Reviewer's report

Title: A bilberry drink with fermented oatmeal decreases postprandial insulin demand in young healthy adults

Version: 1 Date: 2 February 2011

Reviewer: Riitta Torronen

Reviewer's report:

This paper describes the results of two series of postprandial studies examining the effects of fermented oatmeal drinks containing berries on glycaemic and insulinaemic responses in healthy young adults.

In Series 1, fermented oatmeal drinks containing 10% bilberries or rose hips were compared with reference bread (white wheat bread). The glycaemic responses of the drinks were high and comparable to that of the reference bread. However, the insulinaemic responses at 45 and 95 min, incremental area under curve (iAUC), insulin index and insulin demand (II/GI) were lower after the bilberry drink than after the reference bread.

In series 2, fermented oatmeal drinks containing 10% or 47% bilberries were compared with the reference bread and a reference drink (fermented oatmeal drink without berries). The glucose responses of the two bilberry drinks were not significantly different from the reference drink or the reference bread. However, in the early postprandial phase (0-45 min), the iAUC was smaller after the drink with the higher content of bilberries compared to the reference drink, and also the peak glucose value at 30 min was lower. Compared to the reference drink, the postprandial insulin responses were lower at 15 and 30 min after the bilberry drinks. Also the iAUC (0-120 min), insulin index and II/GI were lower for the bilberry drinks compared to the reference drink, but these differences are not statistically significant. However, all the drinks are significantly different from the reference bread.

These findings on the decreased insulin demand are very interesting, but the manuscript is not acceptable for publication in its present form. I hope that the authors could improve the clarity of the presentation and interpretation of the results.

Major Compulsory Revisions

1. In these studies, two references were used. White wheat bread was used in both studies for determination of GI and II. When compared to the reference bread, the fermented oatmeal drinks – both with or without bilberries – seem to show more favourable insulin responses. These results are extensively discussed and are also presented in the abstract. In the second study, a reference drink without berries was also used. There is a significant difference
between the reference bread and the reference drink, but no statistically significant differences between the bilberry drinks and the reference drink. The authors should discuss these results more thoroughly and present conclusions on the possible contribution of bilberries to the decreased insulin demand (also in the abstract).

2. The glucose and insulin responses of the bilberry and reference drinks seem to significantly differ only in the early postprandial phase (the first 30 minutes), when sucrose and starch are digested and glucose is absorbed in the intestine. However, this is totally ignored in the discussion of the results. Instead, the authors discuss that the mechanisms might include increased uptake of glucose into the peripheral cells (muscle cells, adipocytes) or improved insulin sensitivity. These mechanisms could influence glycaemia and insulinaemia during the later postprandial phase, after absorption of glucose. The discussion of the possible mechanisms involved should be reconsidered.

3. Statistical analysis: Statistical significance of the fasting values, AUCs, GIs and IIs was analyzed with ANOVA and Tukey’s test (Tables 3 and 4). Which test was used for analyzing the time x treatment interactions of glucose and insulin responses presented in Figures 1-4? Add this information also in the figure legends.

4. The authors could comment on the reasons for the lack statistical significance, especially in the cases where differences between the groups seem obvious, e.g. II 76 for FOMD and 49 for BBFOMD.

5. The figures are unsatisfactory, they should be redrawn. The timepoints given on the x axis could be the ones used in the experiments (0, 15, 30, etc.). It is very easy to do these changes in GraphPad Prism.

Minor Essential Revisions

6. Abstract, Conclusions: For Vaccinium myrtillus, the terms ‘blueberry’ and ‘bilberry’ are used. Please use consistently ‘bilberry’.

7. Methods, third paragraph: The test meals were consumed within 12-14 min. After each meal, water, tea or coffee was served. Were they served before the 15 min blood sampling? Did you check that tea or coffee would not interfere with the glycaemic responses? Tea and coffee contain polyphenols which may influence digestion and absorption of carbohydrates and thereby postprandial glycaemia. Also caffeine is known to have an effect on the glycaemic response.

8. Discussion, eight paragraph: There are many papers available on the content of anthocyanins and other polyphenols in the Scandinavian bilberries (for the replacement of reference 38). Reference 39 includes only phenolic acids, not all polyphenols common in berries.

Minor issues not for publication:

- Title page: Check the superscript numbers (1-5 are given after the title, but only
3 and 4 are used in the addresses).

- In several parts of the text, the phrase ‘respectively’ is used incorrectly.
- All tables and the text: Do not use comma as a decimal point.
- Tables 3 and 4, footnote: Turkey’s test should be Tukey’s test.
- Table 3, footnote: Should “comparing reference bread and fermented drink with RFOMD” be “comparing reference bread and BFOMD with RFOMD”?
- References:
  Check the spelling of the author names (e.g. ref. 12, 24, 27, 28)
  Check the spelling of the article titles or the bibliographic information (e.g. ref. 5, 9, 35)
  Use the abbreviated journal names (e.g. ref. 8, 20, 24, 26, 37)

Discretionary Revisions

9. Methods, third and fifth paragraphs (Subjects): These paragraphs could be combined to avoid repetition.

10. Tables 1 and 2 could be combined.

11. Figure legends: Because the symbols of the meals are presented in the figures, it is not necessary to repeat them in the legends.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.