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Microbial production of essential and toxic compounds among oat-using CeD and NCGS patients

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Abstract

The recent development of diagnostic methods and current well-being trend have increased the awareness of gluten-related diseases, such as celiac disease (CeD) and non-celiac gluten sensitivity (NCGS), 1% and 6 % of general population, respectively. Currently for both CeD and NCGS, the only effective treatment is a life-long gluten-free diet, which makes adequate intake of fiber challenging. Despite of improving gut function, dietary fibers promote the growth of gut beneficial microbes. They are in charge of production of numerous compounds, which are essential for human health, such as enzymes and short chain fatty acids (SCFA). Moreover, dietary fiber has an effect on ammoniacal nitrogen levels and beta-glucuronidase activity, which are harmful for human in high concentrations. Gluten-free oats are an excellent source of dietary fiber and they have exceptionally good nutritional properties.

In this observational study, SCFA production, ammoniacal nitrogen levels and beta-glucuronidase activity of oat-using CeD patients, NCGS patients and healthy controls were compared. SPME-GC-MS method was developed for SCFA analysis and the other biomarkers were analyzed by spectrophotometer.

There were no significant differences between groups on propionic acid and butyric acid production, only the percentage of acetic acid of total SCFAs was higher in control group compared to NCGS group, ($p = 0,03$). Neither was there significant differences between groups in ammonia production or beta-glucuronidase activity.

It has been scientifically proven that pure oats are suitable for celiac disease and gluten-sensitive patients, but they are not commonly used outside of Scandinavia. Our results stated that oat-using CeD and NCGS patients, whose disease is in balance, have gut microbiota capable of healthy production of essential SCFAs and normal levels of harmful compounds.

Conflict of Interest

There is no conflict of interest.