# Reduction of Phytic Acid in Bambara groundnut grains using high-temperature soaking and microwave heat treatment

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Background
Micronutrient deficiency affects many people in Africa and other parts of the world. Phytate is an antinutritive factor in oil seeds, nuts, cereals, and legumes/pulses such as Bambara groundnut. Phytate chelates minerals such as calcium, iron, magnesium, manganese and zinc, and reduce their bioavailability. The study aims to reduce phytate in Bambara groundnut grains by soaking them at a high temperature followed by microwave heat treatment.

Methods
Bambara groundnut grains were soaked at 25 or 55 °C for 24 hours, followed by microwave heat treatment at 1200W for 10 min. The oven-dried grains were analysed for their cooking time. The grains were gently crushed to simulate chewing and subjected to *In* vitro protein digestibility (IVPD) and starch digestibility tests.

Results
Soaking at 55 °C reduced the phytic acid activity by 44.6%, while soaking at the same temperature followed by microwave heat treatment further reduced the phytic acid by 60.4%. There was a significant reduction (77-80%) in the cooking time of the soaked and microwave heat-treated grains. The digested starch (at 90 min) was 58%, 61% and 69%, respectively, for untreated, soaked at 25 °C, and soaked and microwaved Bambara groundnut grains. Similarly, the grains soaked at 55 °C had a slightly higher starch digested at 64% and 76% for grains that underwent soaking followed by microwave heat treatment. The IVPD of the crushed grains increased from 77% to 78% for grains soaked at 25 and 84% for soaked at 25 °C and microwave heat treated in untreated grains after soaking followed by microwave heat treatment. After microwave heat treatment, the IVPD of grains soaked at 55 °C increased from 83% to 87%.

Conclusions
This study demonstrates that soaking at a higher temperature followed by microwave heat treatment effectively reduces Bambara groundnut grains' cooking time and phytic acid. Phytase is released within the seed during soaking and breaks down phytic acid. The breakdown of phytic acids enhanced mineral bioavailability as bound minerals are liberated while starch and protein digestibility are increased.