Author's response to reviews

Title: Effects of whole grain rye crisp bread for breakfast on appetite and energy intake in a subsequent meal: two randomized controlled trials with different amounts of test foods and breakfast energy content

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Author's response to reviews: see over
Dear Editor in Chief,

Whole grain rye products are important contributors to dietary fiber intake in the Scandinavian countries and in some European countries. Fibre-rich rye products have been shown to have superior effects on appetite compared to white wheat bread through mediation of prolonged feelings of fullness, less hunger and less desire to eat in more than five published studies. Moreover, consumption of rye products compared to white wheat bread has resulted in lower energy intake after a subsequent meal. Products tested include porridge, with different cereal fractions and soft breads.

The aim of this investigation was to evaluate the acute effects of a crisp rye bread on appetite in terms of hunger, fullness and desire to eat in a four hour perspective. Rye crisp bread is commonly consumed in Scandinavia it has a food matrix, volume and surface area/ energy content ratio which is different compared with many other rye products previously tested. Results from the present study may be used to support or reject the hypothesis that WG rye per see results in beneficial effects on appetite, irrespective of volume and microstructure for example. Moreover, results may show whether WG crisp bread rye could be a candidate food to be included in long-term study where appetite is linked to weight management study and/or body composition study.

The analysis is based on results from two randomised cross-over studies. Appetite was rated by visual analogue scales. In total, 20 and 21 subjects completed the studies, respectively. The studies differed in terms of total energy content of the breakfasts and proportion of energy coming from the treatment product. Differences between breakfasts within the two studies were evaluated using mixed models with repeated measures appropriate for cross-over designs.

Results from both studies show that whole grain rye crisp bread affects appetite through contributing to lower perceived hunger, higher perceived fullness and less desire to eat in a four hour perspective compared to a wheat reference bread. It also led to a lower energy intake after an ad libitum lunch in one of the studies, which may be the result of positive effects on appetite. These findings are very useful when designing future studies on weight management, and it also suggest that the effect observed for rye products is due to features of WG rye and not primarily to factors related to specific products.

On behalf of the co-authors,

Rikard Landberg (PhD, Associate Professor), Uppsala 2013-09-15