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Pearl millet: a sustainable cereal with low glycemic potential

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Pearl millet (*Pennisetum glaucum*) is a climate resilient cereal consumed widely in traditional diets in rural regions of Africa. It has a higher content of protein and minerals but is relatively lower in carbohydrates compared to maize, rice and sorghum[1]. Studies have shown potential beneficial effects of starchy food consumption on obesity, especially those containing slowly-digestible and resistant starch, and low content of sugar[2].

In this study, the free sugar content and starch digestibility of pearl millet flour and cooked porridge were evaluated. Starch digestion was undertaken using the harmonised INFOGEST *in vitro* system[3]. All experiments were done in three biological replicates. Sugars were quantified using high performance anion exchange chromatography with pulsed amperometric detection (HPAEC-PAD) and results expressed as percentage yield relative to dry weight.

Our results show that free sugar content of pearl millet flour (Fig. 1A) was 2·81 %, consisting mainly of sucrose and raffinose. Free sugar content increased significantly by 64·48 % after cooking ($p < 0·05$) suggesting endogenous amylase activity which resulted in the release of maltose and maltotriose; and invertase activity resulting in the release of glucose and fructose. Nevertheless, the total free sugar content of millet porridge is still low (less than 10 %). We observed that millet starch digestion (Fig. 1B) was rapid, reaching 44·95 % and 47·63 % in flour and cooked porridge respectively within 20 min. However, only 10·94 % and 6·83 % further digestion was observed between 20 min and 120 min. Around 45 % of starch was resistant to digestion after 120 min in both flour and porridge. Cooking had no significant effect ($p < 0·05$) on starch digestion at any time point.

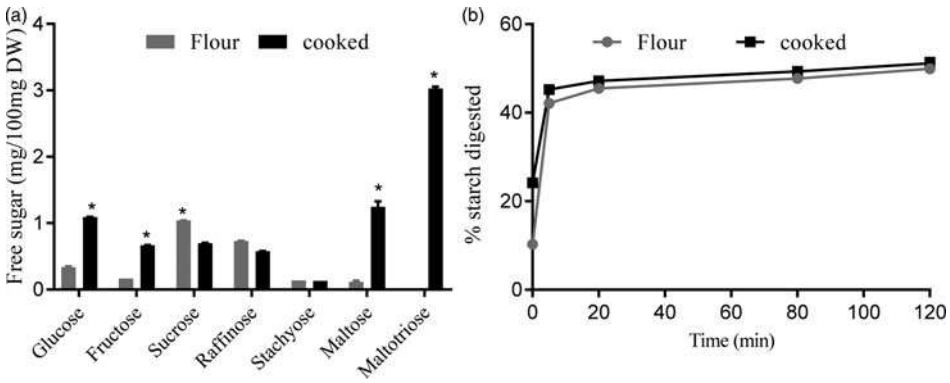

Fig. 1. Free sugar content (a) and *in vitro* starch digestibility (b) of millet flour and cooked porridge. Results are presented as mean of 3 biological replicates and are expressed in a dry weight basis, error bars are standard deviation of the mean. *$P < 0·05$*

In conclusion, high levels of resistant starch indicates low glycemic potential that needs to be verified in vivo. The consumption of millet porridge by obese populations could help them limit energy intake.

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