White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of Leeds.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/143972/

Version: Published Version

Proceedings Paper:
Igbetar, BD, Bosch, C and Orfila, C (2018) Pearl millet: a sustainable cereal with low glycemic potential. In: Proceedings of the Nutrition Society. Nutrition Society Summer Conference, 10-12 Jul 2018, Leeds, UK. Cambridge University Press, E136-E136. ISSN: 0029-6651. EISSN: 1475-2719.

https://doi.org/10.1017/S0029665118001428

Reuse
Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

Proceedings of the Nutrition Society (2018), **77 (OCE4)**, E136 doi:10.1017/S0029665118001428

Summer Meeting, 10–12 July 2018, Getting energy balance right

Pearl millet: a sustainable cereal with low glycemic potential

B.D. Igbetar, C. Bosch and C. Orfila

School of Food Science and Nutrition, Nutrition and Public Health Group, Faculty of Mathematics and Physical Sciences, University of Leeds, LS2 9JT, UK.

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.

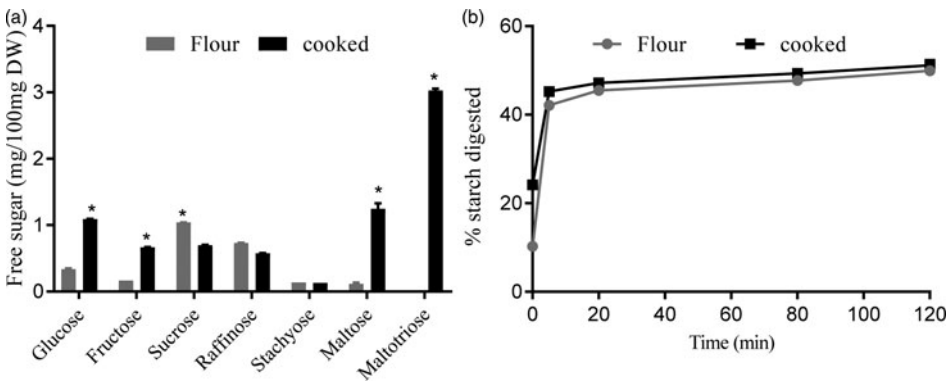

Fig. 1. Free sugar content (a) and *in vitro* starch digestibility (b) of millet flour and cooked porridge. Results are presented as mean of 3 biological replicates and are expressed in a dry weight basis, error bars are standard deviation of the mean. *$P < 0·05$*

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.

1. Saleh AS, Zhang Q, Chen J *et al.* (2013) *Comp Rev Food Sci Food Saf* **12**(3), 281–295.
2. Aller EE, Abete I, Astrup A *et al.* (2011) *Nutrients* **3**(3), 341–369.
3. Minekus MM, Alminger P, Alvito S *et al.* (2014) *Food Funct* **5**(6), 1113–1124.

Downloaded from https://www.cambridge.org/core. University of Leeds, on 08 Nov 2018 at 10:59:33, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S0029665118001428