



Fluid Viscosity and Thirst Quenching

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ABSTRACT

- ◊ A body desires water to fulfill its needs^{2,4}. Those with dysphagia cannot drink water because they may aspirate the liquid. They instead drink a thickened beverage to quench their thirst. Past research has shown that thick beverages are not thirst quenching².
- ◊ The six beverages in this study were tested for their liking and thirst quenching ability. The beverages selected were sugar, citric acid, both sugar and citric acid, cloudy-milky white, cold in temperature, and a control.
- ◊ The variations of beverages in this study did not significantly improve the thirst quenching ability of the thickened beverage.

INTRODUCTION

- ◊ Some describe thirst quenching as refreshing, or said another way, after you drink something you are not thirsty anymore.
- ◊ Consumers tend to drink water to quench their thirst^{1,2}.
- ◊ Those with dysphagia, a condition experienced most frequently post surgery, cannot swallow water or similar beverages because the fluids go into their lungs causing choking. They instead drink thickened beverages, which have been shown to be the least thirst quenching among most beverages².
- ◊ Research on thirst quenching and/or thickened beverages is limited, thus the importance of this research for those with dysphagia. Past research has indicated that beverages are thirst quenching based on properties such as acidity, sweetness, astringency, carbonation, thickness, temperature, color, and strength of flavor^{2,3,5}.
- ◊ The goal was to take a thickened beverage of honey consistency and find which ingredients and components would make it thirst quenching.
- ◊ The hypotheses included if sour or cold components are added to a thickened beverage, it would result in a more thirst quenching beverage and if sweet ingredients are added, it would result in a less thirst quenching beverage.

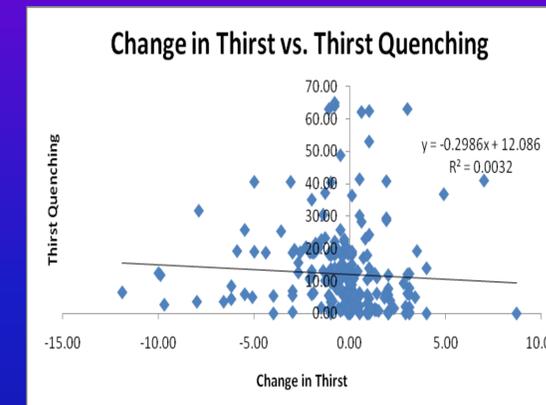
METHODOLOGY

- ◊ Students and staff from the University of Minnesota- Twin Cities participated in a sensory panel taste test. The base mixture for all of the six beverages was a 5.2% cellulose gum premix and distilled water as a honey consistency. The six beverages were control, sweet (2.8% sugar), sour (0.2% citric acid), cloudy (0.1% titanium dioxide-milky white color), cold (held in the refrigerator), and then sweet and sour (3.4% sugar and 0.2% citric acid). The 42 participants consumed a mouthful of the six beverages and answered questions pertaining to their liking and the thirst quenching ability of the beverages.
- ◊ The panelists were asked their initial thirst level before consuming the beverage on a line scale from 0-15 from not thirsty to extreme thirst. After they consumed a mouthful of the beverage, they indicated their thirst level again. The panelists were asked how well the beverage quenched their thirst (Fig 1) and their level of liking of the beverage (Fig 2). This process was repeated for each of the six beverages.

RESULTS

- ◊ The samples did not significantly differ in thirst quenching ability and level of liking. The histograms of the level of liking and thirst quenching ability for each of the beverages were not a normal distribution.
- ◊ There were only slight differences between the samples pertaining to thirst quenching and level of liking as shown in Figure 3 and 4. It can only be speculated that there is a trend between sour ingredients and thirst quenching ability (Fig 3). The cloudy thickened beverage that resembled the color of milk resulted with a slightly higher value in the level of liking (Fig 4).
- ◊ The difference of the initial and final thirst level were compared to the thirst quenching ability (Fig 5) and liking (not shown) of the beverage and indicated no correlation.
- ◊ A positive value for change in thirst indicated an increase in thirst after consuming the beverage. This positive change in thirst should correlate with a lower thirst quenching rating, which would be shown with an inverse correlation and a decreasing slope. The slope decreases slightly but the r^2 value is very small.

Fig 5. The difference in thirst from before to after consumption of the thickened beverage versus the thirst quenching rating of each thickened beverage



DISCUSSION

- ◊ If further research is conducted on this project, a larger sample size and recruiting panelists who have previously consumed thickened beverages, would provide more accurate results.
- ◊ It can be speculated that the liking (or disliking) of the beverage influenced the thirst quenching ability of the thickened beverage.
- ◊ Panelists did not have similar results for the thirst level as more beverages were consumed. There are many speculations pertaining to this result including the influence of the name of the study. Some panelists may have answered that they were less thirsty as they consumed more beverages because of the mouth-coating and other sensory attributes of the beverages.
- ◊ The thirst quenching ability of a thickened beverage was not significantly influenced by the addition of an ingredient, change of the temperature, or change of the color.
- ◊ The combination of acidic and sweet components seemed to help the thirst quenching ability.

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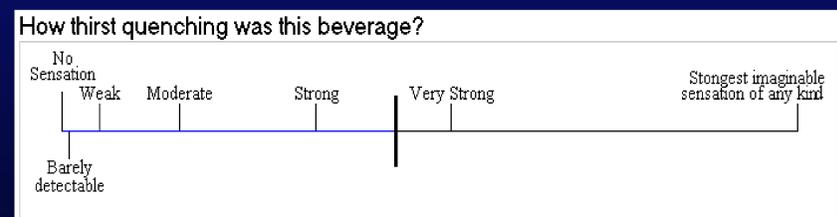


Fig 1. Line scale asking the thirst quenching ability of the thickened beverage

Fig 3. Comparing the mean score values of each thickened beverage pertaining to thirst quenching ability

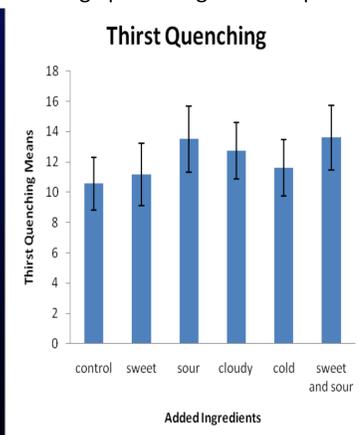


Fig 4. Comparing the mean liking scores of each thickened beverage

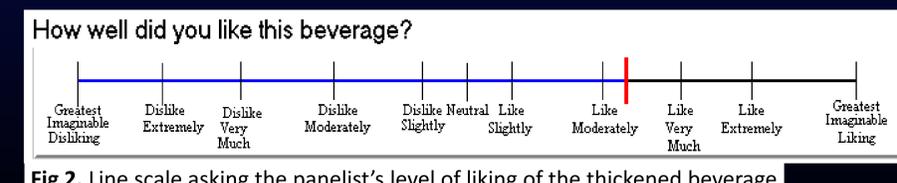
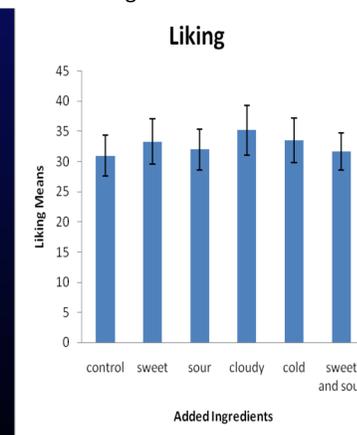


Fig 2. Line scale asking the panelist's level of liking of the thickened beverage