

Evaluating the Interaction of an Oral Superabsorbent Hydrogel with Alcohol and Acidic Beverages

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INTRODUCTION

- Plenity™ is a non-systemic, oral superabsorbent hydrogel (OSH) indicated to aid in weight management in overweight and obese adults with a BMI of 25-40 kg/m², when used in conjunction with diet and exercise (Figure 1).
- Plenity acts primarily by increasing the volume and the elastic response (firmness) of ingested foods in the stomach and small intestine. It is taken as 3 capsules (2.25g) with 500mL (2 glasses) of water 20-30 minutes prior to lunch and dinner.
- Some patients may choose to consume beverages other than water during their meals. No prior studies have evaluated the effects of various beverages consumed during mealtime on the physical properties of the oral hydrogel.

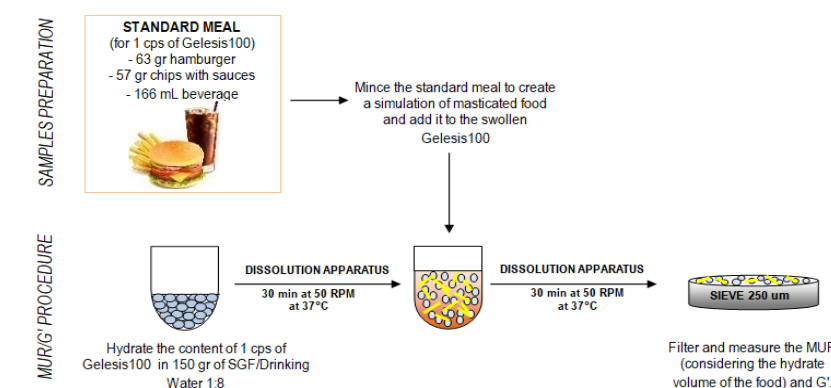
- The contents of one capsule of the oral hydrogel were hydrated for 30 minutes in 150mL of simulated gastric fluid (SGF)/H₂O 1:8 (V/V). SGF composition was 0.25 g NaCl and 0.4g pepsin per 1,000mL.
- Following hydration, oral hydrogel particles were mixed with the ground-up standard meal and 166mL of beverage (Table 1) and stirred together for 30 additional minutes.

Table 1. Study test beverages.

Beverage	Quantity	pH
Drinking water	166mL	7.51
Cola	166mL	2.45
Orange juice	166mL	2.38
Rum (40% abv)	33mL rum + 133mL water	7.08
Red wine (13% abv)	66mL wine + 100mL water	3.7

- The resultant suspension was drained with a stainless-steel sieve and weighed (Figure 2).
- Media uptake ratio (MUR), or water absorption capacity, was calculated by comparing the pre- and post-experiment weight of the oral hydrogel.
- Rheological analysis was performed to determine the elasticity of the hydrogel particles.
- Under normal conditions, the oral hydrogel particles are expected to exhibit an MUR of ≥70 g/g and an elasticity of ≥500 Pascals (Pa).

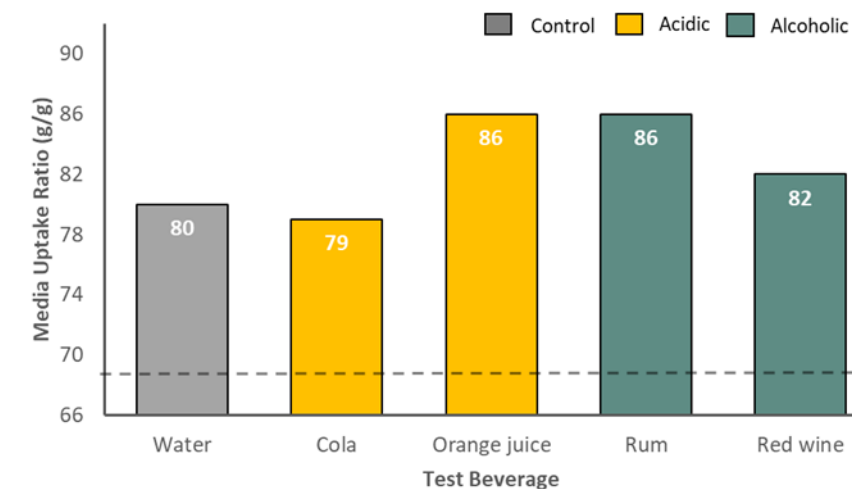
Figure 2. Scheme of experimental procedure.



RESULTS

- The mean water absorption capacity (MUR) for hydrogel particles mixed with the standard meal and water (control) was 80±5 g/g.
- Mean MUR was similar for the other tested beverages. (Table 2 and Figure 3).
- The observed mean values for MUR were all within the expected range (≥70 g/g).

Figure 3. Water absorption capacity (MUR) of hydrogel particles after mixture with standard meal and various beverages.



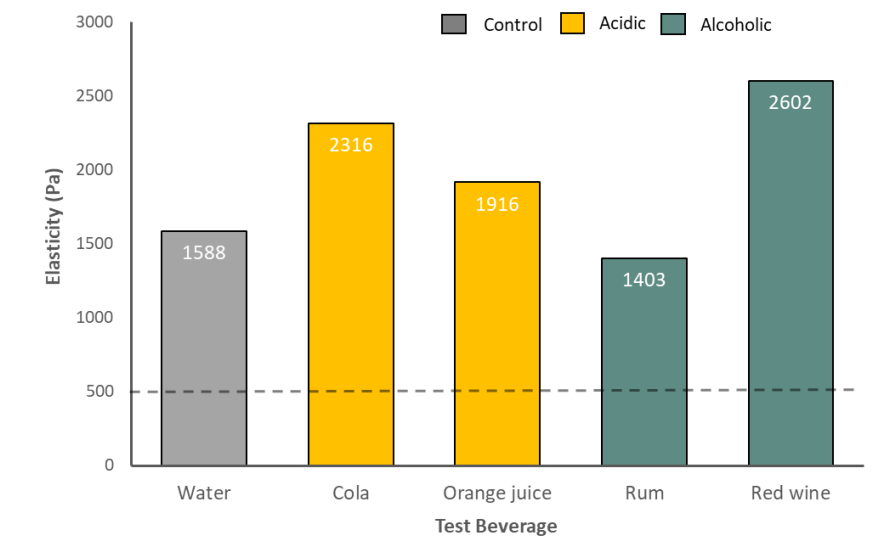
- The measured elasticity for the standard meal and water mixture (control) was 1588±181 Pa.
- For other beverages, elasticity (in Pa) was 1916±117, 2316±370, 2602±520, and 1403±176 for OJ, cola, wine, and rum, respectively. (Figure 4).

Table 2. Mean water absorption capacity and elasticity of hydrogel particles after mixture with standard meal and tested beverages.

Tested Beverage	Water Absorption Capacity (g/g)	Elasticity (Pa)
Drinking water	80±5	1588±181
Cola	79±10	2316±370
Orange juice	86 ± 4	1916 ± 117
Rum (40% abv)	86 ± 7	1403 ± 176
Red wine (13% abv)	82 ± 2	2602 ± 520

- The observed mean values for elasticity were within the expected condition range (≥500 Pa).

Figure 4. Elasticity of hydrogel particles after mixture with standard meal and various beverages.



CONCLUSION

- This simulation study demonstrates that the oral superabsorbent hydrogel (Plenity®) maintained its water absorption capacity and elasticity in the presence of a standard meal with various alcoholic and acidic beverages.

DISCLOSURES

RC, MB, EC, DB, and CD work for Gelesis and own Gelesis stock or stock options.

