

Consumer acceptability of premixed and package instruction mixed nectar thick apple juice thickened with a starch based and gum based thickening agent

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♦ INTRODUCTION

Dysphagia is defined as difficulty in swallowing and affects around 15 million people in the United States

- The number one concern for patients diagnosed with dysphagia is aspiration which can lead to life threatening aspiration pneumonia
- Patients are prescribed modified texture diets and thickened liquid diets to increase oropharyngeal transit time, reducing the risk for aspiration
- The National Dysphagia Task Force developed guidelines for viscosity to assist speech pathologist in selecting the proper viscosity
  - Think Liquid (1-50 centipoises (cP))
  - Nectar Thick (51-350 cP)
  - Honey Thick (351-1,750 cP)
  - Spoon/Pudding Thick (>1,750 cP)
- Currently starch based and gum based thickening agents are commercially used to obtain desired viscosity
- Dysphagia patients are at high risk for malnutrition and dehydration due to the altered taste of thickened beverages
- Commercial thickeners can result in undesired sensory attributed leading to decreased intake in an already at risk population

♦ OBJECTIVES

- To identify most accepted nectar thick (NT) apple juice
- To identify the sensory drives of overall acceptance of nectar thick apple juice using consumer perceived intensity

♦ MATERIALS AND METHODS

Sample Preparation

A total of 5 samples were chosen. Three are commercially available and two samples were prepared using Mott's Apple Juice and commercially available thickeners. Viscosity was tested before each session with a viscometer (Brookfield RVDV-II Pro). Samples were held and served at 5°C.

Table 1. Nectar thick apple juice samples

Product ID	Thickener	Preparation	Viscosity (cP) 0 – 60 min
Control	N/A	Mott's Apple Juice Commercially available	12
Starch-based Pre-mixed	Starch	Commercially available	290
Starch-based Instruction	Starch	8 fl oz. (229g) Mott's Apple Juice with 2 TBSP (9g) powder	52 ~ 140
Gum-based Pre-mixed	Gum	Commercially available	450
Gum-based Instruction	Gum	8 fl oz. (229g) Mott's Apple Juice with 2 pumps of gel (30g)	102 ~ 132

Evaluation

- 101 Participants with no history of dysphagia
- Liking: Overall, appearance, flavor, texture, and viscosity
- Perceived Intensity: apple identity, bitterness, sweetness, sourness, metallic, causes dry mouth, fat feel, graininess, lumpiness, slickness, starchy and viscosity (modified from Matta and others (2006))

♦ RESULTS

- Based on consumers' overall liking ANOVA, the control apple juice sample was liked moderately and received the highest liking score among 5 samples
- Of nectar thick samples, starch-based instruction prepared sample was liked slightly
- Starch-based pre-mixed sample was disliked moderately and received the lowest liking score
- Gum-based pre-mixed and instruction mixed samples were neither liked nor disliked
- Instruction mixed samples (Starch and Gum) differed in flavor liking compared to Control sample although the base apple juice were the same.

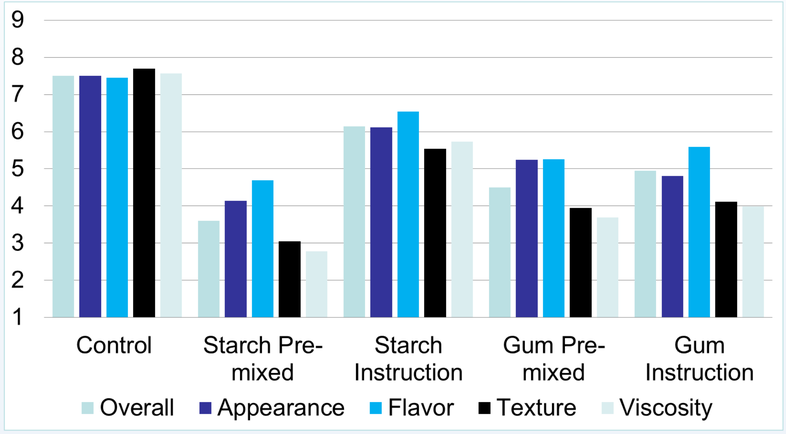

Figure 1. Average liking scores for apple juice samples

•Consumers' perceived intensity indicated that nectar thick samples are significantly different from control in most attributes (except metallic and causes dry mouth attributes)
•Starch instruction sample was the highest in graininess, which could be an explanation for low viscosity. Other attributes were perceived very similar to Control sample

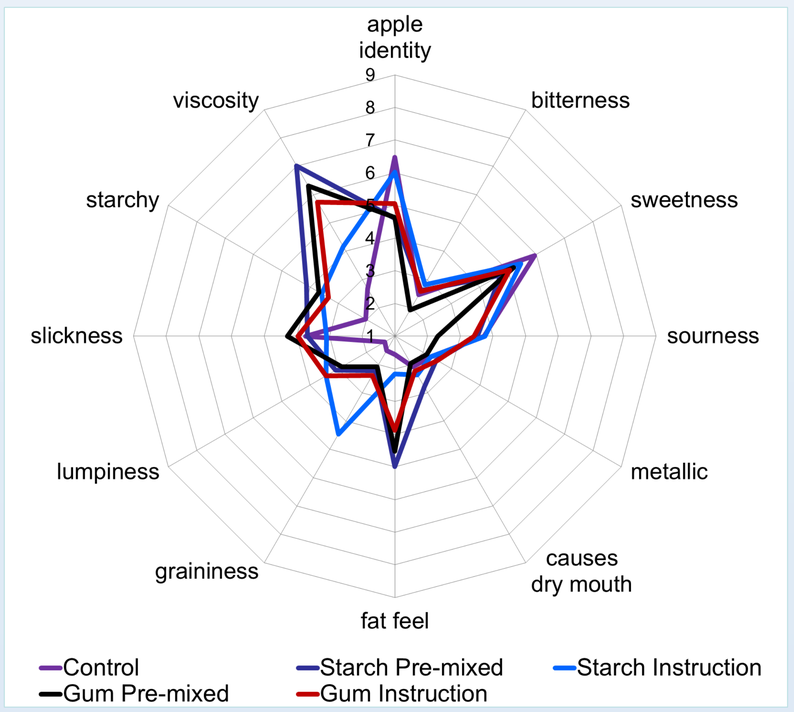

Figure 2. Consumer perceived attributes

- Correlation analysis demonstrates that overall liking was highly correlated with apple identity (r=0.97) and sweetness (r=0.97) and highly negatively correlated with fat feel (r=-0.98) and viscosity (r=-0.99).

♦ DISCUSSION

Product Consistency:

- Based on the viscosity classification of the National Dysphagia Task Force Guideline, the viscosity of gum-based pre-mixed "nectar thick" apple juice had honey thick viscosity
- Although this is not harmful to patient, higher viscosity is negatively correlated with overall liking, which may reduce intake and results in dehydration

Perceived Viscosity by Consumers:

- Consumer did not perceive the difference between nectar thick viscosity and honey thick viscosity when gum was used as a thickening agent
- Although starch-based pre-mixed nectar thick sample was perceived as the highest in viscosity, gum-based pre-mixed nectar thick sample was the highest based on the viscometer reading

Starch-Based Thickener:

- Single packet starch-based thickener may be used for consumer
- Starch-based thickener used in Health care has the greatest room for errors
  - Viscosity changes (increases) over time
  - Less thickener: Risk of aspiration
- Starch-based pre-mixed sample had higher viscosity compared to starch instruction sample and this agrees with finding of Adeleye and Rachal (2007)

Cost:

Gum-based > Starch-based pre-mixed > Starch-based Instruction

♦ CONCLUSION

- Consistency of products needs to improve
- Different thickening agents are recommended for different circumstances
- Health care facilities may choose gum based thickening agent (pre-made or instruction) for minimal room for error in preventing aspiration in dysphagia patients
- Starch-based single packet may be the best for consumer preparing nectar thick beverage at home for immediate consumption for the highest acceptability

♦ REFERENCES

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