

Characterizing Food Waste From A South African Supermarket – A Case Study

Noluyolo Vundisa¹, Xola Xiki¹, Jactone A. Ogejo², Grace Emily Okuthe*¹.

¹Department of Biological & Environmental Sciences, Walter Sisulu University, P/B X1 Mthatha, 5117, South Africa.

²Biological Systems Engineering Department, Virginia Tech, Blacksburg, VA, USA.

Introduction

- ▶ Every year, one-third of food produced worldwide for human consumption is lost or wasted (FAO 2021).
- ▶ Food waste (FW) comprise nearly 40% of municipal solid waste (MSW) in S. Africa.
- ▶ Landfilling results in wastage of nutrients and energy, and places pressure on the environment.
- ▶ Before food becomes waste, it is intended for human consumption, so it is nutrient rich & is considered a good source of value-added products.
- ▶ Traditionally, Fruit and Vegetable Waste (FWW) is often directly converted into animal feeds, while a substantial quantity is diverted to composting as the conversion technology (Cheng & Lo, 2016).
- ▶ Due to pressure to eliminate hunger by 2030, and the rising cost of food due to the war in Ukraine,
- ▶ The challenges to ending hunger, food insecurity and all forms of malnutrition keep growing specifically in sub-Saharan Africa (SSA).
- ▶ Substantial quantity of food, usually those not sold within defined selling period, are regularly thrown away.
- ▶ These wastes could be utilized suitably as animal food or supplements.
- ▶ This study provides a descriptive summary of seasonality in the composition of food waste collected at selected supermarket departments.
- ▶ Agrifood systems have become a major source of global GHG emissions and are placing excessive pressure on land, water, and other natural resources.
- ▶ The Food and Agriculture Organization predicts that cultivated aquatic species will provide around 53% of the world's seafood supply by 2030.
- ▶ Further growth of intensive farmed aquatic species may be limited by a shortage of feed resources.
- ▶ The aquaculture sector therefore needs to intensify its search for alternative ingredients based on renewable natural resources.
- ▶ This will require an accelerated transition in technology & production systems, better use of natural available resources, development of high-quality alternative feed resources.
- ▶ Accordingly, our research group feels that Supermarket Food Waste (SFW) would fill this void.

Aim & Objectives

- ▶ The aim of the present study was to identify appropriate alternative ingredients for a sustainable Mozambique tilapia (*Oreochromis mossambicus*) production.
- ▶ To identify the types of food waste from a supermarket.
- ▶ Determine their composition & temporal variation as raw materials for aquafeed.

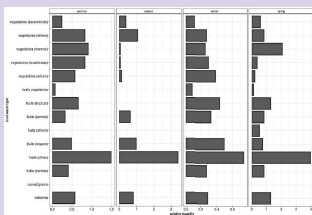
Materials and Methods

- ▶ Qualitative index of amount of food waste: - - 'none',* - 'few',** - 'average', and *** - 'abundant' was converted to numeric scale into 0,1,2, and 3.
- ▶ This was then summarised visually. In addition nutritional content of major food waste also summarised.
- ▶ All the analysis, visualization and report generation were done in R (R Core Team, 2022).
- ▶ Multiple R packages were utilized for data processing, visualization, analysis and summary of results.

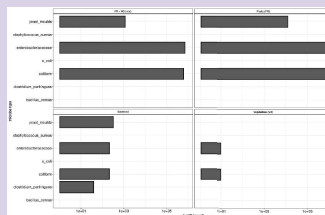


Results

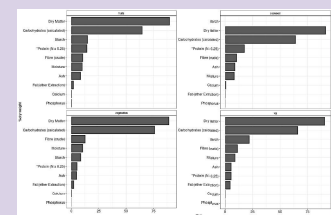
Relative Magnitude & Seasonality



Microbial Count By Food Waste Type



Proximal Composition



Conclusions

- ▶ Results indicate that SFW is a partial replacement for commercial feed.
- ▶ Biosafety data also indicate that the formulated feed is safe for animal use.
- ▶ No PAHs and OCPs were detected on ground SFW flour.
- ▶ Based on the findings of the study, a feeding trial will be carried out to evaluate growth repose of *O. mossambicus* juveniles, using feed formulated from SFW.
- ▶ It was observed, that SFW is generated on a daily basis, at the supermarket, so the supply is guaranteed all year round for sustainable use as aquafeed.