GRANADA (SPAIN), SEPTEMBER 15-20, 2013

"Joining Cultures Through Nutrition"

Impact of different sugary beverages on thirst

Pedro Carvalho* [1], Mónica Sousa [2], Renata Barros [1], Pedro Moreira [1,3], Patrícia Padrão [1], Vitor Hugo Teixeira [1,3]

1 Faculdade de Ciências da Nutrição e Alimentação, Universidade do Porto, Portugal

2 Faculdade de Desporto, Universidade do Porto, Portugal

3 Centro Investigação em Atividade Física e Lazer , Universidade do Porto, Portugal

* pedrocarvalho@fcna.up.pt

Background and Objectives:

Sugary beverages are frequently considered less effective than water in satisfaction of thirst, but a direct link between sugar and thirst has never been described. The few studies that analyzed the impact of different sugary beverages on thirst sensation are very inconclusive and doesn't allow to draw any connection between the amount or even the presence of sugar in a beverage and a positive impact on thirst. Sugary beverages are also believed to interfere in energy compensation mechanisms. So, the aim of this study is determine the **impact of sugary beverages in thirst sensation and in physiological parameters involved in their regulation** and evaluate their **effect on energy and fluid intake throughout the day**.

Methods:

32 subjects (15 women), mean age of 22.3 ± 1.97 with BMI between 18.5 – 25 kg/m², were included in a **crossover clinical trial** at the same day of **4 consecutive weeks**. A standardized breakfast was served at arrival and 1 hour after, **330ml** of **Water, Non-Fat Milk, Orange Juice** and **Iced Tea** were ingested. A standardized lunch was served 2h30 after preload.

Thirst, desire to drink and **mouth dryness** were measured at baseline and **every 30 minutes** until the end of lunch.

Glycaemia, **plasmatic sodium** and **osmolality** were measured at the beginning and at the end of protocol.

***Ad libitum* water intake at lunch** was measured, and a **food diary** was taken to participants to record all food and fluid intake until 00.00 that day.

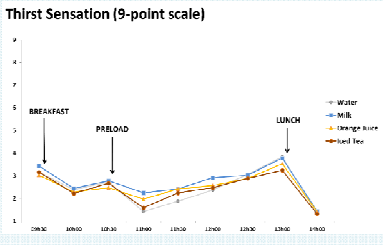
ClinicalTrials.gov Identifier: NCT01770327

Table 1. Energy, macronutrient and chemical composition of the 330ml preloads

Preload	Energy	Carbohydrates	Sugars	Protein	Fat	Energy Density	pH	Osmolality	Sodium
	kcal	g	g	g	g	kcal/g		mOsm/Kg	mEq/L
Water	0	0	0	0	0	0	7.1	0	0.18
Non Fat Milk	115.5	16.2	16.2	10.9	0.66	0.35	7.0	278	172.7
Orange Juice	145.2	34.0	27.7	1.98	0.07	0.44	4.0	607	154
Iced Tea	105.6	25,4	25,4	0	0	0.32	4.0	294	138.8

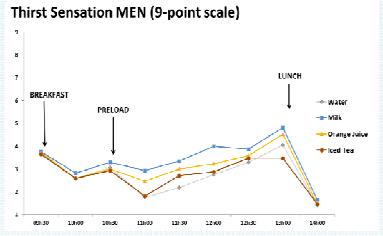
Results:

Figure 1 - Temporal profile of **Thirst** Ratings



A **main effect of time** (P<0.001) but **no effect of beverage** (P>0.05) were observed for **all motivational ratings.** A main interaction beverage*sex in thirst was observed (P = 0.005)

Figure 2 - Temporal profile of **Thirst** Ratings in **Men**



In **men** a **main effect of beverage** was noticed (P=0.01) with **Milk** leading to a non-significant increase in thirst sensation face to **Water** (P=0.068) and **Iced Tea** (P=0.053).

Preload	Water Ingestion
	ml
Water	238 ± 154
Milk	305 ± 168
Orange Juice	279 ± 118
Iced Tea	243 ± 111

Table 2 - Water Ingestion at Lunch

Milk tended to a higher water ingestion at lunch face to **Water** (P=0.095) and **Iced Tea** (P=0.071).

Table 3 – Variation of plasma osmolality, sodium and glycaemia for each beverage

Preload	Osmolality (mOsm/Kg)		Sodium (mEq/L)		Glycaemia (mg/dl)	
	Initial	Final	Initial	Final	Initial	Final
Water	291.3 ± 4.52	290.8 ± 3.78	137.1 ± 1.56	137.6 ± 1.97	82.3 ± 6.35	79.2 ± 6.10
Milk	291.1 ± 4.49	291.2 ± 3.58	136.8 ± 1.79	137.5 ± 1.34	82.7 ± 4.60	75.7 ± 10.7
Orange Juice	291.0 ± 7.07	289.8 ± 4.87	137.1 ± 1.87	137.7 ± 1.76	83.4 ± 5.38	74.6 ± 9.70
Iced Tea	290.0 ± 4.64	289.9 ± 3.50	136.8 ± 1.68	137.5 ± 1.95	82.4 ± 4.78	76.3 ± 9.62

Osmolality values didn't differ and no differences between beverages occurred

Sodium values increased but no differences between beverages were found

Glycaemia decreased but more pronouncedly in sugary beverages than in water

Table 4 – Energy, sugar and caloric beverages intake for each beverage

Preload	Energy	Sugar	Caloric Beverages
	kcal	g	ml
Water	1334 ± 433	67.8 ± 45	353 ± 322
Milk	1455 ± 541	69.9 ± 49.7	328 ± 279
Orange Juice	1310 ± 460	71.6 ± 42.7	396 ± 338
Iced Tea	1235 ± 488	57.5 ± 25.5	304 ± 261

No differences between beverages were observed for any of these parameters

Conclusions:

. **Milk** revealed a **tendency to higher water intake** in a subsequent meal and to an **increase of thirst sensation in men**

. **Osmolality** and **sodium** did **not differ between beverages**

. **Energy, sugar** and **caloric beverages** intake throughout day **did not differ between beverages**

Keywords:

Thirst, sugar, milk, orange juice, iced tea

PO2449

european hydration institute