

Glycaemic, gastrointestinal, hormonal and appetite responses to pearl millet and oats porridge breakfast: a randomized, crossover trial

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Wholegrain-based, breakfast-porridge consumption has been associated with beneficial health effects with respect to obesity, and related disease, risk factors⁽¹⁾. Dietary intake of oat grain has been associated with health-promoting characteristics including effects on glycaemic control and satiety^(2,3). However, limited data are available for ancient grains, such as pearl millet, which has a low glycaemic index⁽⁴⁾. Pearl millet is also nutritious and increasing its use offers the potential for the development of a more sustainable and resilient agricultural system, with greater plant and dietary diversity⁽⁵⁾. Accordingly, this study aimed to compare the glycaemic, gastrointestinal, hormonal and appetite responses to a pearl millet and an oat porridge breakfast in healthy volunteers (HV).

In a cross-over study, 26 HVs consumed two iso-energetic and iso-volumetric (meal volume (mL) + water drink provided (mL)) breakfast porridges made from pearl millet and oats, on two separate occasions. Fasting and postprandial measurements over two hours, were made for glucose levels (using finger prick), plasma insulin and glucose-dependent insulinotropic peptide (GIP) (using venous sampling), gastric emptying (using MRI) and appetite (using VAS scales and food diaries). An *ad libitum* pasta meal was offered at lunchtime and the amount eaten measured.

All subjects completed the two study days. The IAUC₀₋₁₂₀ min blood glucose was not significantly different between the porridges ($P = 0.106$). The AUC 2 h gastric volume was larger for pearl millet (29900, SEM 1637 mL.min) compared with oats (26144, SEM 1670 mL.min) (Fig. 1; $P = 0.005$). The AUC 2 h GIP concentration was lower for pearl millet (15796, SEM 858 pg/mL) compared with oats (21643, SEM 1375 pg/mL) (Fig. 2; $P = 0.001$). AUC 2 h serum insulin concentration was not significantly different between the porridges ($P = 0.129$). Subjective appetite ratings, the energy intakes from the *ad libitum* pasta meal and self-reported daily energy intakes were similar for both porridges ($P > 0.05$).

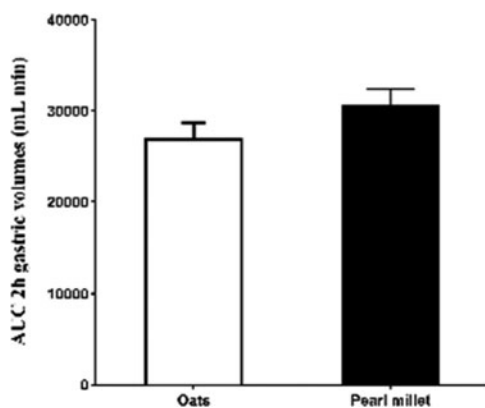


Fig. 1. AUC 2 h gastric volume.

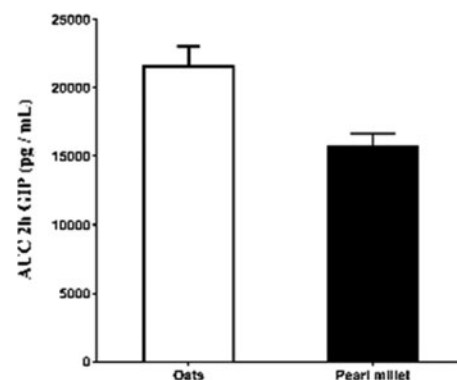


Fig. 2. AUC 2 h GIP.

In conclusion, a pearl millet grain breakfast elicits glycaemic, insulinemic and appetite responses comparable to an isoenergetic and isovolumetric oats breakfast. Pearl millet could be an alternative and sustainable breakfast intervention.

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