

# Fermented zinc improves bioavailability

<b>Submission date</b> 31/01/2024	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 12/02/2024	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 17/05/2024	<b>Condition category</b> Other	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study arms

Glycoprotein matrix (GPM) nutrients are produced from a nutrient-dense broth which is cultured and bio-transformed via glycosylation by microorganisms such as yeast and/or probiotics into an advanced nutrient bound to a food source that becomes more bioavailable. This study investigates the effects of GPM on the absorption of zinc, compared to zinc oxide, commonly used as a dietary supplement.

### Who can participate?

Male and female healthy volunteers, 18-55 years of age

### What does the study involve?

The study involved the ingestion of the study material (GPM zinc or zinc oxide) followed by multiple blood draws.

### Where is the study run from?

University of Mary Hardin-Baylor, Belton, TX, USA

### When is the study starting and how long is it expected to run for?

July 2023 to January 2024

### Who is funding the study?

Ashland, Kearny, NJ, USA

### Who is the main contact?

Prof. Lem Taylor, University of Mary Hardin-Baylor, [ltaylor@umhb.edu](mailto:ltaylor@umhb.edu)

## Contact information

### Type(s)

Public, Scientific, Principal investigator

### Contact name

Prof Lem Taylor

## Contact details

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### ClinicalTrials.gov (NCT)

Nil known

### Protocol serial number

GPM Zinc

## Study information

### Scientific Title

Glycoprotein matrix zinc exhibits improved absorption: a randomized crossover trial

### Acronym

GPM Zinc

### Study objectives

The overall purpose of this study was to compare the effects of glycoprotein matrix-bound nutrients on the bioavailability of inorganic zinc oxide, commonly used as a dietary ingredient. We hypothesized that fermentation would result in greater absorption and appearance in the blood following acute ingestion while potentially reducing the incidents of gastrointestinal distress.

### Ethics approval required

Ethics approval required

### Ethics approval(s)

approved 04/10/2023, Institutional Review Board of the University of Mary Hardin-Baylor (900 College Street, Belton, TX, 76513, United States of America; +1-254-295-4553; abaggett@umhb.edu), ref: 267

### Study design

Single-center interventional randomized crossover trial

### Primary study design

Interventional

### Study type(s)

Other

## Health condition(s) or problem(s) studied

Healthy subjects

## Interventions

Following baseline sampling, participants ingested their respective supplements with 350 mL of cold water. Blood samples will be taken at 30-, 60-, 90-, 120-, 180-, 240-, 300-, 360-, 420- and 480-minutes post-ingestion. Both zinc treatments, GPM (220mg GPM™ Soy-Free Zinc (GPM) containing 5% zinc, Ashland, Kearny, NJ, USA) and USP (zinc oxide) contained the equivalent of 11mg of zinc, 100% of the daily value and will be administered in the form of one uncoated tablet. Subjects will be randomized using random.org. A 1-week wash-out period will be implemented before subjects are crossed over to the other supplement and repeated the experimental procedure.

## Intervention Type

Supplement

## Primary outcome(s)

The primary outcome measure in this study is plasma zinc levels measured using inductively coupled plasma/mass spectrometry (ICP/MS) at baseline, and 30-, 60-, 90-, 120-, 180-, 240-, 300-, 360-, 420- and 480-minutes post-ingestion as mcg/dL.

The zinc concentrations are used to calculate:

1. Incremental area under the concentration versus time curve (iAUC) as mcg/dL \* 480 minutes
2. Maximum observed concentration (C<sub>max</sub>) as mcg/dL
3. The time of maximum observed concentration (T<sub>max</sub>) as minutes

## Key secondary outcome(s)

Adverse events measured using the GI Health questionnaire evaluating and ranking stomach ache, abdominal pain or cramps, bloating, subjective impression of rectal gas excretion and nausea side effects on a scale from 0 (no symptoms) to 5 (severe symptoms) before and 480 minutes post-ingestion. In addition, participants will be asked to rank the severity of dizziness, headache, fast or racing heart rate, heart skipping or palpitations, shortness of breath, nervousness, blurred vision, and other unusual or adverse effects on a scale from 0 (none) to 5 (very severe).

## Completion date

03/01/2024

## Eligibility

### Key inclusion criteria

1. Healthy adults
2. A normal body weight (body mass index (BMI) of 19–24.99 kg/m<sup>2</sup>)
3. Recreationally active (according to American College of Sports Medicine Guidelines)

### Participant type(s)

Healthy volunteer

### Healthy volunteers allowed

No

**Age group**

Adult

**Lower age limit**

18 years

**Upper age limit**

55 years

**Sex**

All

**Total final enrolment**

16

**Key exclusion criteria**

1. Currently being treated for or diagnosed with a gastrointestinal, cardiac, respiratory, circulatory, musculoskeletal, metabolic, immune, autoimmune, psychiatric, hematological, neurological or endocrinological disorder
2. Participants determined to not be weight stable defined as measured body mass deviating by 2% or more
3. Participants not willing to abstain from alcohol, nicotine, and caffeine for 12 hours before each visit

**Date of first enrolment**

05/10/2023

**Date of final enrolment**

05/11/2023

**Locations****Countries of recruitment**

United States of America

**Study participating centre**

University of Mary Hardin-Baylor

900 College St

Belton

United States of America

76513

**Sponsor information****Organisation**

Ashland Specialty Ingredients G.P.

## Funder(s)

### Funder type

Industry

### Funder Name

Ashland Specialty Ingredients G.P.

## Results and Publications

### Individual participant data (IPD) sharing plan

The datasets generated during and/or analyzed during the current study will be available upon request from the principal investigator, Prof. Lem Taylor, ltaylor@umhb.edu. The raw data is available and can be shared upon written request, if the request is reasonable, as determined by the principal investigator.

### IPD sharing plan summary

Available on request

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		30/03/2024	17/05/2024	Yes	No