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Comparative studies on diverse propolis samples in order to reveal their antimicrobial feature by means of a novel in vitro human intestinal model

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Propolis is a natural product derived from plant resins collected by honeybees. Propolis has been applied in the traditional medicine since ancient times, and at present gains growing popularity in healthy foods owing to its beneficial composition and plausible antimicrobial character. In this paper, the antimicrobial properties of four different Hungarian propolis samples and their extracts were examined. We investigated the effects of various Hungarian propolis samples on a model microbiota of the large intestine. Until recently, only very few data was published about the impact of propolis on intestinal bacteria. Agar diffusion test was applied to assess the inhibition zones in order to evaluate the impact of propolis samples on various bacterial strains. Influence of digestion on the antimicrobial activity was assessed by means of an improved in vitro model system simulating the digestion process by a three-step procedure. Most of the investigated propolis samples exhibited inhibitory activity against the tested bacteria subsequent to the simulated digestion procedure, so digestion appears to have no decisive influence on the antibacterial properties of propolis. Some specific bacterial strains did not prove to be susceptible to propolis in certain concentrations. Depending on the propolis concentration, the tested bacterial strains proved to be sensitive against the propolis samples of different geographical origin, except for E. coli. The largest inhibition zones were noticed for propolis denoted as "Z" and "B", followed by "D" and "E" samples. Additionally, the Gram negative Bacteroides fragilis showed susceptibility against bee glue. The soluble part of digested propolis samples did not inhibit the growth of E. coli strain, but at the same time it showed activity against all the other tested bacteria. Enterococcus faecium and E. coli displayed resistance against the insoluble part of the digested propolis, whereas the other investigated 10 bacteria exhibited sensitivity. Based on our results, it might be stated that the actual biological impact of propolis samples of diverse origin can just be accurately estimated if well-tailored model studies are performed on representative human intestinal bacteria. On the basis of the current knowledge, in this paper we pointed out the prospects of applicability of selected propolis samples for manufacturing functional foodstuffs of beneficial physiological features in the future.

Biography

Attila Kiss is a Professor of food chemistry. He is the Director of Institute Food Science Innovation Centre at Kaposvár University, Hungary. He obtained various experiences as the leader of the Food Science Research Institute of the National Agricultural Research and Innovation Centre's Institute for Food Sciences, as well as the EGERFOOD Regional Knowledge Centre at Eszterházy Károly College. The scientific topics of his interest are development of functional foodstuffs of health-promoting effects, assessment of bioactive substances, food chemistry, transformation processes of food bioactive components and food safety issues. His impact factor is 71,7. Delivers regularly talks on Hungarian and international conferences (272 times).

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