**Online supporting material (OSM) for manuscript entitled “Efficacy of Fibre Additions to Flatbread Flour Mixes for Reducing Post-Meal glucose and Insulin responses in Healthy Indian Subjects”**

***Supplemental Table 1: Criteria for inclusion and exclusion***

|  |
| --- |
| **Inclusion criteria** |
| * Willing to give consent to participate in the study in writing |
| * Healthy male and female subjects between ≥ 20 and ≤ 50 years of age |
| * BMI of ≥ 18.0 and ≤ 23.0 kg/m2 |
| * Apparently healthy: no medical conditions which might affect study measurements as judged by the study physician or measured by questionnaire, and/or assessed by hematology, blood chemistry and urine analysis |
| * Willing to comply to study protocol during the study |
| * Agreeing to be informed about medically relevant personal test-results by study physician |
| * Willing to refrain from drinking alcohol on and one day before the blood withdrawal |
| * Fasting blood glucose value of volunteer is ≥ 3.4 and ≤ 6.1 mmol/litre (i.e. 62-110 mg/dl) at screening |
| **Exclusion criteria** |
| * Being an employee of Unilever of Lambda Therapeutics Research Ltd |
| * Chronic smokers, tobacco chewers and drinkers |
| * Participation in any other biomedical study 3 months before screening visit day of this study and/or participating in any other biomedical study during the screening period |
| * Intake of too much alcohol (>120 ml/week) |
| * Reported use of medically prescribed/slimming diet |
| * Reported participation in night shifts (between 23.00 and 6.00 hrs) |
| * Use of medication which interferes with study measurements, including vitamins and tonics |
| * Reported intensive exercise (≥10 hrs/week) |
| * Reported weight loss/gain ≥10% of body weight in the 6 months before screening |
| * Blood donation for 2 months prior to screening |
| * Blood analysis that showed any drug abuse |
| * Allergy to any food or cosmetics |
| * If female, not being pregnant or planning pregnancy during the study period |
| * If female, lactating or has been lactating for 6 weeks before pre-study investigation and/or during the study period |

***Supplemental table 2a: Exploratory measures of the glucose response curve*** ***(mean absolute and [%] difference from control ± SEM) (Per Protocol data (PP))***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Flatbread composition**\*\* | **Glucose tAUC0-2hr (absolute and [%] difference from control, 672.83 mmol/l.min)** | | **Glucose Cmax (absolute and [%] difference from control, 6.72 mmol/l)** | |
| **Mean** | **SEM** | **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | -15.34  [-2.28%] | 8.39  [1.25] | -0.38  [-5.66] | 0.10  [1.51] |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -23.47  [-3.49%] | 8.25  [1.23] | -0.44  [-6.53] | 0.10  [1.49] |
| 81 g HFF + 15 g CPF + 4 g GG | -24.35  [-3.62%] | 8.19  [1.22] | -0.56  [-8.31] | 0.10  [1.48] |

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

***Supplemental table 2b: Exploratory measures of the glucose response curve*** ***(mean absolute change from control ± SEM) (PP)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Flatbread composition**\*\* | **Glucose Tmax (change from control, 44.71 min.)** | | **Glucose at t=3hr (change from control, 5.11 mmol/l)** | | **Slope to C max (change from control, 0.05 mmol/l.min)** | |
| **Mean** | **SEM** | **Mean** | **SEM** | **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | 1.08 | 3.37 | 0.08 | 0.07 | -0.01 | 0.003 |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -3.27 | 3.32 | 0.07 | 0.06 | -0.01 | 0.003 |
| 81 g HFF + 15 g CPF + 4 g GG | 4.52 | 3.31 | 0.11 | 0.06 | -0.02 | 0.003 |

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

***Supplemental table 3: Insulin levels at t=3hr (mean absolute change***

***from control ± SEM) (PP)***

|  |  |  |
| --- | --- | --- |
| **Flatbread composition**\*\* | **Insulin at t=3hr (change from control, 20.94 μIU/l)** | |
| **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | -8.01 | 1.47 |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -8.06 | 1.47 |
| 81 g HFF + 15 g CPF + 4 g GG | -8.88 | 1.46 |

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

***Supplemental table 4: Glucose +iAUC2hr (mean absolute and [%] difference from control ± SEM)) (Intention to Treat Data (ITT).***

|  |  |  |
| --- | --- | --- |
| **Flatbread composition**\*\* | **Glucose +iAUC0-2hr (absolute and [%] difference from control, 104.8 mmol/l.min)** | |
| **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | -17.6  [-16.8] | 7.4  [7.10] |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -23.8  [-22.7%]\* | 7.4  [7.07] |
| 81 g HFF + 15 g CPF + 4 g GG | -28.4  [-27.1%]\* | 7.4  [7.09] |

Statistically significant \*(p<0.01)

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

***Supplemental table 5: Insulin tAUC0-2hr (mean absolute and [%] difference from control ± SEM) (ITT)***

|  |  |  |
| --- | --- | --- |
| **Flatbread composition**\*\*\* | **Insulin tAUC0-2hr (absolute and [%] difference from control, 3124.5 μIU/l.min)** | |
| **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | -882.14. \*\*  [-28.23] | 139.77  [4.47] |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -1142.30\*\*  [-36.56] | 140.40  [4.49] |
| 81 g HFF + 15 g CPF + 4 g GG | -1377.40\*\*  [-44.08] | 140.87  [4.51] |

Statistically significant: \*\*p<0.0

\*\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

***Supplemental table 6a: Exploratory measures of glucose response curve*** ***(mean absolute and [%] difference from control ± SEM) (ITT)***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Flatbread composition**\*\* | **Glucose tAUC0-2hr (absolute and [%] difference from control, 673.08 mmol/l.min)** | | **Glucose Cmax (absolute and [%] difference from control, 6.74**  **mmol/l)** | |
| **Mean** | **SEM** | **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | -15.83  [-2.35%] | 8.12  [1.21] | -0.37  [-5.55] | 0.10  [1.47] |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -24.71  [-3.67%] | 8.08  [1.20] | -0.47  [-6.98] | 0.10  [1.46] |
| 81 g HFF + 15 g CPF + 4 g GG | -24.54  [-3.65%] | 8.11  [1.20] | -0.57  [-8.49] | 0.10  [1.47] |

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

***Supplemental table 6b: Exploratory measures of glucose response curve*** ***(mean absolute change from control ± SEM) (ITT)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Flatbread composition**\*\* | **Glucose Tmax (change from control, 44.44min.)** | | **Glucose at t=3hr (change from control, 5.11 mmol/l)** | | **Slope to C max (change from control, 0.050mmol/l.min)** | |
| **Mean** | **SEM** | **Mean** | **SEM** | **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | 2.00 | 3.28 | 0.08 | 0.06 | -0.012 | 0.003 |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -2.83 | 3.26 | 0.05 | 0.06 | -0.013 | 0.003 |
| 81 g HFF + 15 g CPF + 4 g GG | 4.58 | 3.27 | 0.11 | 0.06 | -0.018 | 0.003 |

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

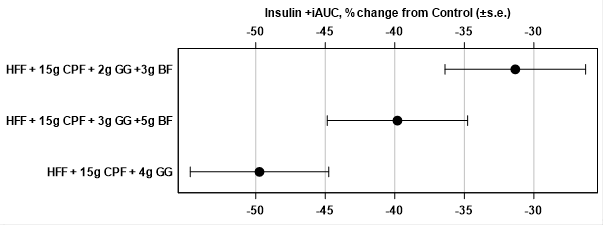
***Supplemental table 7: Insulin levels at t=3hr (mean absolute change***

***from control ± SEM) (ITT)***

|  |  |  |
| --- | --- | --- |
| **Flatbread composition**\*\* | **Insulin at t=3hr (change from control, 21.00 μIU/l)** | |
| **Mean** | **SEM** |
| 80 g HFF + 15 g CPF + 2 g GG + 3 g BF | -8.09 | 1.44 |
| 77 g HFF + 15 g CPF + 3 g GG + 5 g BF | -9.23 | 1.45 |
| 81 g HFF + 15 g CPF + 4 g GG | -8.91 | 1.45 |

\*\* HFF= high fiber flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

**Supplemental Fig 1. Percentage change (mean +/- SEM), in PPI (+iAUC2hr) of flatbreads with different amounts of guar gum (2-4%) and 15% chickpea flour relative to the control.**



**Supplemental Fig 2: Satiety figures (Per Protocol data)**

**Supplemental Fig. 2a: Are you feeling hungry, tAUC/120 min in % change from control (mean ± 95% C.I.)\***



**Supplemental Fig. 2b: Do you desire to eat, tAUC/120 min in % change from control (mean ± 95% C.I.)\***



\*HFF= high fiber Annapurna flour, CPF =chickpea flour, GG = guar gum and BF = barley flour

**Supplemental Fig. 3: Mood figures (PP data)**

**Supplemental Fig. 3a: Are you feeling energetic, tAUC/120 min % change from control (mean ± 95% C.I.)\***



**Supplemental Fig. 3b: Are you feeling happy or contented, tAUC/120 min % change from control (mean ± 95% C.I.)\***



\*HFF= high fiber Annapurna flour, CPF =chickpea flour, GG = guar gum and BF = barley flour