**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