Short Communication

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Hypoglycemic Effect of Aguamiel Sweetener with Probiotic Additives

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ABSTRACT

Abbreviations: LAB: Lactic Acid Bacteria; FOS: Fuctooligosaccharides; BMI: Body Mass Index; SD: Standard Deviation

Introduction

At present, due to health problems that have increased over the years, health institutions, as well as the food industry, have sought healthier alternatives as an option to sweeten food, with sweeteners of natural origin. They are obtained from natural foods that contain easily degradable sugars such as fruits and some plants. (Villarreal Morales, et al. [1]) Agave atrovirens, A. americana, A. ferox, A. mapisaga and A. salmiana are species known as pulque agaves from which a byproduct called aguamiel is obtained. Maguey sap or aguamiel is a light-yellow liquid composed of a variety of carbohydrates such as glucose, sucrose and fructooligosaccharides; vitamins and minerals, as well as proteins, amino acids and phenolic compounds (Ortiz Basurto, et al. [2]). It has been demostrated that the consumption of aguamiel for its components provides different benefits, for example, anti-inflammatory activity due to concentration of saponins and the phenolic compounds offer antioxidant activity. Agave pulquero producing localities traditionally consume aguamiel as a refreshing beverage, but current research recognizes its potential in the food industry as a functional beverage, due to the presence of Fuctooligosaccharides (FOS), which are recognized as prebiotic compounds (Villarreal Morales, et al. [1]).

Aguamiel has a prebiotic effect as it can modulate the microbiota by increasing the number of Lactic Acid Bacteria (LAB). This microbiota includes several species of bacteria and yeasts of importance

in the food industry, as they can impact the quality and shelf life of the beverage. Another characteristic of mead is the probiotic activity due to the presence of indigenous microbiota of some lactic acid bacteria; Lactobacillus acidophilus, L. paracasei and L. mesenteroides (Diana, et al. [3]). Probiotics are live microorganisms that, when administered in adequate amounts, confer a demonstrated health benefit on the host. There are a number of health benefits attributed to the consumption of probiotics. In recent years, many of the health benefits attributed to probiotics have been reviewed, including aspects of gut health, immune health, metabolic health, and NEC. (Gopal [4]). The objective of this research is to demonstrate whether the natural sweetener based on Agave salmiana agamiel obtained by spray dryed maintains a low glycemic index and is a food suitable for consumption by people suffering from diabetes mellitus (Gomes, et al. [5]).

Methodology

Design and Place of Study

This is a secondary analysis of a cross-sectional population study. The study will be carried out in the city of Saltillo, Coahuila, specifically personnel who study or work at the Autonomous University of Coahuila, which consists of an approximate population of 20,000 students, collaborators, and faculty. (Muniz Marquez, et al. [6]) It was chosen as the place of study because it is a school in which the population varies in gender, age, Body Mass Index (BMI) and pathologies.

Study Population

Individuals between the ages of 30 and 45, with a BMI in any range, habitually resident in the study area, and capable of voluntary consent, will be included in the study. Pregnant women, individuals with disabilities and pathologies will not be included in the study. A selection and exclusion criterion will be used in which a blood chemistry test will be performed, excluding subjects who present values outside the ranges established by the WHO in a healthy patient (Triglycerides <150 mg/dL, Glucose <95 mg /dL and <140 mg/dL postprandial, Cholesterol <200 mg/dL, HDL Cholesterol > 65 mg/dL, LDL Cholesterol <130 mg/dL, Urea 7 - 25 mg/dL, Creatinine 0.6 – 1.2 mg/dL, Acid Uric acid [women] 2.3 – 6.6 mg/dL [men] 4.40 -7.60 mg/dL, albumin 3.5 – 5.0 g/dL).

Definition of Variables

Participants will be divided in one study group: 20 people who will be given the aguamiel-based sweetener added with probiotics and then given pure glucouse to do the curve.

Clinical Trial

Personal information was collected in personal interviews with the participants. Participants were required to fast for a minimum period of 8 to 12 hours before the test. After verifying the fasting period, the first capillary sample was extracted and analyzed with a glucometer, blood samples for clinical analysis were analyzed by a certified laboratory located in Saltillo, Coahuila. Then, on the first day the study subjects consumed 30 g of pure glucose and on the second day they consumed the mead and probiotic-based sweetener. A blood sample was then taken at 15 minutes, 30 minutes, 60 minutes, 90 minutes and 120 minutes with the glucometer on both days to compare the results. All assays were carried out at least in triplicate and results were reported as the average ± Standard Deviation (SD).

Ethical Considerations

This project was authorized by the Ethics Committee of the School of Chemical Sciences of the Universidad Autónoma de Coahuila, under the registration number TMCYTA-25-01-23-2. Was carried out taking into account the 3 principles of the Belmont Report (1978), as well as the criteria established by the Nurember Code (1947) and the ethical principles for medical research in human beings described in the Declarations of Helsinki (1964). Therefore, the study is oriented to protect and safeguard the life, health, dignity, integrity, confidentiality and free right of choice of the people involved in the study.

Results and Discussion

Based on the results of the glucose analysis, only healthy subjects were included in this first stage of the study. This selection therefore considered 15 study subjects whose behavior in glucose levels is shown in (Figure 1). The results show that, compared to the simple glucose curve, the aguamiel sweetener consumed by the study subjects does not show high glucose peaks or sudden variations in the behavior of blood glucose, thus proving its hypoglycemic effect due to the presence of fructooligosaccharides that are beneficial to health.

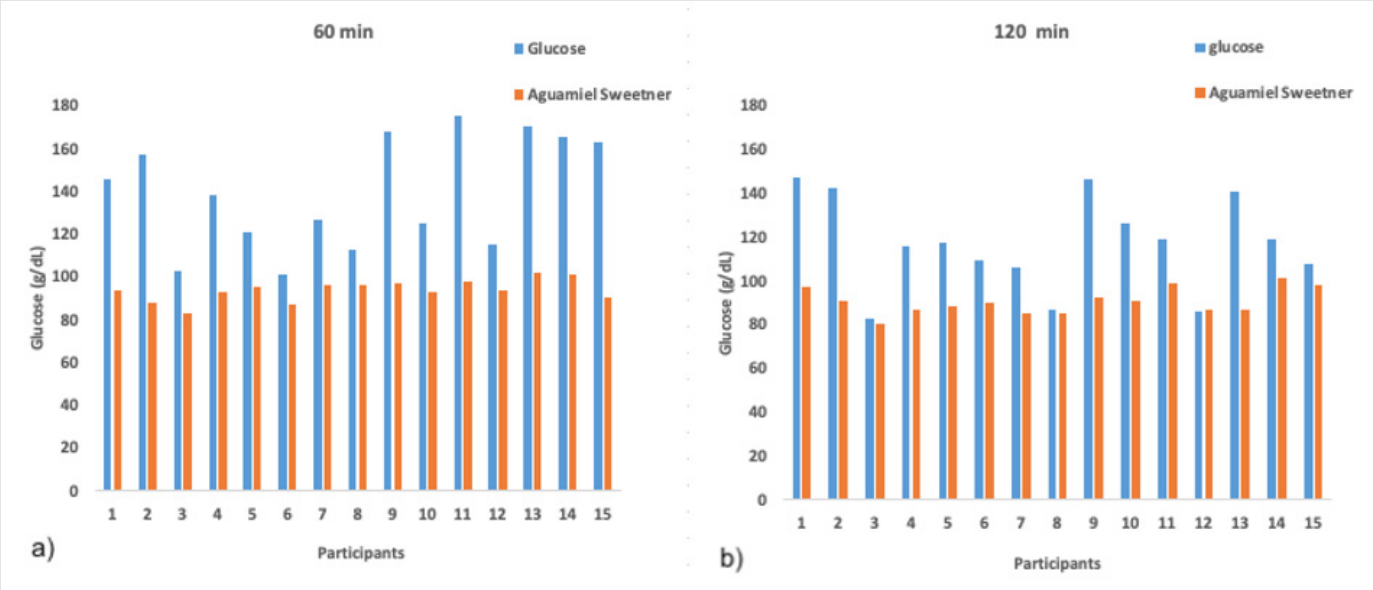

Figure 1: Postprandial glucose obtained with glucose and aguamiel sweetener at
a) 60 minutes and
b) 120 minutes.

Conclusion

Based on studies, it is shown that the consumption of foods with prebiotics and probiotics provides important health benefits, being able to use this product as a functional food, which, in addition to providing a hypoglycemic effect, helps to improve the immune system, to prevent and control chronic degenerative diseases. like diabetes and others.

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