

A mixture of plant extracts attenuates postprandial glycemia

The epidemiological studies demonstrate beneficial effects of a regular consumption of fruits, vegetables or grains on human health, which is usually a result of their lower caloric value and dietary fiber and specific bioactive compounds present in them. It is known that excessive consumption of refined sugars is associated with the global outbreak of metabolic syndrome and type 2 diabetes, and that glucose intolerance and insulin resistance are one of the most burning social challenges. Even though synthetic drugs that inhibit postprandial glycaemia are available on the market, they are not recommended for healthy people, as their consumption may cause undesirable side effects from the gastrointestinal tract, such as flatulence or diarrhea. Thus, dietary supplements containing ingredients of natural origin that could be effective in regulating glucose metabolism also in healthy subjects and those with prediabetes are interesting option.

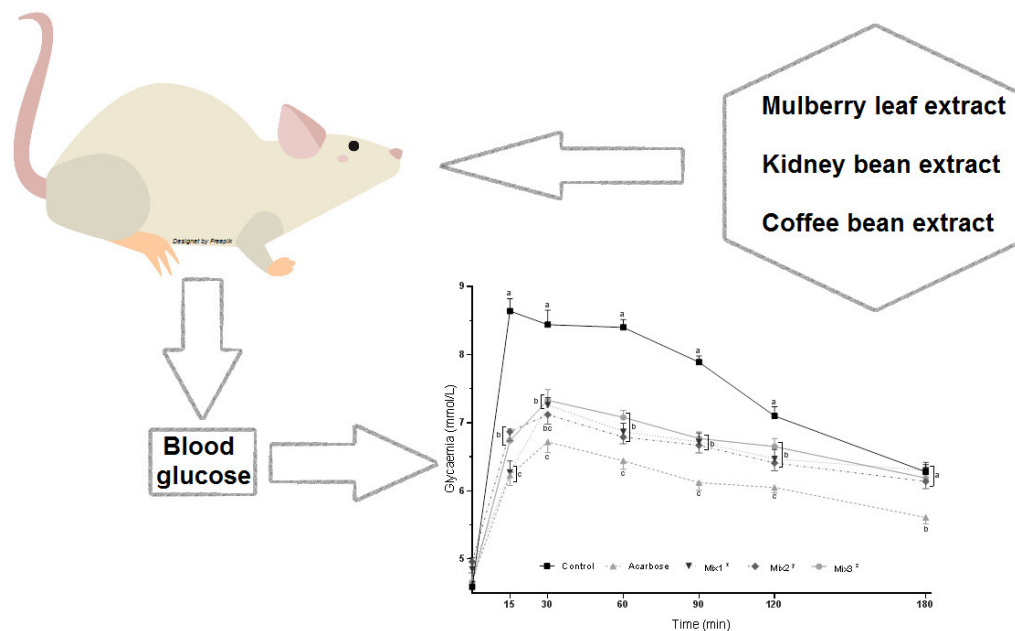


Fig. 1.

The study was focused on selecting the most effective mixture of plant extracts for lowering postprandial glycemia in experiments on laboratory animals and on establishing its working therapeutic dose for further clinical trials. The idea of the research was based on obtaining a synergistic effect of a mixture of plant extracts containing biologically active compounds with a different mechanism of action. The following standardized preparations were tested: white mulberry leaf extract, coffee robusta seed extract, white kidney bean extract, pomelo fruit extract, bitter melon fruit extract and purified L-arabinose. The study design was composed of oral sucrose and starch tolerance tests in laboratory rats preceded by a single ingestion of the preparations or their mixtures. Then, a 20-week long experiment was conducted on rats that were fed a high-fat diet and supplemented with the most effective mixture.

Our results showed that a meaningful synergistic, blood glucose-lowering effect after the ingestion of naturally originated preparations containing inhibitors of carbohydrate digestion and/or glucose absorption was difficult to obtain. Nevertheless, a mixture consisting of mulberry leaf, kidney bean and coffee robusta seed extracts with mass percentages of 50, 42 and 8, respectively, was found to be the most effective inhibitor of postprandial glycemia in rats. The overall effective dosage of the mixture was 240 mg per kg of rat's body weight, and according to the body surface area normalization method, this represents approximately 2.8 g for an adult weighting 70 kg, which is a dose feasible for use in clinical trials. This effect is a result of bioactive compounds present in the extracts which are able to inhibit the enzymatic activity in the digestive tract at particular stages of carbohydrate digestion (1-deoxynojirimycin, phaseolamin and caffeoylquinic acids, respectively). The therapeutic dose of the selected mixture of extracts was initially set at 2.8 g/70 kg body weight. The glucose-lowering effect of the mixture and its effective dosage were confirmed in the long-term feeding experiment on rats fed a high-fat diet. Those results suggest that the mixture also has potential to inhibit postprandial glycemia and to regulate glucose metabolism over a longer period of time. As importantly, dietary supplementation with the mixture was also able to attenuate other disorders induced by a high-fat diet, including the increase in body weight, body fat and blood cholesterol.

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Publication

[Formulation of a Mixture of Plant Extracts for Attenuating Postprandial Glycemia and Diet-Induced Disorders in Rats](#)

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