PREBIOTIC POTENTIAL OF KAMUT® KHORASAN WHEAT: FROM IN VITRO STUDIES TO HUMAN CLINICAL TRIALS

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Results:
Wheat grains are a rich source of dietary fibres, particularly in the western human diet. Many of the health effects attributed to dietary fibres are believed to be related to their microbial fermentation in the gut. An in vitro study investigated the ability of two potentially probiotic strains, Lactobacillus plantarum L12 and Bifidobacterium pseudocatenulatum B7003, to ferment soluble dietary fibres (SDFs) as sole carbon source from modern and ancient durum-type wheat varieties. Although no significant differences in SDF content were observed, the tested wheat varieties showed different qualitative fiber composition resulting in a high variability of prebiotic activity scores. Among tested wheat SDF fractions, the ancient grain KAMUT® khorasan wheat and the modern variety Solex have the most promising potential to promote the growth of both tested strains in the gastrointestinal tract. The in vitro findings related to KAMUT® khorasan wheat fibres have been further assessed in vivo in 30 healthy volunteers. The study was a randomized, parallel arm study designed to test whether a replacement diet with grain products (pasta, bread, biscuits, crackers, crisp toasts) made from the ancient organic whole KAMUT® khorasan wheat would impact the gut microbial ecology and metabolic profiling of the participants, compared with a similar replacement diet using as a control grain products made from organic modern whole durum wheat. Participants were randomly divided into two groups (15 individuals/group), each assigned to consume either the KAMUT® khorasan wheat or the control products, respectively, for a period of 4 months. The whole KAMUT® khorasan wheat-based diet was mainly characterized by a tendency towards a reduction in Bacteroides/Prevotella and an increase in members of Clostridium cluster XIVa in fecal microbiota in comparison to whole durum wheat adopted as a control diet. The metabolic profile of subjects administered with the whole KAMUT® khorasan wheat-based diet, in comparison to the control, was mainly characterized by phenol, nonanol and short chain fatty acids (SCFA), whereas alcohols, such as oleyl alcohol and isopropyl alcohol, better discriminated the whole durum wheat intake. Co-abundance analysis of microbiota and metabolome data evidenced the presence of a potentially health-promoting co-abundance group (CAG), which was more abundant in the whole KAMUT® khorasan wheat-based diet group. These results may contribute to support recent findings from other human clinical trials where a replacement diet with KAMUT® khorasan wheat-based products was effective in reducing markers of oxidative stress and inflammation, as well as cardiovascular risk factors in healthy volunteers and in patients suffering from non-infectious chronic diseases (Irritable Bowel Syndrome, Acute Coronary Syndrome, Type-2 Diabetes).

Cited bibliography:

Keywords: KAMUT® khorasan wheat, Soluble dietary fibres, Prebiotic index, Gut microbiota, Metabolome, Diet intervention study, Probiotic

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