Tastermonial

Real-world Evaluation of JBA GlucoTrojan with Reducose ® on Glycemic Response

NCT not assigned yet

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Summary

The project is focused on evaluating the real-world efficacy of JBA GlucoTrojan, a powdered supplement sachet containing Reducose, a natural water extract of White Mulberry Leaf, which has been scientifically proven to reduce the absorption of sugars and carbs by up to 40%. The study aims to compare the effect of consuming GlucoTrojan with a meal (Test Meal) vs. having the meal alone (control) on the blood sugar response of 50 healthy adults, pre-diabetes, or non-insulin dependent diabetes, over a period of 14 days. It is expected that GlucoTrojan will reduce the incremental area under the curve and the peak for plasma glucose concentration over 120 minutes in normoglycemic adults when compared to the response to a control meal.

Sponsor: *AQP Pharmaceuticals, Inc.*
Contract research organization: Tastermonial Inc
Principal investigator (PI): Guillermo Repizo, PhD.
Co-investigator: Bude Piccin, CEO

About Tastermonial

Food and supplement brands use the Tastermonial Platform to substantiate metabolic health claims by collecting data-driven insight from members of the public in a cost-effective manner.

Tastermonial consists of scientists and engineers who are passionate about conducting citizen scientist studies to help companies and their partners examine the efficacy of their product(s) via continuous-glucose-monitors (CGMs) and other biofeedback data sources. The results generated from our real-world studies are used to substantiate claims, drive consumer trust and brand loyalty, guide product development decisions, and de-risk clinical trials.

Disclaimer:
Please note that although Tastermonial conducted their studies in a real-world scenario and collected trustworthy data, these experiments were not conducted in a controlled setting, such as a laboratory, and the information does not hold any formal research significance.

Background

AQP Pharmaceuticals, Inc. (“Company”) developed a powdered supplement sachet that can be added to meals targeting consumers who follow carbohydrate-heavy Asian diets. The product is formulated with the

patented ingredient, “Reducose®”, a natural water extract of novel White Mulberry Leaf that has been scientifically proven to reduce the absorption of sugars and other carbs by up to 40%. The effects have been confirmed previously via Randomized, Double-Blind, Controlled Trials (see Appendix I and II).

The Company is looking to conduct a real-world study of blood glucose responses to JBA GlucoTrojan (see specifications here) with a 5% concentration of Reducose®. The study will observe the real-world efficacy of GlucoTrojan when taken with high carbohydrate meals.

The Company wishes to use the collected data to showcase the comparative glycemic impact as well as testimonials from participants to build trust and loyalty with their customers.

Rationale

Reducing the health impact of dietary sugar intake is a public health priority. Mulberry leaf extract may reduce blood glucose responses following sugar intake by reducing gastrointestinal carbohydrate absorption via alpha-glucosidase inhibition activity of iminosugar constituents such as 1-deoxynojirimycin (DNJ). Mulberry leaf extracts are widely consumed in Asia for normalizing post-prandial blood glucose. Reducose has been tested in multiple clinical trials and lowers the postprandial glucose response by up to 40% (see Appendix).

Hypothesis

An appropriate dose of GlucoTrojan when co-administered with a complete meal will reduce the incremental area under the curve and the peak for plasma glucose concentration over 120 minutes in normoglycaemic adults when compared to the response to a control meal.

Study Objective

To compare the effect of consuming GlucoTrojan (mulberry-extract formula) with a meal (Test Meal) vs. having the meal alone (control) on the blood sugar response of 50 healthy (non-diabetes) adults, pre-diabetes or non-insulin dependent diabetes (Tester). Experiments will span 14 days.

Materials and Methods

Design

Testers will be given sachets of GlucoTrojan and standardized test meals. The experiment is conducted by logging foods on the Tastermonial app and syncing the continuous glucose data from the monitor into the

Tastermonial app. Participants use the Tastermonial mobile iOS app to log what, when, and how they ate the tested product. The participants are instructed not to make changes in their usual diet and physical exercise during the study period. Additionally, participants are asked to note any medications or activities that can impact their postprandial glucose readings.The app is also used to collect qualitative data.

During the study period, each tester will be wearing a continuous glucose monitor (CGM) from Abbott Freestyle Libre (Link) to actively track their postprandial glucose responses for each meal. The Freestyle Libre measures interstitial glucose levels throughout the day and gives back data in 15-minute intervals, transmitting the results via an NFC receiver in a smartphone. Sensor memory limitations require the device to be scanned every 8 hours. Of note, CGM devices measure interstitial glucose levels (glucose from the fluid in between cells) While interstitial glucose and blood/plasma glucose levels correlate highly, they do not precisely show the exact same reading and incur a lag of about 2-7 minutes (as reported by the manufacturer here) . Medical diagnoses are not made from interstitial measurements.

Participants enrollment

A total of 50 individuals will be recruited via the Tastermonial database and ambassador network. A study-specific online pre-screener (see appendix III) will be used to preliminarily identify potential subjects for the study. Information and guidance will be made available electronically and via our Trial Manager. Participants can ask questions to our staff via email, telephone calls, and video meetings. The Tastermonial platform will be used to manage the HIPAA-compliant data collection process.

Written informed consent for inclusion will be obtained digitally from all subjects before enrollment (check for a separated document). Participants will then conduct the study at home.

The sequence of events for the participant is as follows:
- Eligibility pre-screening based on a self-declared answers to questionnaire filled electronically by participants
- Informed consent signing
- Issuance of a CGM 14-day prescription (Rx) to the participant for it to be filled and the CGM picked up at their local pharmacy
- Shipment of Tastermonial test box containing 2 portions of the standardized test meals, the test instruction postcard and 15 sachets of GlucoTrojan with a 5% concentration of Reducose®
- Participants follow the self-service onboarding guide and step-by-step test instructions by scanning the QR code on the postcard found inside the Tastermonial box
- Participants apply the CGM and wait 1 day before starting the test
- Participants start the protocol and follow day-by-day instructions for the next 13 days
- Participants are asked to complete the product feedback surveys.

Inclusion & Exclusion criteria

Inclusion criteria:
- Consent to study protocol
- BMI: 18.5 to 29.9 kg/m2

- 21 to 75 years old

Exclusion criteria:

- Physician-diagnosed T1D and insulin-dependent T2D
- Taking medications that modulate blood glucose response or control blood pressure other than Metformin
- An underlying health condition that warrants non-participation
- Individuals who are pregnant
- Any other dietary restrictions that prevent them from consuming study foods
- Unable to follow remote guidance via the Internet or smartphone
- Unable to follow controlled diet instructions
- Unable to use a CGM (Continuous Glucose Monitoring Devices)

Withdrawal or Discontinuation of Study Participation

Participants are entitled to withdraw from the study at any point. In addition, the principal investigator has the authority to remove a participant due to medical concerns or if the participant no longer fulfills the study's inclusion and exclusion criteria. It is the participant's responsibility to inform the study personnel if they believe they no longer meet the criteria while participating. The sponsor reserves the right to pause, delay, or terminate the study if necessary.

Timeline

From study kick-off to completion, the investigators anticipate that the entire study will take in total about 7-10 weeks depending on how fast feedback is provided. Inclusion and exclusion criteria of the study will influence the recruitment time. During the study, the investigators will support ad-hoc requests from the Company to review incoming test results, provide a prompt update, and provide marketing assets from the comparative results of individual testers per request.

Prior to commencing the creation of study material and the recruitment, the Company shall agree on the above elements of the study design. The company may work with Tastermonial to co-develop an additional testing guide to fulfill new hypotheses and collect more data.

The investigators anticipate the following timeline after the investigators agree on the test design and protocol:

- Creation of study material e.g. ICF, study questionnaires, pre-screeners, digital protocol, and onboarding materials: 1-2 weeks*
- Enrollment of participants: 2-3 weeks
- Conducting the study: 2 weeks
- Data analysis & Report: 2 weeks

Execution plan

The investigators will carry out a within-subject comparative, open label study on enrolled participants. The experimental protocol is as follows:

Day 1: Start wearing the CGM sensor and let it self-calibrate for 24 hours
Day 2: Consume 1 serving of Test Meal for breakfast. Log the meal in the Tastermonial app.
Day 3: Consume 1 serving of Test Meal with GlucoTrojan for breakfast. Log the meal in the Tastermonial app.
Days 4-8: Participants will be instructed to take GlucoTrojan twice per day. Once during their typical breakfast meal and once during their typical dinner meal. Each breakfast and dinner will be logged in the Tastermonial app.
Days 9-13: Participants will continue with their typical lives but continue to log meals — breakfast and dinner — in the Tastermonial app.
Day 14: The experiment ends

On Day 1 and Day 2, testers must avoid eating foods or drinking anything except water after 10 PM and until 6 AM. At the start of each test, the investigators will ask testers to confirm that their blood glucose is within the typical resting range (70-100 mg/dL). If their blood glucose is not within the resting range, the investigators will ask testers to wait and check again in 15 minutes before starting the experiment. The test meal must be consumed within 10 minutes.

General instructions that apply from Day 1 to Day 14:

- 2 hours before the required action, refrain from strenuous exercise
- 2 hours after the required action, avoid other foods and refrain from strenuous exercise
- Use the proprietary Tastermonial smartphone app to scan the barcode or manually log test products and meals to record the serving size as they start eating. All events outside of the instructed ones should be noted in the food log.
- The context for each experiment should be consistent. E.g., if black coffee or tea is consumed within 2 hours after the required action, it should be consistently consumed for all experiments.

Data Handling & Analysis

Data Collection

The entire 14-day historical blood glucose data from the participants will be made available for analysis. The 2-hour postprandial blood sugar readings within a 15-minute interval will be analyzed, as well as the time-in-range of participants.

Additional demographic profiles of participants will be collected and analyzed, including clinical parameters (age, sex, body weight, height, body mass index, meal composition; i.e.,calories, carbohydrates, fats, proteins, and fiber) and individual resting glucose range (Baseline Glucose Range) to determine their glycemic cohort.

The investigators will also collect qualitative data. Participants will be asked to report their feelings such as mood and well-being during and after the experiments in an online questionnaire. The questionnaire will be finalized with the approval of the company.

Data management

All documents relevant to the study, including completed ICFs, are hosted on a secure online portal. The ICFs are completed using a secured data transfer system on the HIPAA-compliant online portal. The company has access to the de-identified data set. The data is saved to a secured internal network. All data is anonymized during the analysis. HIPAA relevant PHI data privacy of participants is ensured on a secured online portal that uses the HIPAA compliant AWS servers. All participants are de-identified and labeled using a coding system.

Test Validation Methods

To ensure that the test was conducted under ideal conditions, e.g. on an empty stomach, the investigators rely on the participant's computed "baseline" or resting glucose average value, calculated as the average of all their glucose values from 1 AM to 4 AM each morning over the lifetime of the sensor. If the test was started far above the individual's ***baseline range***, the test is considered an outlier and excluded from our initial analysis. This methodology was reviewed by a registered dietitian and a statistician.

The Baseline range

The baseline range of each individual is computed between 1 AM to 4 AM each morning over the lifetime of the sensor.

Several studies performed specifically using continuous glucose monitors suggest that a non-diabetic, healthy individual can expect:

- Maximum baseline range should not exceed 102 mg/dl for average non-diabetic testers
- Mean post-meal glucose peaks ranging from 99.2 ± 10.5 to 137.2 ± 21.1 mg/dl
- Time to post-meal glucose peak is around 46 minutes – 1 hour
- Fasting glucose levels between 80-86 mg/dl

These are not standardized criteria or ranges but can serve as a simple guide for what has been observed as normal in individuals without diabetes.

iAUC Calculation

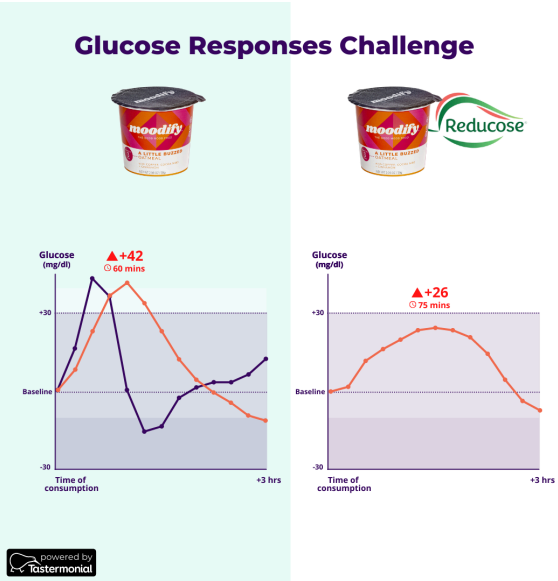
Each participant's eating period (called a "meal") is normalized and overlaid in a data frame that captures glucose values over the course of the test. Several other metrics are computed, such as maximum and minimum values, standard deviation, and others. In particular, the investigators compute the iAUC ("incremental area under the curve"), a measure of the total amount of postprandial blood glucose level increased over the entire 2-hour period after eating. The methodology of iAUC calculation follows the gold standard used in the measurement of the glycemic index. The iAUC metric allows our team to easily compare and rank testing results, as well as compare against the pure sugar responses or the sugar tolerance test of an individual.

Data from each user is analyzed by our team and verified by a practitioner and a statistician. The raw Libreview data is annotated by the timestamps and the food log generated through the Tastermonial app.

Summary of obtained data

- A Glycemic Impact Exploratory Data Exports file in .xlsx/.csv format:
    - Anonymized blood glucose analysis including time-in-range
        - Per individual
        - Per experiment log
    - Metrics including iAUC, time to peak, peak (mg/dl), indicative GI & GL
    - Anonymized food log data
    - Anonymized tester profile and demographics data
    - Statistical Significance Analysis - P-Value, Mean, Std Deviation at 95% confidence level

  An example is shown below:



Limitations of the study and disclaimer

The investigators suggest the Company to not draw any final conclusion from the statistical analysis illustrated above, given the nature of this real-world observational study. A notable advantage of using this system is that volunteers are tested in real-world conditions. However, the test subjects were not under strict research testing conditions which could have caused a variance in the data generated. Further studies are required to further confirm our findings. As opposed to the randomized control trial studies, the collected data should provide a basis to further observe the different use cases, contexts and the customer profiles that the Company can market to.

Categorization of Study Risk and Dietary Supplement Safety

The study falls under the "Minimal Risk" category, as the dietary supplement ingredients selected for the study have been well-tolerated in previous clinical studies and consumer products. These ingredients have either been on the market or submitted as new dietary ingredients to the FDA. The manufacturing process

used to obtain the extracts from the appropriate plant sources did not cause any chemical alterations. Moreover, the selected dietary supplements have a high safety profile, and the daily doses are within the upper limits tolerated by the FDA (where applicable). The ingredients are also on the GRAS list, and although there is a possibility that some participants may have a sensitivity to the herbal ingredients, there are no known side effects associated with the test product. The potential benefits of the dietary supplements outweigh the negligible risks, except for the potential risk of gastrointestinal upset for participants with previously unrecognized allergies or sensitivities to any ingredient. Regarding confidentiality, the risk is minimal as all study participant information will be de-identified, and since it is a virtual study, no confidential or protected information will be taken outside the standard. In the unlikely event that complications arise, and additional medical care is required, there is a slight financial risk to the participants.

Assessment of Benefits

This study aims to evaluate the benefits of using the test product, including enhancements in participants' quality of life and improvements in their blood glucose levels.

Conflict of interests

Ensuring the impartiality of this study, free from any actual or perceived external influence, is of utmost importance. To that end, any individual involved in the trial's design, implementation, analysis, publication, or any other aspect must disclose and appropriately manage any actual or perceived conflict of interest. In cases where a perceived conflict of interest exists, the individual must take measures to ensure their involvement in the trial is conducted appropriately.

Given that the sponsor will benefit financially from the study's success, it is imperative to manage their conflict of interest. To achieve this, an independent PI will oversee the study's execution, and Tastermonial will handle all aspects related to the design, administration of participant-focused materials, participant recruitment, and data collection.

Payment

Participants will get a $20 gift card to use for future Tastermonial purchases.

Appendix I

Reducose white paper

Appendix II

Reducose clinical summary

Appendix III

Online pre-screener