

# Drinking soft drinks fast or slow, which one is better?

**Submission date**

21/05/2021

**Recruitment status**

No longer recruiting

☐ Prospectively registered

☐ Protocol

**Registration date**

01/06/2021

**Overall study status**

Completed

☐ Statistical analysis plan

☒ Results

**Last Edited**

08/07/2021

**Condition category**

Nutritional, Metabolic, Endocrine

☐ Individual participant data

## Plain English summary of protocol

### Background and study aims

Drinking sweetened beverages is associated with an increased risk of heart disease and type 2 diabetes. The aim of this study is to determine if the speed of drinking the sweetened beverage alters the effects of fructose (fruit sugar).

### Who can participate?

Healthy adult volunteers who are free of any chronic illness and do not routinely use any medication

### What does the study involve?

Participants are randomly allocated to one of two groups. After overnight fasting, participants in group 1 drink 500 ml of apple juice over an hour by drinking 125 ml every 15 minutes, while subjects in group 2 drink 500 ml of apple juice over 5 minutes. Blood samples are collected at 0, 15, 30, 60, and 120 minutes after ingestion to be tested for levels of sugar and other factors.

### What are the possible benefits and risks of participating?

Participation is on a voluntary basis and does not provide individual benefits. Risks include the risks of having blood drawn, which are mainly temporary pain due to needle stick and bruising.

### Where is the study run from?

Koc University Hospital (Turkey)

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

June 2020 to December 2020

### Who is funding the study?

Koc University Research Center for Translational Medicine (KUTTAM) (Turkey)

### Who is the main contact?

Prof. Dr. Mehmet Kanbay

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## Contact information

### Type(s)

Scientific

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### ClinicalTrials.gov (NCT)

Nil known

### Protocol serial number

Nil known

# Study information

## Scientific Title

The effects of speed of ingestion of a sugary beverage on the acute metabolic response to fructose

## Acronym

SPEFRU

## Study objectives

It is hypothesized that the metabolic effects of fructose in sugary beverages might be modulated by the speed of ingestion in addition to the overall amount.

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

Approved 10/06/2020, Koc University Committee on Human Research (Rumelifeneri Mahallesi, Rumelifeneri Yolu, 34450, Sariyer, Istanbul, Turkey; +90 (0)212 338 11 76; chr@ku.edu.tr), ref: 2020.275.IRB1.098

## Study design

Single-center interventional randomized controlled trial

## Primary study design

Interventional

## Study type(s)

Other

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

Determination of the metabolic response to fructose after fast versus slow ingestion of 100% fruit juice

## Interventions

Thirty healthy, nonobese participants without any systemic disease and receiving no medications and alcohol are included in this study. Each subject is given a total of 500 ml of 100% pure, commercially available apple juice to consume during the intervention. The participants are randomly allocated to either group 1 or group 2. The study used 100% apple juice as the fructose source since it has a higher fructose-to-glucose ratio and has no antioxidant effect. Each participant drinks the same apple juice. The participants in group 1 are instructed to drink 125 ml every 15 min under direct supervision four times until a total of 500 ml is consumed. The participants in group 2 are instructed to drink 500 ml of apple juice within 5 min under direct supervision. No other eating or drinking is allowed during the 2 h study period for both groups. The subjects do not perform any physical activity during the study period. Blood samples are collected for laboratory analysis at baseline and 15, 30, 60, and 120 min after apple juice consumption initiation

## Intervention Type

Other

**Primary outcome(s)**

1. Serum glucose measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
2. Insulin measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
3. FGF-21 measured using sandwich enzyme-linked immunosorbent assay (ELISA) using commercial kits (Cloud-Clone Corp., Wuhan, China) at baseline, and 15, 30, 60, and 120 min after drinking apple juice. Sera is separated in aliquots and is frozen rapidly at -80 °C for the measurements.
4. Copeptin measured using sandwich enzyme-linked immunosorbent assay (ELISA) using commercial kits (Cloud-Clone Corp., Wuhan, China) at baseline, and 15, 30, 60, and 120 min after drinking apple juice. Sera is separated in aliquots and is frozen rapidly at -80 °C for the measurements.
5. Osmolarity measured using the freezing-point Osmometer K-7400S (Knauer, Berlin, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
6. Sodium measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
7. BUN measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
8. Lactic acid measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
9. Uric acid measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice
10. Phosphate measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) at baseline, and 15, 30, 60, and 120 min after drinking apple juice

**Key secondary outcome(s)**

HOMA-IR measured using the following formula:  $\text{HOMA-IR} = (\text{plasma glucose} \times \text{plasma insulin} / 405)$ , where glucose is in mass units (mg/dL), measured using a Roche Cobas 6000 analyzer (Roche, Mannheim, Germany) and calculated for baseline, and 15, 30, 60, and 120 min after drinking apple juice

**Completion date**

01/12/2020

**Eligibility****Key inclusion criteria**

1. Healthy, nonobese participants
2. No systemic diseases
3. Not taking medications or alcohol

**Participant type(s)**

Healthy volunteer

**Healthy volunteers allowed**

No

**Age group**

Adult

**Sex**

All

**Total final enrolment**

30

**Key exclusion criteria**

1. Obesity
2. Any systemic disease
3. Receiving any medications routinely
4. Significant alcohol use

**Date of first enrolment**

01/09/2020

**Date of final enrolment**

01/12/2020

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

Türkiye

**Study participating centre****Koc University Hospital**

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İstanbul

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34010

**Sponsor information****Organisation**

Koc University Research Center for Translational Medicine (KUTTAM)

**Funder(s)****Funder type**

University/education

**Funder Name**

## Results and Publications

### Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are/will be available upon request from Prof. Dr Mehmet Kanbay (mkanbay@ku.edu.tr).

### 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>		02/06/2021	08/06/2021	Yes	No
<a href="#">Participant information sheet</a>			08/07/2021	No	Yes
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes