Screening for Antioxidant and Antimicrobial Bioactive Compounds from *Carica Papaya* Extracts

Lilian Kafuko, Prof. Kwaku Duodu, Prof. Eugenie Kayitesi, Dr Ngwekazi Mehlomakulu

University of Pretoria, Pretoria, South Africa

Abstract

FAO reports an increase in purchase of fresh produce due to consumer lifestyle changes related to health benefits of consuming fresh produce. Fresh produce are sources of micronutrients, bioactive compounds such as phenolic compounds with health-promoting abilities. However, approximately 60% of global food waste is from fresh produce with by-products (seeds and peels) as major contributors. Bioactive compounds in these by-products have gained research interest in their utilization to produce high-end commercial products. *Carica papaya* by-products are potential sources of bioactive compounds. This study is aimed at identifying bioactive compounds in papaya peel with antioxidant and antimicrobial properties.

Briefly, peels from mature papaya fruit were freeze-dried and ground to powder. Bioactive compounds were extracted from 2 g powder in 15 mL of 50% methanol with 1% formic acid, followed by sonication for an hour. The crude extracts were analysed for bioactive compounds using LC-MS at the Central Analytical Facility (University of Stellenbosch, South Africa). Crude extracts for antimicrobial activity were prepared from freeze-dried papaya peel powder mixed with 90% acetone in a 1:10 ratio for 3 h. After extraction, the extract was dried and reconstituted with 50% DMSO. The antimicrobial activity of the crude extract was tested against *Listeria monocytogenes* and *Escherichia coli* using the agar-well diffusion assay. Temperature stability and activity of the crude extract was conducted at 4^{o}C and 10^{o}C for 5 days.

The LC-MS data showed that the crude extract had high concentrations of benzyl glucosinolates, citric acid, quercetin-3-rhamnosyl rutinoside and ferulic acid. Rutin, malic acid, gluconic acid, vanillic acid and ρ-coumaric acid were present at low concentrations. The crude extract at 500 mg/mL was most effective at inhibiting the growth of both microorganisms with more susceptibility seen in *L. monocytogenes*. The crude extract remained stable and active when exposed to 4^{o}C and 10^{o}C.

Crude extract of papaya peels contained bioactive compounds with antimicrobial compounds. The partial dissociation of these compounds results in hydrogen ions that cause a pH change within the bacterial cell walls ultimately causing cell death. Stability of the extract at low temperatures shows a potential application in fresh produce.

Biography: Lilian Kafuko

Lilian is an Msc Food science student at the University of Pretoria with a passion for solving food security, malnutrition, and hunger related issues across the African continent