Some pearl millet-based foods promote satiety or reduce glycaemic response in a crossover trial

Anna M.R. Hayes,1 Fanny Gozzi,1 Aminata Diatta,1 Tom Gorissen,2 Clay Swackhamer,3 Susann Bellmann,2 Bruce R. Hamaker1\*

1Whistler Center for Carbohydrate Research, Department of Food Science, Purdue University, West Lafayette, IN, USA

2The TIM Company, TIM B.V., Zeist, The Netherlands

3Department of Biological and Agricultural Engineering, University of California, Davis, CA, USA



**E2**

**E1**

**C1**

**C2**

**D2**

**D1**

**A1**

**B1**

**B2**

**A2**

**Supplemental Figure 1.** Example percent dose recovery (PDR) and cumulative percent dose recovery (CPDR) graphs and modelling for determining gastric half-emptying times of the different test meal foods for one participant. A: White rice. B: Millet thick porridge. C: Millet couscous (self-made). D: Millet couscous (commercial). E: Wheat couscous. All figures labelled 1 show PDR, while all figures labelled 2 depict CPDR.

A close up of a map

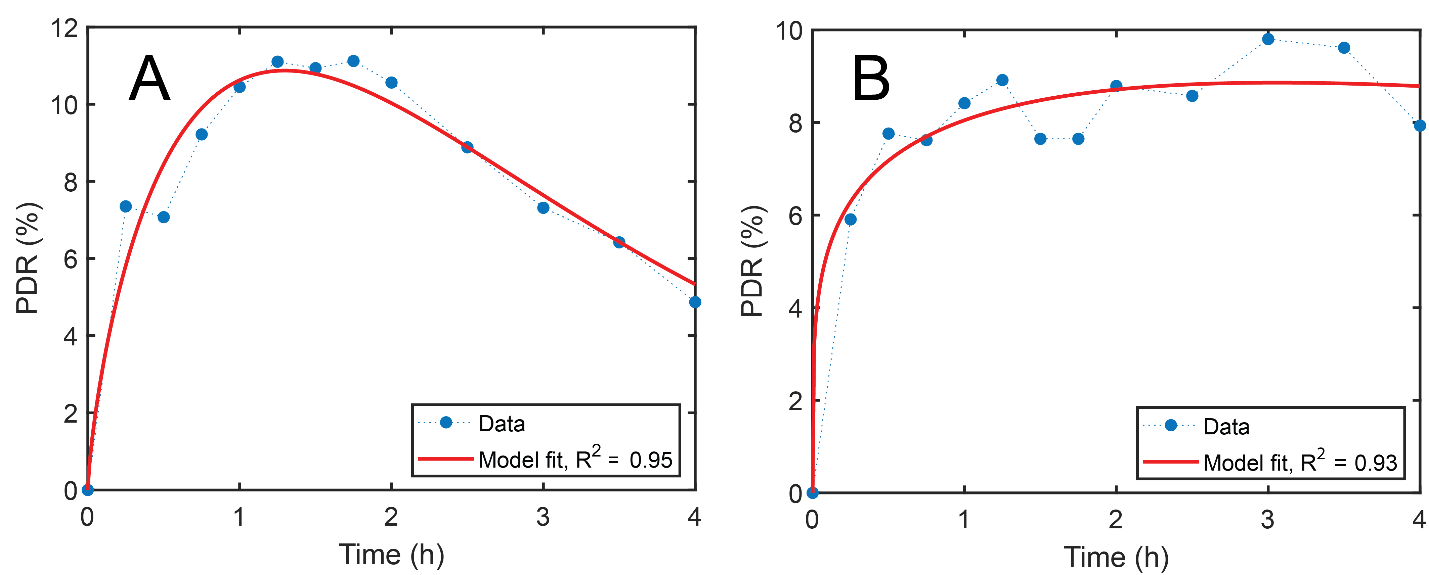
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**Supplemental Figure 2.** Mean gastric half-emptying times for each carbohydrate-based test food displayed as a box-plot, with either all values (A) or outliers removed (B) (*n*=14). No statistically significant differences were found (*p*=0.15). Circles represent values from individual participants per test meal. Central red marks indicate the median. Bottom and top edges of the blue box represent the 25th and 75th percentiles, respectively. Note that instances for which the percent dose recovery of the tracer did not decrease by more than 1% of its peak value during the monitoring period were deemed outliers (4 values greater than 10 h).

A screenshot of a cell phone

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**Supplemental Figure 3.** Gastric half-emptying times by participant averaged across all test meal foods (*n*=15, includes participant 61 who withdrew during the study). Exploratory data visualization, so no statistical analysis was conducted. Circles represent values for individual test meal foods per participant. Central red mark indicates the median. Bottom and top edges of the blue box represent the 25th and 75th percentiles, respectively. Note that instances for which the percent dose recovery of the tracer did not decrease by more than 1% of its peak value during the monitoring period were deemed outliers (4 values greater than 10 h).



**Supplemental Figure 4.** Example of included (A) and excluded (B) percent dose recovery (PDR) modelling curves for gastric half-emptying time. Excluded modelling curves (and therefore gastric half-emptying times) did not decrease by more than 1% of their peak value during the monitoring period, such as the curve seen in (B), were deemed outliers.

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**Supplemental Figure 5.** Relationship between gastric half-emptying time (h) and glucose incremental area under the curve from 0-120 min (iAUC0-120min; mg×min/dL; A, D), ΔPeak glucose value (mg/dL; B, E), and peak glucose time (min; C, F) (*n*=14). Analyses in two instances of inclusion of gastric half-emptying time values are shown. A-C: no values removed. D-F: outliers removed. Note that instances in which the percent dose recovery of the tracer did not decrease by more than 1% of its peak value during the monitoring period were deemed outliers.

**Supplemental Figure 6.** Mean breath hydrogen during the 4 h postprandial period for each test meal (*n*=14, excluding one participant due to outlier values and one additional outlier value) as a general indicator of potential fermentation of the test meals. As breath hydrogen values never rose above baseline for any of the treatments, it was concluded that fermentability was not a confounding factor in the study.

**Supplemental Table 1.** Values used for correction of endogenous 13C for percent dose recovery per timepoint for gastric emptying assessment of millet-based meals. Values are means from testing with a subgroup of 4 participants (n=4). Values shown were used for the millet thick porridge, millet couscous (self-made), and millet couscous (commercial) test meals. Endogenous 13C for white rice and wheat couscous were nearly negligible.

|  |  |
| --- | --- |
| Time (min) | Millet 13C (DOB, ‰) |
| 0 | -0.16 |
| 15 | 0.46 |
| 30 | 0.66 |
| 45 | 1.06 |
| 60 | 0.84 |
| 75 | 1.04 |
| 90 | 1.62 |
| 105 | 2.02 |
| 120 | 2.62 |
| 150 | 3.22 |
| 180 | 3.80 |
| 210 | 3.56 |
| 240 | 3.92 |

DOB, delta over baseline.

**Supplemental Table 2.** Parameters from modelling percent dose recovery (PDR) and cumulative percent dose recovery (CPDR) of 13C (corrected for endogenous 13C) for each participant. These parameters were used for calculating gastric half-emptying time, lag phase, and gastric emptying coefficient.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test meal** | **Partici-pant number** | | **PDR model** | | | | | | | | **CPDR model** | | | | | | | |  | |
| **a** | | **b** | | **c** | | **R2** | | **m** | | **k** | | **β** | | **R2** | | **tHalf (h)** | | |
| White rice | 19 | 15.66 | | 0.62 | | 0.48 | | 0.88 | | 45.65 | | 0.42 | | 1.77 | | 1.00 | | 2.70 | |
| 20 | 18.40 | | 0.70 | | 0.40 | | 0.97 | | 80.39 | | 0.32 | | 1.75 | | 1.00 | | 3.51 | |
| 32 | 12.41 | | 0.68 | | 0.25 | | 0.95 | | 142.61 | | 0.16 | | 1.66 | | 1.00 | | 6.57 | |
| 39 | 16.57 | | 0.01 | | 0.38 | | 0.95 | | 40.67 | | 0.45 | | 1.25 | | 1.00 | | 1.89 | |
| 43 | 19.51 | | 0.54 | | 0.58 | | 0.91 | | 39.29 | | 0.53 | | 1.74 | | 1.00 | | 2.09 | |
| 48 | 17.75 | | 0.60 | | 0.61 | | 0.97 | | 34.18 | | 0.53 | | 1.73 | | 1.00 | | 2.09 | |
| 56 | 21.16 | | 0.57 | | 0.55 | | 0.95 | | 48.72 | | 0.47 | | 1.71 | | 1.00 | | 2.34 | |
| 61 | 19.41 | | 0.17 | | 0.47 | | 0.99 | | 40.15 | | 0.53 | | 1.41 | | 1.00 | | 1.80 | |
| 65a | 6.89 | | 0.16 | | 0.00 | | 0.93a | | 566.58 | | 0.02 | | 1.25 | | 1.00 | | 34.69a | |
| 71 | 16.99 | | 0.32 | | 0.48 | | 0.96 | | 37.76 | | 0.50 | | 1.54 | | 1.00 | | 2.05 | |
| 80 | 15.34 | | 0.44 | | 0.32 | | 0.93 | | 62.33 | | 0.33 | | 1.61 | | 1.00 | | 3.14 | |
| 85 | 20.90 | | 0.65 | | 0.42 | | 0.90 | | 79.53 | | 0.35 | | 1.77 | | 1.00 | | 3.18 | |
| 93 | 18.27 | | 0.32 | | 0.37 | | 0.98 | | 56.72 | | 0.39 | | 1.50 | | 1.00 | | 2.56 | |
| 95 | 16.40 | | 0.52 | | 0.45 | | 0.97 | | 50.58 | | 0.37 | | 1.60 | | 1.00 | | 2.80 | |
| Millet thick porridge | 19 | 58.77 | | 2.19 | | 1.53 | | 0.99 | | 37.98 | | 0.88 | | 3.41 | | 1.00 | | 1.92 | |
| 20 | 33.34 | | 0.93 | | 0.76 | | 0.99 | | 55.39 | | 0.57 | | 2.00 | | 1.00 | | 2.16 | |
| 25 | 14.95 | | 0.43 | | 0.32 | | 0.98 | | 67.53 | | 0.29 | | 1.52 | | 1.00 | | 3.50 | |
| 32 | 15.68 | | 0.52 | | 0.27 | | 0.91 | | 117.36 | | 0.21 | | 1.57 | | 1.00 | | 5.01 | |
| 39 | 26.52 | | 0.63 | | 0.73 | | 0.91 | | 38.83 | | 0.66 | | 1.88 | | 1.00 | | 1.78 | |
| 43 | 39.54 | | 1.37 | | 1.62 | | 0.96 | | 15.04 | | 1.24 | | 2.82 | | 1.00 | | 1.23 | |
| 48 | 24.44 | | 0.69 | | 0.63 | | 0.96 | | 47.16 | | 0.54 | | 1.84 | | 1.00 | | 2.14 | |
| 56 | 21.20 | | 1.16 | | 0.95 | | 0.98 | | 26.48 | | 0.66 | | 2.23 | | 1.00 | | 2.00 | |
| 65 | 10.62 | | 0.47 | | 0.20 | | 0.89 | | 95.71 | | 0.19 | | 1.59 | | 1.00 | | 5.41 | |
| 71 | 10.25 | | 0.75 | | 0.81 | | 0.97 | | 13.82 | | 0.65 | | 1.89 | | 1.00 | | 1.82 | |
| 80 | 30.64 | | 1.02 | | 0.83 | | 0.95 | | 46.55 | | 0.60 | | 2.11 | | 1.00 | | 2.12 | |
| 85 | 23.00 | | 1.56 | | 0.88 | | 0.94 | | 48.33 | | 0.53 | | 2.53 | | 1.00 | | 2.70 | |
| 93 | 17.44 | | 0.36 | | 0.35 | | 0.90 | | 64.59 | | 0.33 | | 1.49 | | 1.00 | | 3.02 | |
| 95 | 27.00 | | 0.53 | | 0.59 | | 0.99 | | 53.48 | | 0.52 | | 1.67 | | 1.00 | | 2.09 | |
| Millet couscous (self-made) | 19 | 19.17 | | 0.64 | | 0.55 | | 0.96 | | 46.57 | | 0.45 | | 1.72 | | 1.00 | | 2.47 | |
| 20 | 17.94 | | 0.83 | | 0.42 | | 0.96 | | 85.91 | | 0.31 | | 1.88 | | 1.00 | | 3.75 | |
| 25 | 19.66 | | 0.44 | | 0.43 | | 0.89 | | 57.25 | | 0.40 | | 1.58 | | 1.00 | | 2.59 | |
| 32a | 9.64 | | 0.16 | | 0.01 | | 0.93a | | 344.40 | | 0.05 | | 1.30 | | 1.00 | | 16.54a | |
| 43a | 10.20 | | 0.10 | | 0.00 | | 0.94a | | 275.75 | | 0.06 | | 1.25 | | 1.00 | | 13.79a | |
| 48 | 15.90 | | 0.53 | | 0.36 | | 0.94 | | 69.32 | | 0.31 | | 1.63 | | 1.00 | | 3.47 | |
| 56 | 22.42 | | 0.47 | | 0.44 | | 0.98 | | 63.63 | | 0.41 | | 1.63 | | 1.00 | | 2.55 | |
| 61 | 24.53 | | 0.70 | | 0.80 | | 0.89 | | 31.96 | | 0.71 | | 1.98 | | 1.00 | | 1.72 | |
| 65 | 12.73 | | 0.25 | | 0.31 | | 0.94 | | 47.29 | | 0.32 | | 1.40 | | 1.00 | | 2.92 | |
| 71 | 18.01 | | 0.55 | | 0.47 | | 0.94 | | 51.60 | | 0.41 | | 1.67 | | 1.00 | | 2.64 | |
| 80 | 15.08 | | 0.50 | | 0.38 | | 0.85 | | 54.27 | | 0.36 | | 1.67 | | 1.00 | | 2.97 | |
| 85 | 17.09 | | 0.91 | | 0.56 | | 0.94 | | 51.92 | | 0.42 | | 2.00 | | 1.00 | | 2.92 | |
| 93b | 17.32 | | 0.22 | | 0.29 | | 0.69b | | 66.18 | | 0.33 | | 1.43 | | 1.00 | | 2.91b | |
| 95 | 18.37 | | 0.40 | | 0.37 | | 0.96 | | 61.64 | | 0.37 | | 1.55 | | 1.00 | | 2.78 | |
| Millet couscous (commercial) | 19 | 21.09 | | 0.73 | | 0.67 | | 0.86 | | 40.46 | | 0.53 | | 1.86 | | 1.00 | | 2.22 | |
| 20 | 18.78 | | 1.01 | | 0.52 | | 0.97 | | 76.10 | | 0.35 | | 2.01 | | 1.00 | | 3.49 | |
| 25 | 15.90 | | 0.51 | | 0.35 | | 0.94 | | 66.15 | | 0.33 | | 1.65 | | 1.00 | | 3.28 | |
| 32 | 18.82 | | 0.62 | | 0.44 | | 0.99 | | 62.82 | | 0.37 | | 1.72 | | 1.00 | | 2.95 | |
| 39 | 19.72 | | 0.51 | | 0.44 | | 0.92 | | 59.05 | | 0.40 | | 1.65 | | 1.00 | | 2.68 | |
| 43 | 18.86 | | 0.75 | | 0.57 | | 0.95 | | 45.35 | | 0.47 | | 1.87 | | 1.00 | | 2.48 | |
| 48 | 20.70 | | 0.60 | | 0.46 | | 0.97 | | 63.15 | | 0.39 | | 1.70 | | 1.00 | | 2.78 | |
| 56 | 22.50 | | 0.59 | | 1.21 | | 0.96 | | 14.07 | | 1.16 | | 2.00 | | 1.00 | | 1.06 | |
| 65a | 8.64 | | 0.22 | | 0.07 | | 0.93a | | 191.60 | | 0.07 | | 1.29 | | 1.00 | | 11.98a | |
| 71 | 8.40 | | 0.38 | | 0.60 | | 0.98 | | 14.77 | | 0.57 | | 1.58 | | 1.00 | | 1.81 | |
| 80 | 21.02 | | 0.55 | | 0.98 | | 0.92 | | 19.53 | | 0.81 | | 1.72 | | 1.00 | | 1.35 | |
| 85 | 26.56 | | 0.74 | | 0.63 | | 0.98 | | 53.71 | | 0.53 | | 1.88 | | 1.00 | | 2.24 | |
| 93 | 33.10 | | 1.24 | | 0.97 | | 0.96 | | 40.33 | | 0.69 | | 2.37 | | 1.00 | | 2.00 | |
| 95 | 18.92 | | 0.81 | | 0.49 | | 0.96 | | 64.53 | | 0.39 | | 1.90 | | 1.00 | | 3.06 | |
| Wheat couscous (self-made) | 19 | 19.82 | | 0.56 | | 0.46 | | 0.91 | | 55.99 | | 0.43 | | 1.73 | | 1.00 | | 2.58 | |
| 20 | 15.23 | | 0.64 | | 0.36 | | 0.98 | | 76.39 | | 0.29 | | 1.70 | | 1.00 | | 3.82 | |
| 25 | 9.40 | | 0.48 | | 0.39 | | 0.89 | | 31.65 | | 0.39 | | 1.69 | | 1.00 | | 2.79 | |
| 32 | 11.35 | | 0.39 | | 0.16 | | 0.95 | | 116.80 | | 0.16 | | 1.50 | | 1.00 | | 6.03 | |
| 39 | 20.27 | | 0.45 | | 0.37 | | 0.96 | | 74.45 | | 0.35 | | 1.60 | | 1.00 | | 3.00 | |
| 43 | 26.27 | | 0.87 | | 0.76 | | 0.84 | | 39.46 | | 0.64 | | 2.06 | | 1.00 | | 1.94 | |
| 48 | 16.65 | | 0.65 | | 0.48 | | 0.97 | | 50.30 | | 0.41 | | 1.77 | | 1.00 | | 2.78 | |
| 56 | 19.43 | | 0.52 | | 0.80 | | 0.99 | | 23.76 | | 0.70 | | 1.67 | | 1.00 | | 1.54 | |
| 61 | 25.15 | | 0.45 | | 0.87 | | 0.97 | | 25.56 | | 0.87 | | 1.76 | | 1.00 | | 1.30 | |
| 65 | 12.25 | | 0.37 | | 0.21 | | 0.93 | | 89.10 | | 0.21 | | 1.50 | | 1.00 | | 4.75 | |
| 71 | 18.22 | | 0.52 | | 0.61 | | 0.93 | | 32.31 | | 0.58 | | 1.72 | | 1.00 | | 1.90 | |
| 80 | 15.83 | | 0.50 | | 0.48 | | 0.91 | | 39.42 | | 0.47 | | 1.69 | | 1.00 | | 2.34 | |
| 85 | 17.87 | | 0.82 | | 0.55 | | 0.90 | | 50.52 | | 0.44 | | 1.95 | | 1.00 | | 2.76 | |
| 93 | 22.75 | | 0.37 | | 0.51 | | 0.95 | | 49.08 | | 0.51 | | 1.59 | | 1.00 | | 2.04 | |
| 95 | 14.33 | | 0.45 | | 0.29 | | 0.93 | | 79.42 | | 0.25 | | 1.55 | | 1.00 | | 4.04 | |

CPDR, cumulative percent dose recovery; PDR, percent dose recovery; tHalf, gastric half-emptying time. aInstances in which the PDR did not decrease by more than 1% of its peak value during the monitoring period and thus these values were deemed outliers. btHalf value excluded from further analyses because R2 for PDR was less than 0.80.

**Supplemental Table 3.** Mean lag phase and gastric emptying coefficient values (n=14)a.

|  |  |  |
| --- | --- | --- |
|  | Mean gastric emptying parameter | |
| Test meal | Lag phase | GEC |
| White rice | 1.29 ± 0.18 | 2.86 ± 0.04b |
| Millet thick porridge | 1.36 ± 0.12 | 3.12 ± 0.13a |
| Millet couscous (self-made) | 1.33 ± 0.09 | 2.89 ± 0.05ab |
| Millet couscous (commercial) | 1.25 ± 0.11 | 2.97 ± 0.09ab |
| Wheat couscous (self-made) | 1.36 ± 0.13 | 2.83 ± 0.07b |

a ± SEM, Standard error of the mean. GEC, gastric emptying coefficient. Means (with outliers removed) not sharing the same letter are significantly different (*p*<0.05). No statistically significant differences were found for lag phase (*p*=0.89).