Reviewer's report

Title: Indigestible carbohydrates in barley as modulator of glucose metabolism, perceived satiety and voluntary food intake over 16 h in healthy adults - implicating colonic fermentation and stimulation of glucagon-like peptide-1

Version: 1 Date: 7 December 2012

Reviewer: Marion Priebe

Reviewer's report:

MCR: Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)
MER: Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
DR: Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)

General comments:
This study investigates the effect of a barley evening meal compared to a white bread evening meal on several metabolic parameters, hunger rating and energy intake the next day. The research question is very relevant as it focuses on energy intake influenced by colonic fermentation of indigestible carbohydrates. The study is in general well conducted, however control of the preparation as well as the intake of the evening meal would have been desirable. The description of the data is incomplete and not very consistent as e.g. different time intervals for AUC calculations are used without any motivation (see comments below). The findings are very interesting however the discussion could be improved by being more focused and addressing mechanisms more directly (see comments below).

Detailed comments:

Title: MCR
Perceived satiety: no difference in satiety was found.

Objective: MER
The objective of the work was to evaluate the potential prebiotic effect. As far as I know are dietary fiber in barley kernels not yet defined as prebiotics as they not yet have been shown to selective stimulation of the growth and/or activity(ies) of one or a limited number of intestinal bacteria beneficially associated with health and well-being - according to the definition of prebiotics (Roberfroid M, Prebiotic effects: metabolic and health benefits, 2011). Therefore the authors should not address the effect they are investigating as prebiotic effect.

“Specific attention was made to the possibility to increase .....incretin GLP-1.”
GLP-1 was measured at the same time points as GIP, ghrelin and insulin. Therefore I do not understand in which way specific attention was given to GLP-1.

Materials and methods: MER

Study design: What was the reason that the volunteers had to consume each evening meal twice but only at one occasion postprandial measurement were done? What was the method of randomization?

Calculation and statistical methods: MCR

p. 10 “For calculations of fasting values.....two values for each subject were obtained, separated by at least 1 weak”: I do not understand how fasting values can be obtained at different mornings as they should reflect the impact of the previous evening meal and are used to calculate the incremental AUC of the parameters of interest. Only fasting values should be used that are measured on the specific experimental day.

Results: DR

I do not find it necessary and also a bit confusing to indicate a “s” or a “p for measurements in serum or in plasma, while using f- for fasting. Mentioning in the method section whether plasma or serum is used seems enough to me.

Breath H2: DR

Treatment and time x treatment effects are given in the graph, not necessary in the text.

Blood glucose and insulin: MCR

- The iAUC was calculated for the postprandial periods after breakfast and lunch but only an ipeak calculated for the postprandial period after breakfast. Why not for the period after lunch?
- In the text it is reported that the iAUC is reduced during the entire experimental day after BK, however this is due to a significantly reduced iAUC after breakfast and not after lunch. This should also be mentioned.
- Nothing is reported in the text about the postprandial insulin concentrations.

Incretin hormones and ghrelin: MCR

- GIP results are reported of the postprandial period 60 – 120 min. Is this iAUC? The results of the other parameters are reported as iAUC from 0 – 120 min. Why is this reported differently?
- Ghrelin response is not significantly different but data should be provided.

FFA, IL6, adiponectin: MCR

Postprandial data of IL 6 and FFA are missing.

Subjective appetite ratings: MCR

- According to the Method sections VAS where used to assess hunger, satiety
and desire to eat, however only data of hunger are reported in the text (satiety in the table). What are the results of desire to eat?
- In the table AUC 90-120 min of hunger was given – what is the rational for that? I would be interested in the rating shortly before lunch.

Discussion: MCR
- What is novel about the experimental design?
- “In agreement with previous findings [23,28], BK as an evening meal….”
Reference 28 was not an overnight-study with BK, it was a 2wk intervention with a prebiotic (fructan).
- “as a novel finding, BK decreased iAUC (0 – 330 min)”: glucose iAUC 0 – 120 min was significantly decreased while iAUC 210 – 330 min was not. I don’t think it can be described as novel finding because decrease in glucose iAUC 0 – 120 min was seen in several studies before: e.g. their reference 26 and 35 and
- “GLP-1 …has been suggested to account for up to 70 % of meal induced insulin release”, this is not right. 70 % of meal induced insulin release is the incretin effect thus a combined effect of GLP-1 and GIP.
- “Interestingly, studies in mice….increased levels of adiponectin improves clearance of serum FFA…” I do not see the relevance of this information for the discussion of this study: 1) f-adiponectin is the same while f-FFA are decreased, 2) no information is given about the postprandial FFA.
- The authors address the results of several 2-14 weeks intervention studies with oligofructans on gut microbiota and L-cell differentiation in the gut, contributing to higher GLP-1 production. Does this mean that the authors suggest that the same mechanisms exerting these long term effect are responsible for the effects seen 10,5 h after a single dose of barley? is there evidence for this acute effect on L-cell differentiation?
- One of the main objectives was to assess appetite and appetite regulatory hormones it is relevant also to discuss the discrepancy between the results of ghrelin (no difference) and the findings of the VAS as well as energy intake.
**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

'I declare that I have no competing interests