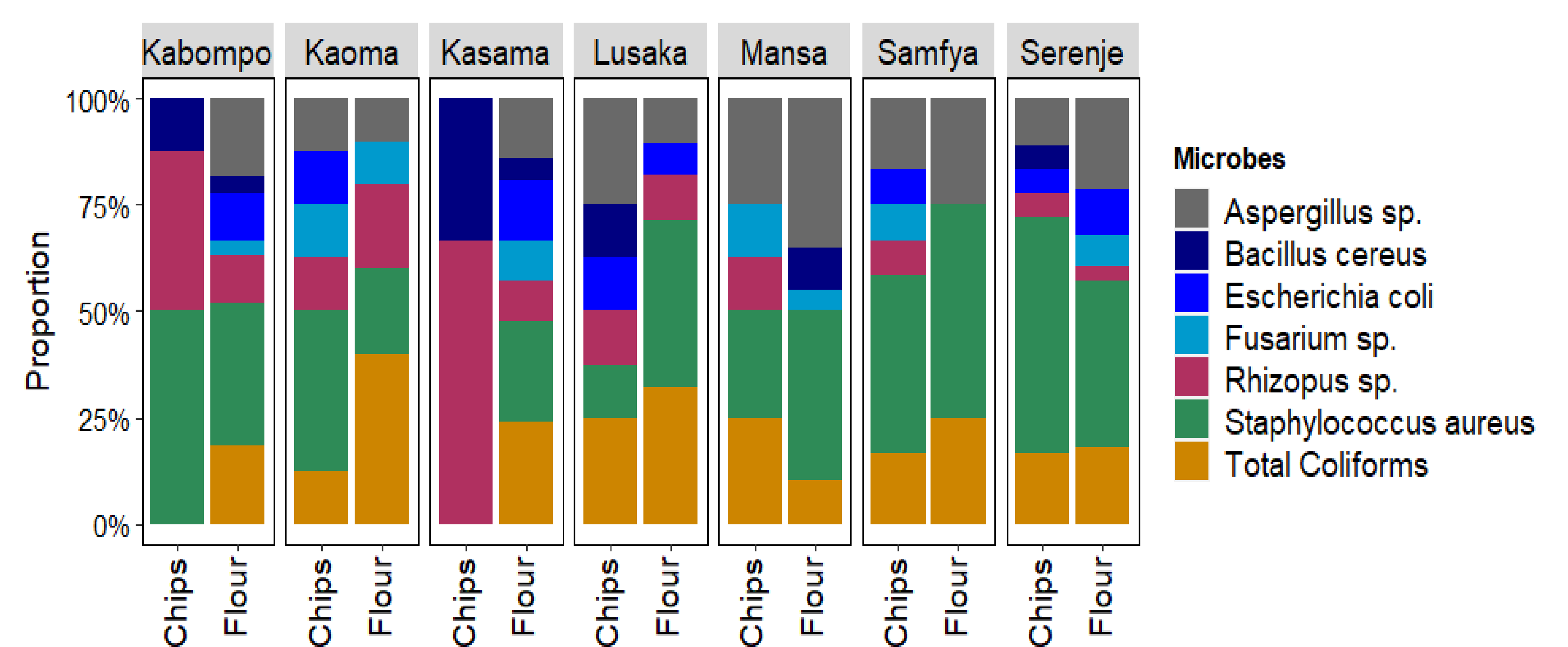


Fig. 6: Relative frequencies (Proportion) of microbes present in cassava products (chips and flours) among the seven study locations (Kabompo, Kaoma, Kasama, Lusaka, Mansa, Samfya and Serenje). Proportions are indicated as mean values (n = 61) and samples with zero proportions were not included.

Conclusion

Therefore, it could be concluded from this study that dried cassava chips and flour in Zambia are contaminated with moulds (*Aspergillus sp.*, *Fusarium sp.*, and *Rhizopus sp.*) and bacteria (*Bacillus cereus*, *Escherichia coli* and *Staphylococcus aureus*). Cassava chips and cassava flour from households, processors, open markets and supermarkets were contaminated with mycotoxins however these were found to be below the limit of detection.

Acknowledgement

The authors express gratitude to the International Institute of Tropical Agriculture (IITA), Southern Africa Hub, Lusaka, Zambia and CGIAR-RTB for financial and material support during and after the period of the research project.