Sponsored by Viscgo
www.viscgo.com

1

Why Thickening Drinks Accurately for People With Dysphagia is so Challenging

Dr Ben Hanson

Associate Professor, University College London
IDDSI board member

ben.hanson@iddsi.org @BenHansonMech

2

Please Note:

IDDSI is an independent body and does not endorse any commercial products or services.

This is not an IDDSI communication; only the opinions of Dr Hanson independently.

Associate Professor, University College London
IDDSI board member

ben.hanson@iddsi.org @BenHansonMech

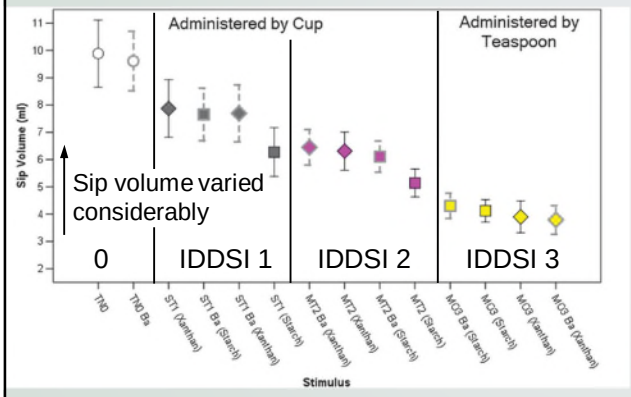
3

4

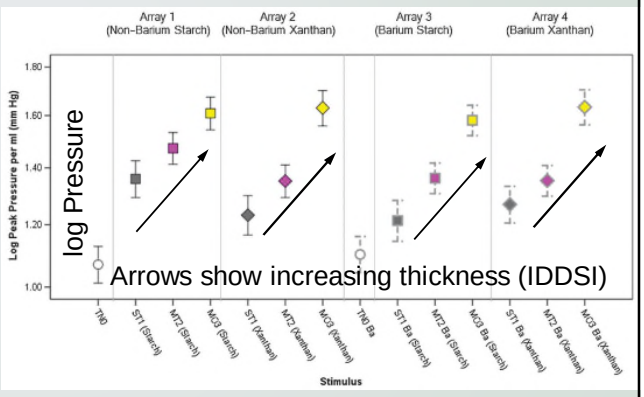
5

TONGUE PRESSURE IN HEALTHY SWALLOWING

Modulation of sip size was a clear conclusion and, unfortunately, major confound.

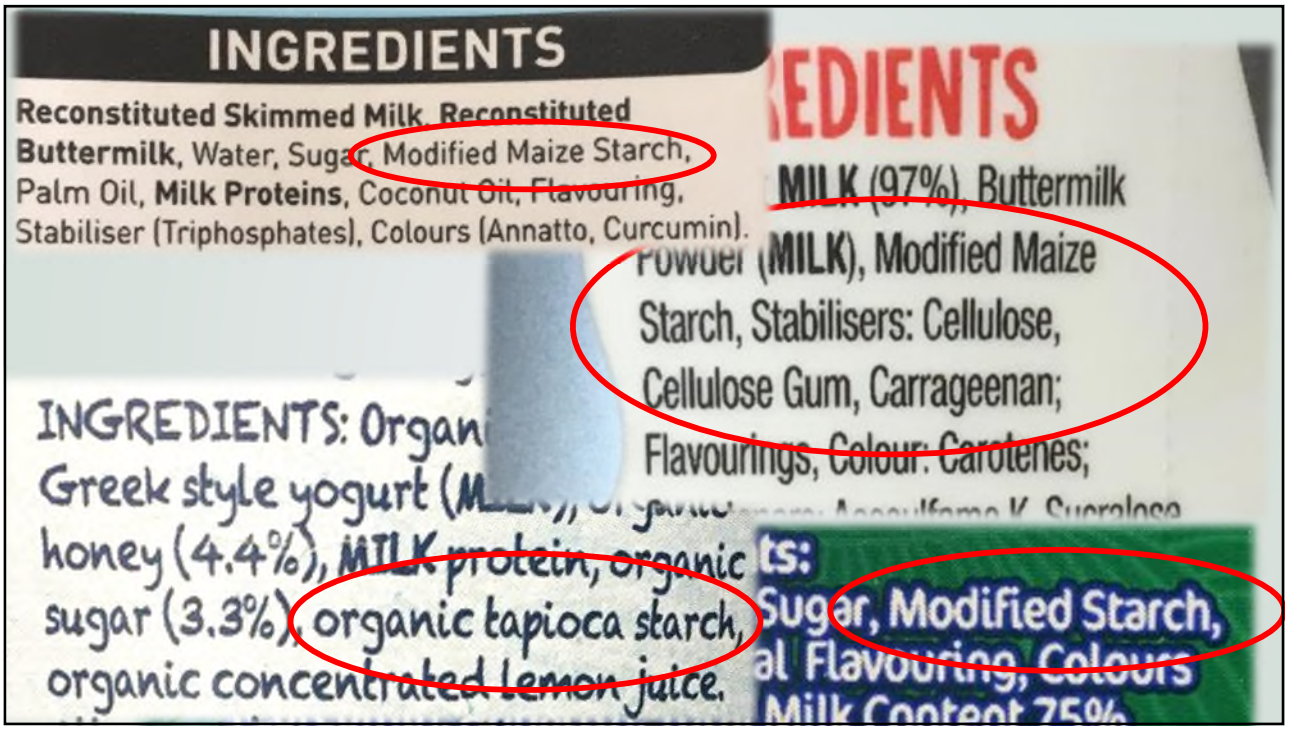


Normalised Peak pressure increased for thicker liquids (despite sip size decreasing)



Steele, C.M., et al., Modulation of Tongue Pressure … *Journal of Speech, Language, and Hearing Research*: 62(1): p. 22-33. 2019.

6


INGREDIENTS
Reconstituted Skimmed Milk, Reconstituted Buttermilk, Water, Sugar, Modified Maize Starch, Palm Oil, Milk Proteins, Coconut Oil, Flavouring, Stabiliser (Triphosphates), Colours (Annatto, Curcumin).
EDIENTS
MILK (97%), Buttermilk
(MILK), Modified Maize Starch, Stabilisers: Cellulose, Cellulose Gum, Carrageenan; Flavourings, Colour: Carotenes;
INGREDIENTS: Organi
Greek style yogurt (M
honey (4.4%), MILK protein, organic sugar (3.3%), organic tapioca starch, organic concentrated lemon juice.
ts:
Sugar, Modified Starch,
al Flavouring, Colours
Milk Content 75%

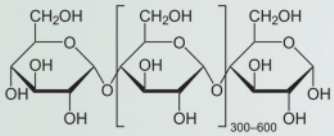
7


LEGO CAKE
Happy 5th Birthday Caleb
NAILED IT

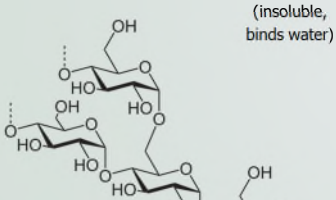
8

CONTROLLING TEXTURE

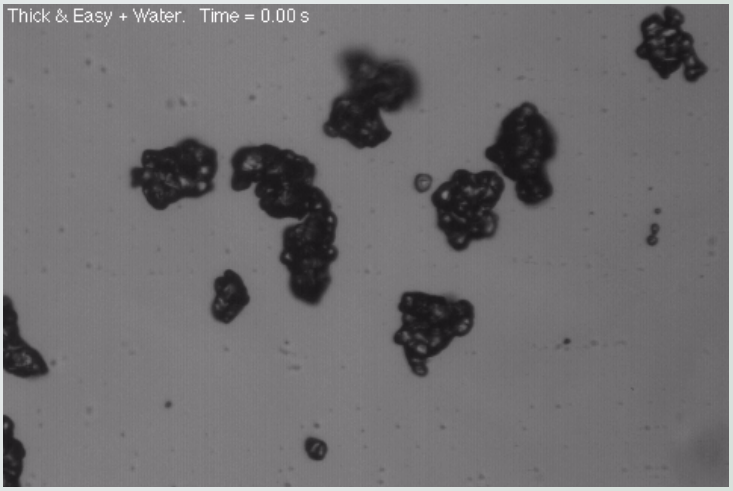
e.g. modified starch (E1442)



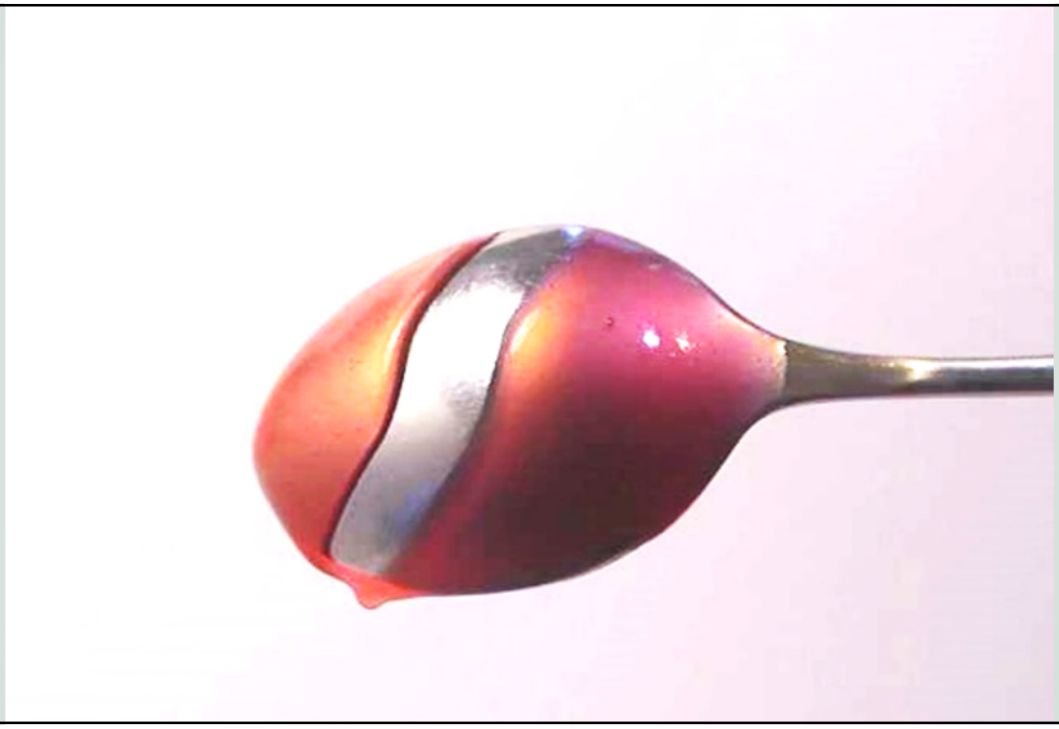
AMYLOSE
(insoluble,
binds water)



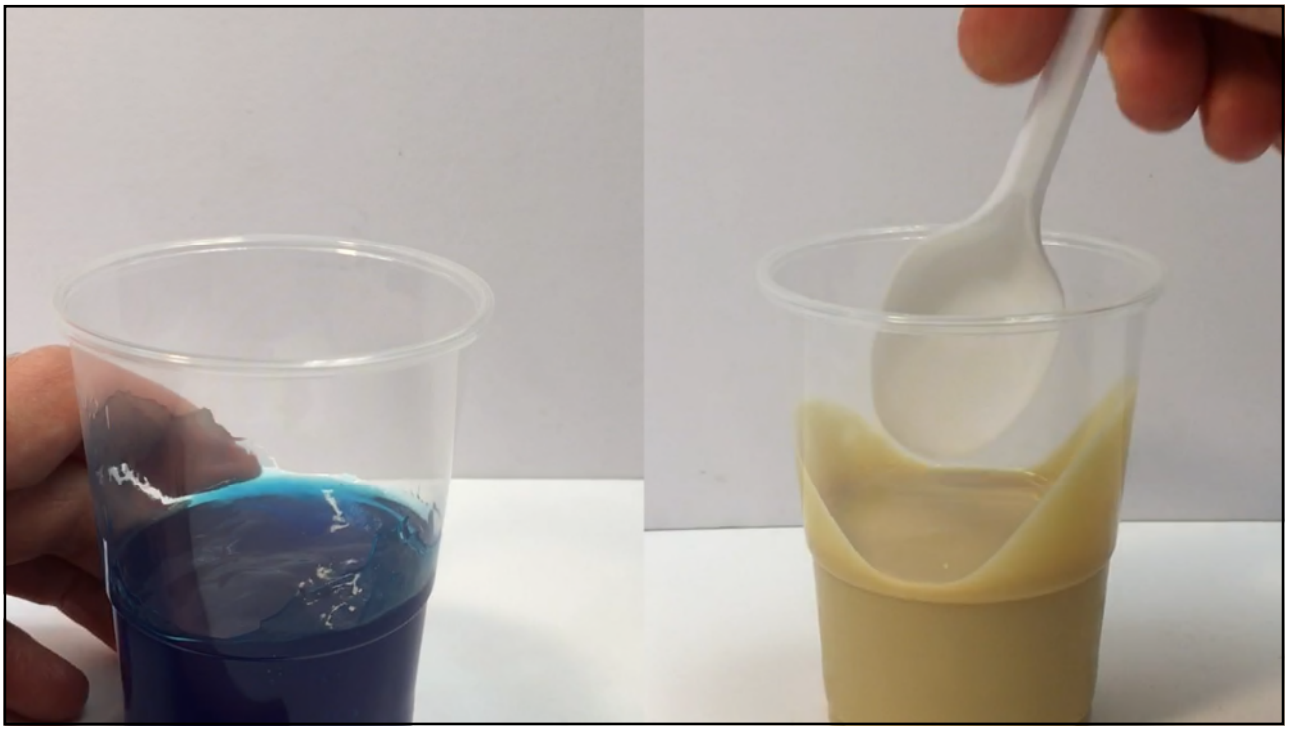
AMYLOPECTIN
(water-soluble)



9

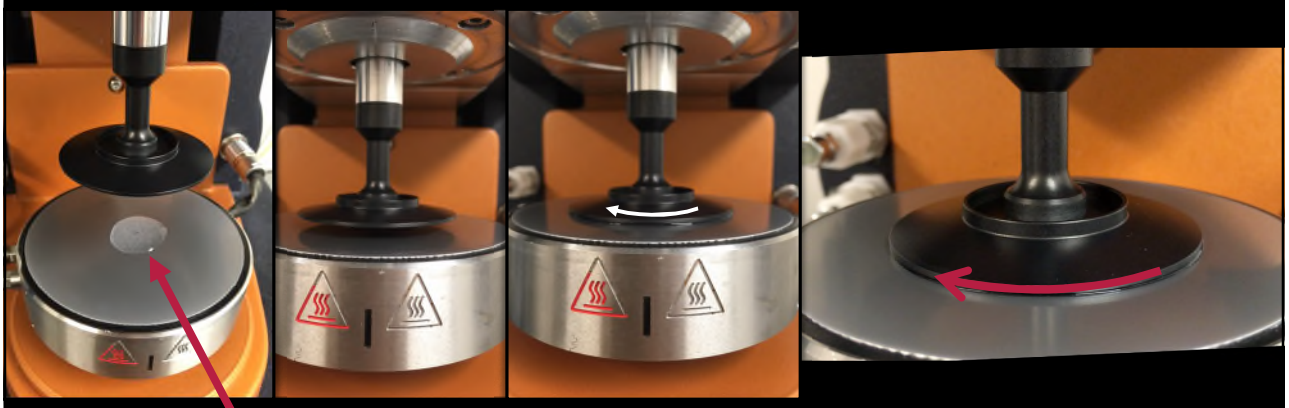


10



11

MEASURING VISCOSITY



12

Dysphagia 15:188–200 (2000)
DOI: 10.1007/s004550000027

Dysphagia
© Springer-Verlag New York Inc. 2000

How Thick Is Thick? Multicenter Study of the Rheological and Material Property Characteristics of Mealtime Fluids and Videofluoroscopy Fluids

Julie A.Y. Cichero, BSpThy (Hons), BA, PhD,[1] Oliver Jackson, BChemEng,[2] Peter J. Halley, BChemEng, PhD,[2] and Bruce E. Murdoch, BSc, PhD[1]

[1]Department of Speech Pathology & Audiology and [2]Department of Chemical Engin
Brisbane, Queensland, Australia

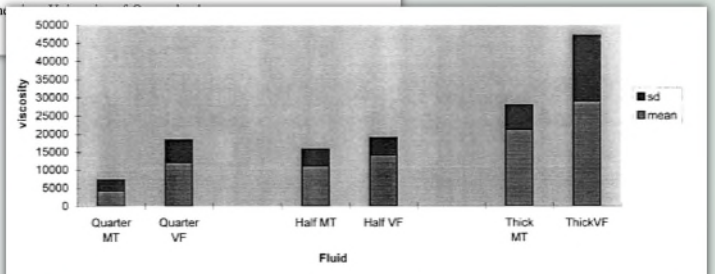
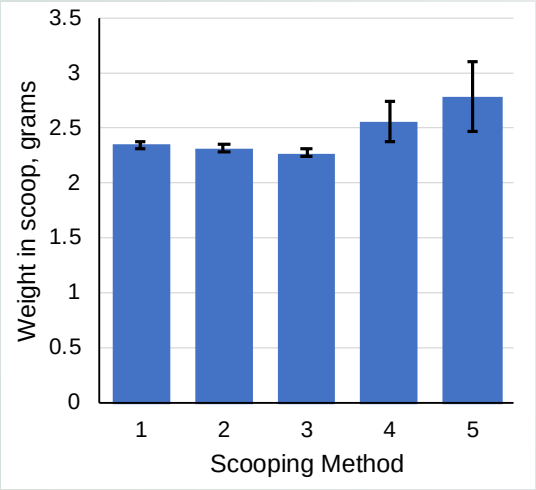
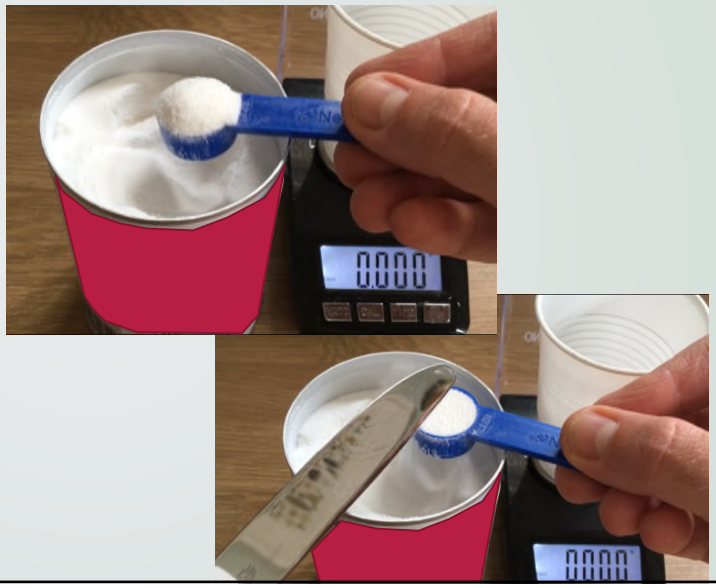


Fig. 4. Mean and standard deviation values of viscosity at low shear rates (cP) for quarter thick, half thick, and full thick mealtime (MT) and videofluoroscopy (VF) fluids.

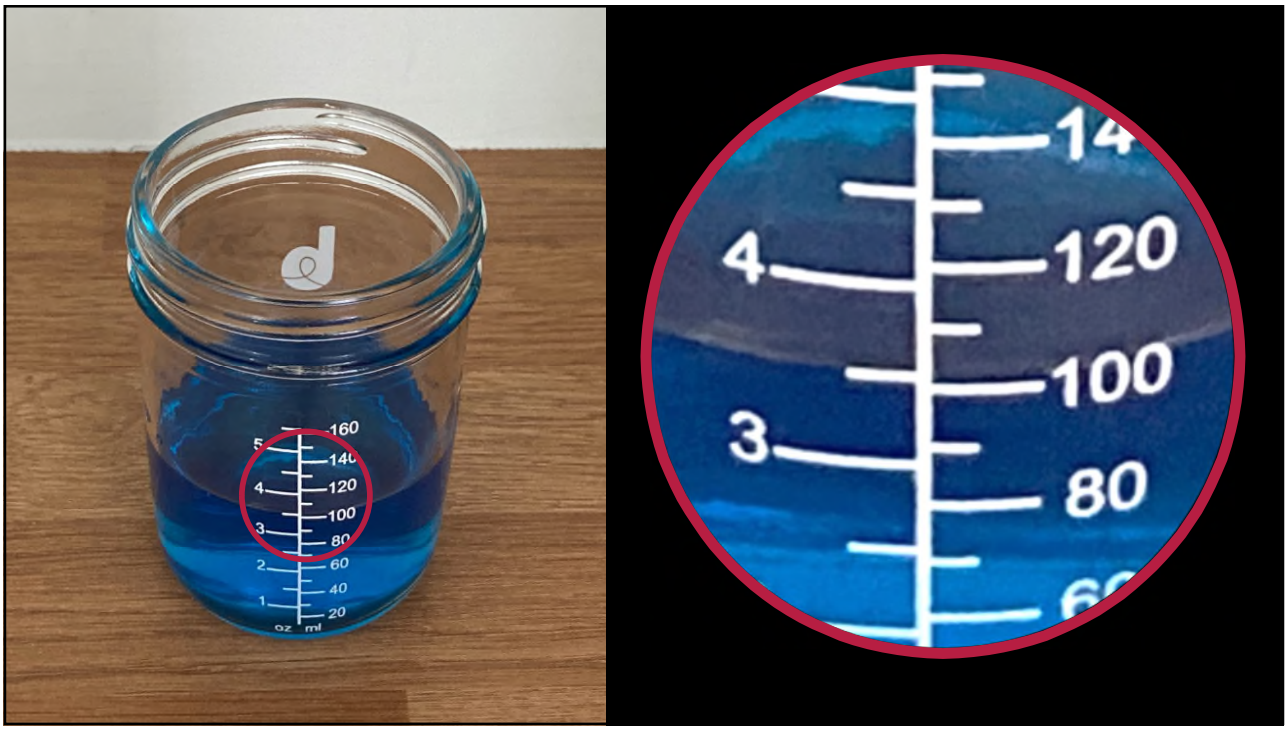
13

VARIABILITY IN SCOOP VOLUME & MASS

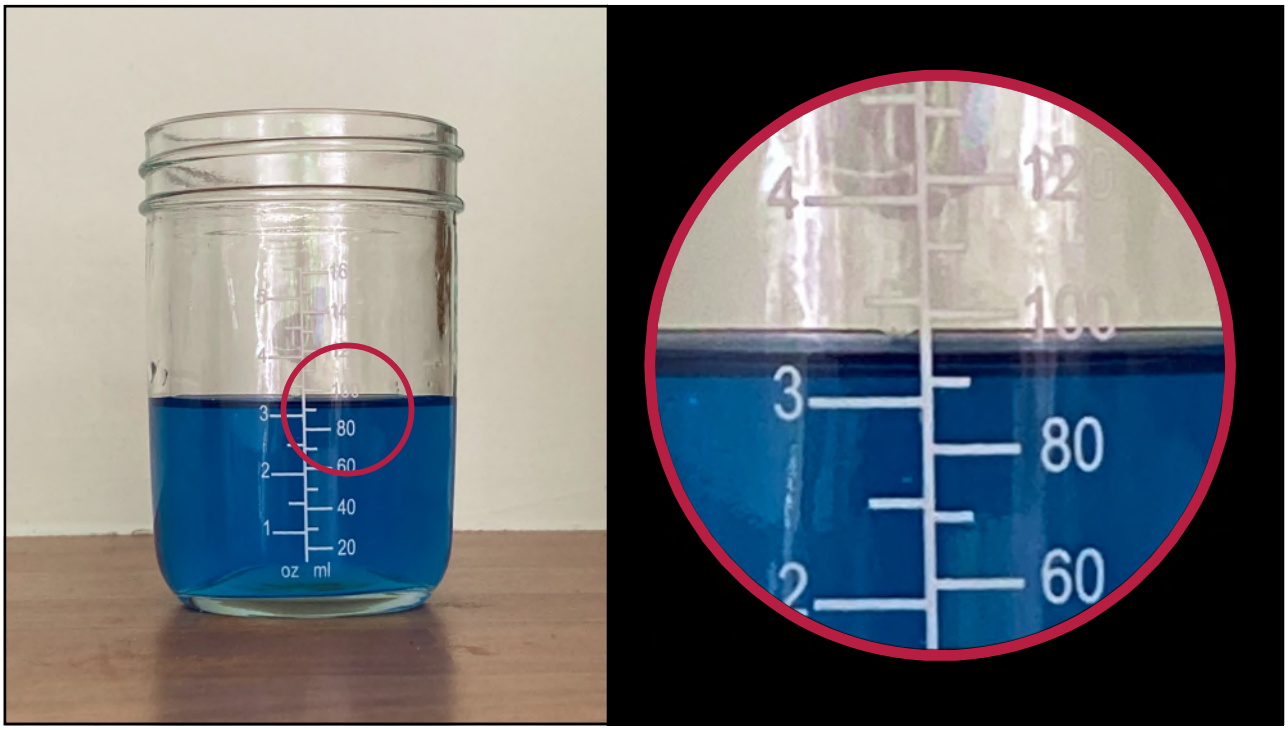




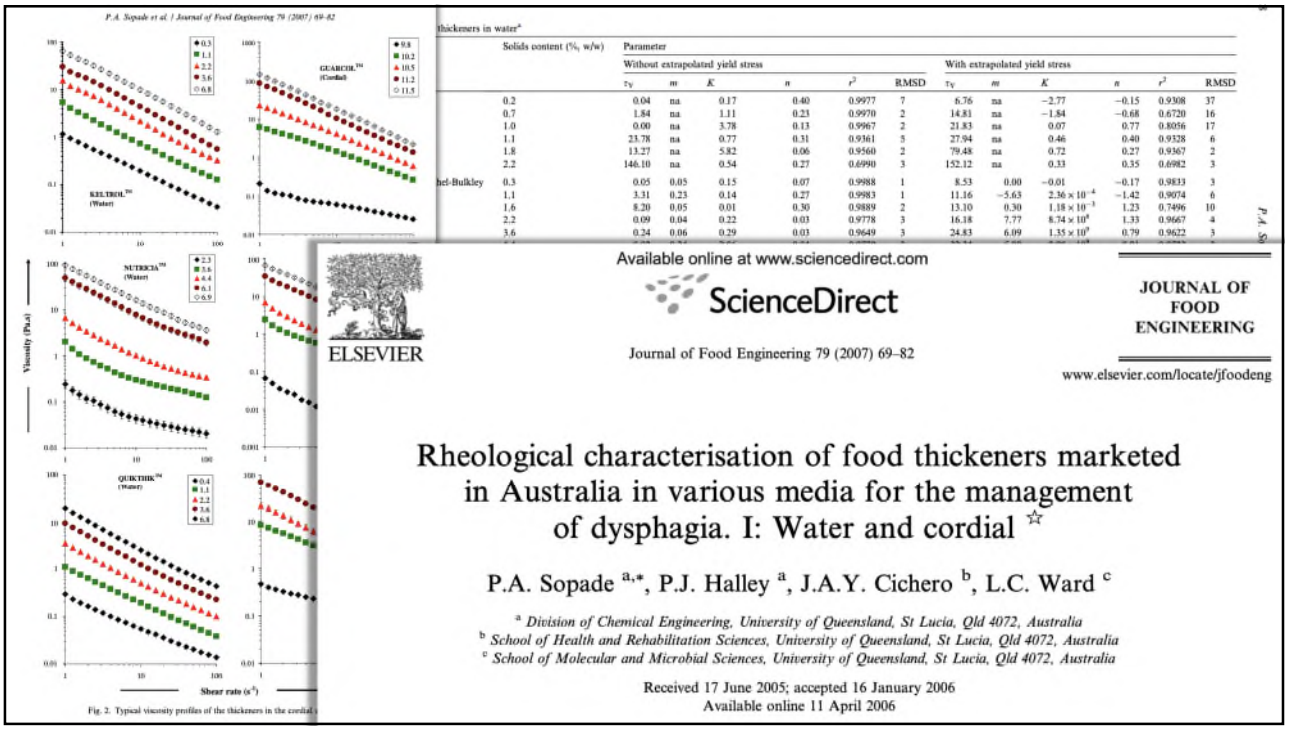
14


160
140
120
100
80
60
40
20
5
4
3
2
1
oz ml
14
4
120
100
3
80

15


80
60
40
20
3
2
1
oz ml
4
12
3
80
2
60

16



Available online at www.sciencedirect.com

ScienceDirect

Journal of Food Engineering 79 (2007) 69–82

JOURNAL OF FOOD ENGINEERING

www.elsevier.com/locate/jfoodeng

ELSEVIER

Rheological characterisation of food thickeners marketed in Australia in various media for the management of dysphagia. I: Water and cordial ☆

P.A. Sopade [a,*], P.J. Halley [a], J.A.Y. Cichero [b], L.C. Ward [c]

[a] Division of Chemical Engineering, University of Queensland, St Lucia, Qld 4072, Australia
[b] School of Health and Rehabilitation Sciences, University of Queensland, St Lucia, Qld 4072, Australia
[c] School of Molecular and Microbial Sciences, University of Queensland, St Lucia, Qld 4072, Australia

Received 17 June 2005; accepted 16 January 2006
Available online 11 April 2006

17

Dysphagia
DOI 10.1007/s00455-014-9533-x

ORIGINAL ARTICLE

Viscosity Differences Between Thicken for Elderly Patients with Dysphagia

Noé Garin · Jan Thomas De Pourcq · Raquel Martín-Venegas · Daniel Cardona · Ignasi Gich · Maria Antònia Mangues

Viscosity results

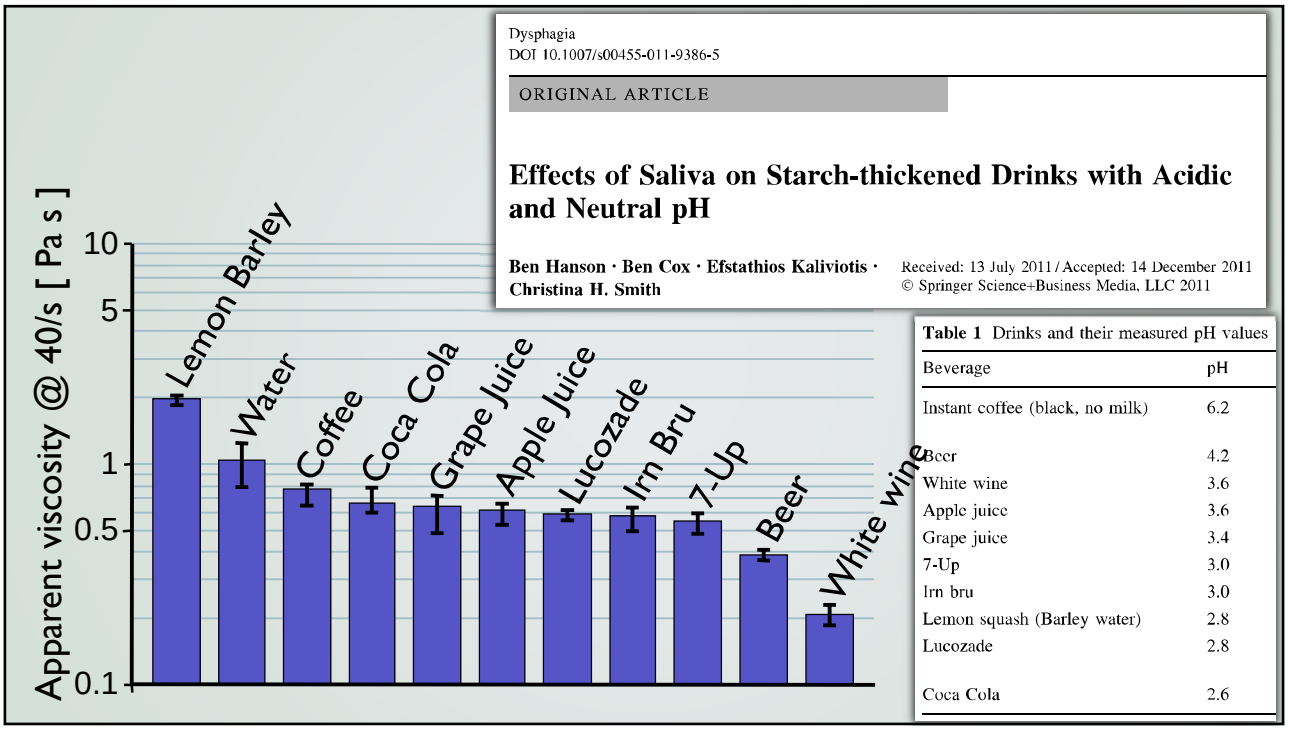
Table 2 Viscosi… sta-tistical significan…

Drink	Viscosity (mean ± SD) (mPa s)	Statistical significance (p)
Water	1,104.4 ± 104.7	–
Peach-grape juice	3,028.2	
Orange juice	1,542.4 ± 220.75	0.001*
Pineapple juice	1,881.8 ± 64.34	0.001*
Skimmed milk	1,295.0 ± 10.0	0.024*
Whole milk	1,489.2 ± 32.9	0.001*
Tigernut milk	1,568.2 ± 65.13	0.001*
Coffee	736.0	

* Statistically significant increase

** Statistically significant decrease

18



Dysphagia
DOI 10.1007/s00455-011-9386-5

ORIGINAL ARTICLE

Effects of Saliva on Starch-thickened Drinks with Acidic and Neutral pH

Ben Hanson · Ben Cox · Efstathios Kaliviotis · Christina H. Smith

Received: 13 July 2011 / Accepted: 14 December 2011

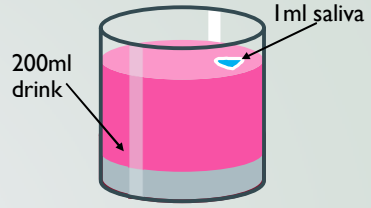
Table 1 Drinks and their measured pH values

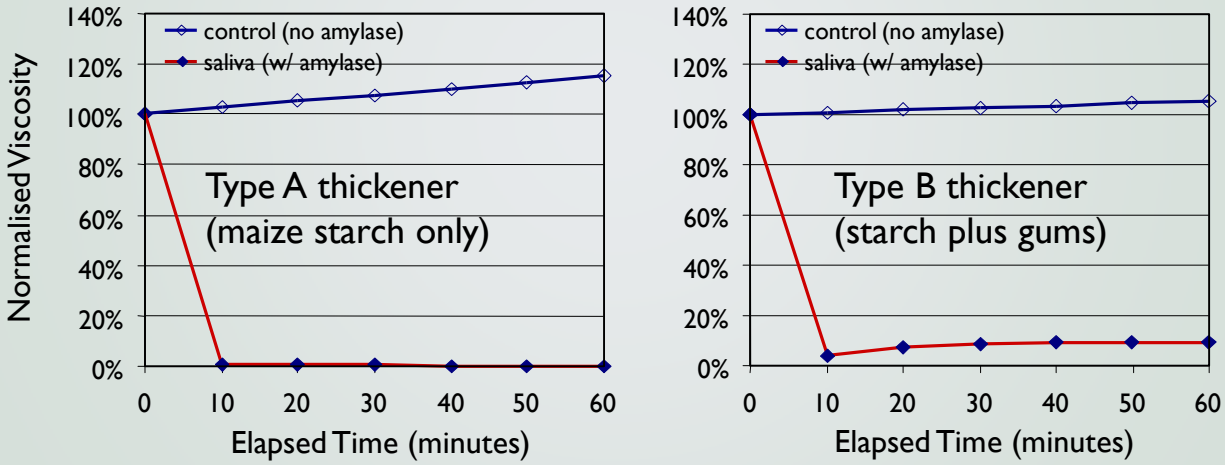
Beverage	pH
Instant coffee (black, no milk)	6.2
Beer	4.2
White wine	3.6
Apple juice	3.6
Grape juice	3.4
7-Up	3.0
Irn bru	3.0
Lemon squash (Barley water)	2.8
Lucozade	2.8
Coca Cola	2.6

19

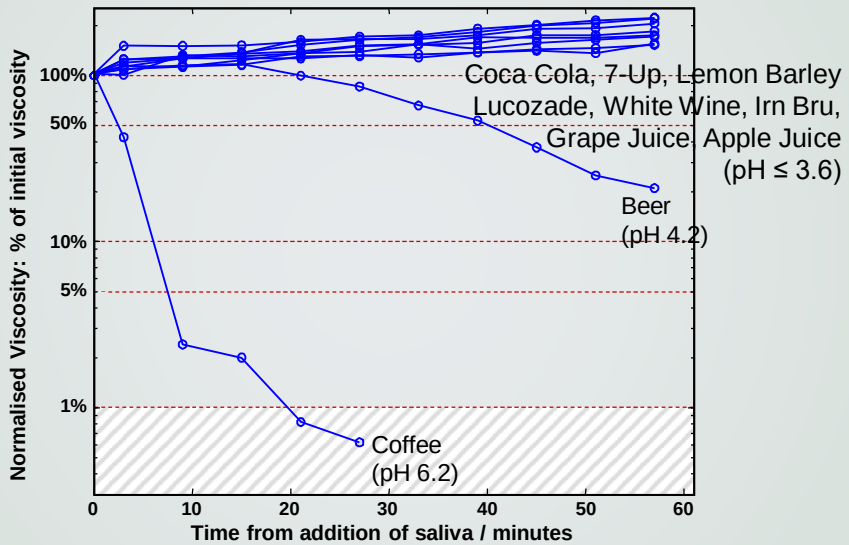
20

EFFECT OF SALIVA IN A CUP





21

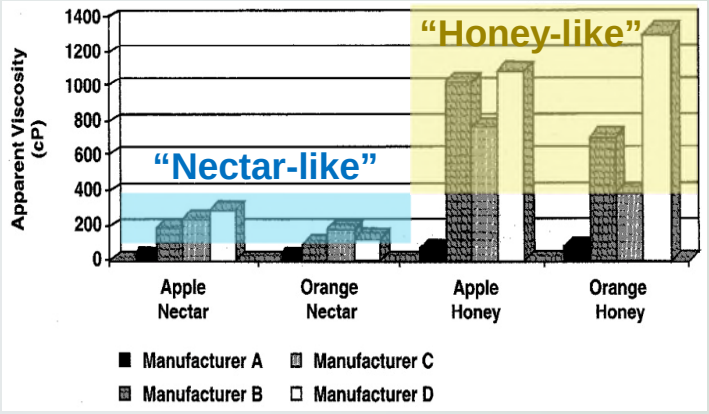


Hanson, B., Cox, B., Kaliviotis, E., & Smith, C. H. (2012). Effects of saliva on starch-thickened drinks with acidic and neutral pH.. Dysphagia, 27(3), 427-435.

22

NATIONAL DYSPHAGIA DIET (USA, 2002)

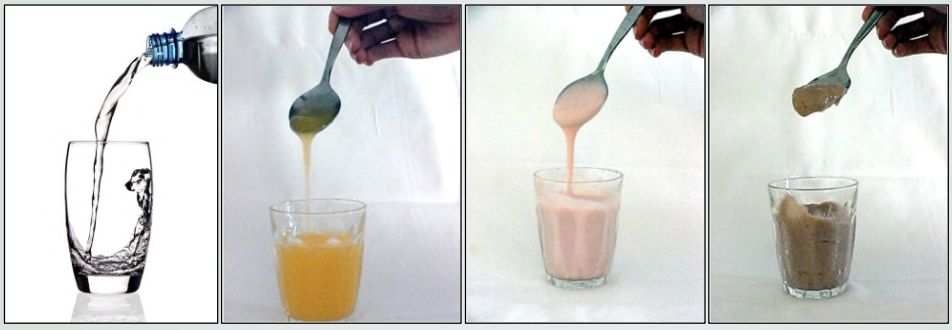
- Task force measured apparent viscosity of existing products at a shear rate of 50 s^{-1} *
- Ranges defined from manufacturers' mixing instructions; no clinical efficacy data was available **



* "...the shear rate of the human swallow is a poorly understood concept"

** "Further study and peer-reviewed, scientific data will be needed…"

VISCOSITY TARGETS WORLDWIDE, BEFORE **IDDSI**



NDD	0-50 cP*	51-350 cP*		351-1750 cP*	> 1750 cP*
AU *proposed*	< 95 mPa.s* (<1.3 Pa)#	95-200 mPa.s* (1.3-4.0 Pa)#		260-550 mPa.s* (5.5-11.5 Pa)#	670-1040 mPa.s* (14-21 Pa)#
JPN	<50 mPa.s*	50-150 mPa.s*	150-300 mPa.s*	300-500mPa.s*	>500 mPa.s*

* Viscosity @ 50 sec^{-1} shear rate;
# Yield stress (Pa)

American Dietetic Association (2002); Hadde (2015) Int J Speech-Lang Pathol, 18:402-410; Watanabe et al.(2017) Dysphagia, epub pre-print

THE FLOW TEST

4 consistencies shown here
(Level 4 needs fork & spoon tests)

IDDSI - Flow Test

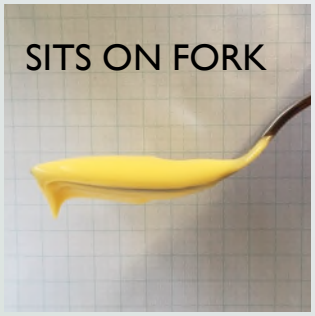
Comparison of level 1-4

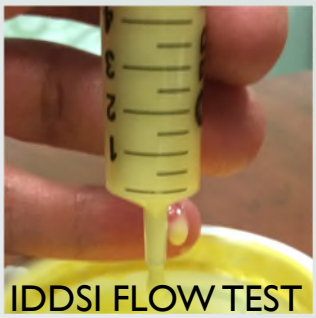
1 2 3 4

25

COLD

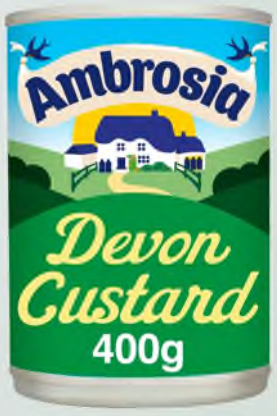
4 EXTREMELY THICK





HOT

3 MODERATELY THICK



26

VISCOSITY OF COLD VS HOT WATER

27

Dysphagia (2019) 34:73–79
https://doi.org/10.1007/s00455-018-9915-6

ORIGINAL ARTICLE

CrossMark

Characterizing the Flow of Thickened Barium and Non-barium Liquid Recipes Using the IDDSI Flow Test

Carly E. A. Barbon[1,2] · Catriona M. Steele[1,2,3]

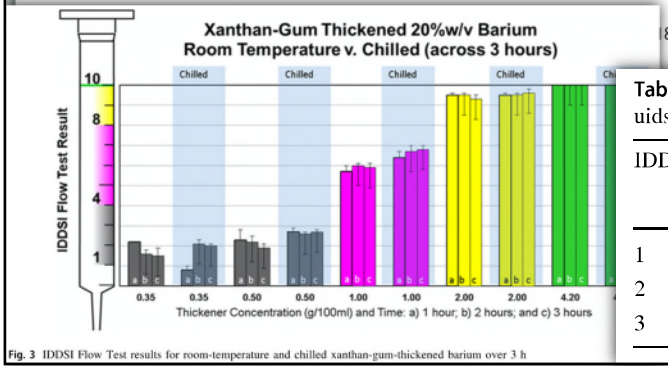


Fig. 3 IDDSI Flow Test results for room-temperature and chilled xanthan-gum-thickened barium over 3 h

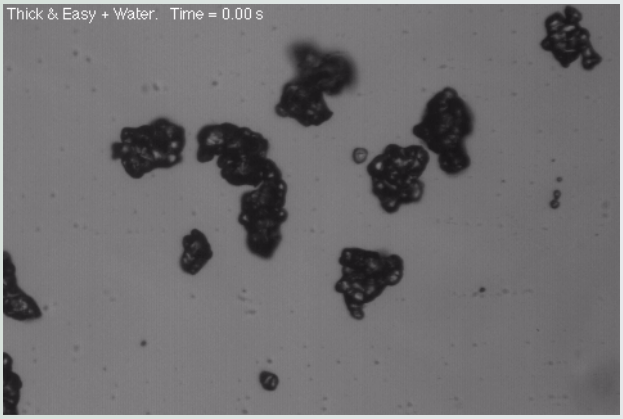
Table 1 Final recipes (g/100 ml) for all non-barium and barium liquids by IDDSI level

IDDSI level	Non-barium		Barium	
	Xanthan gum	Starch	Xanthan gum	Starch
1	0.65	4.15	0.4	2.85
2	1.25	4.77	1.02	3.75
3	2.1	5.85	2.2	5.1

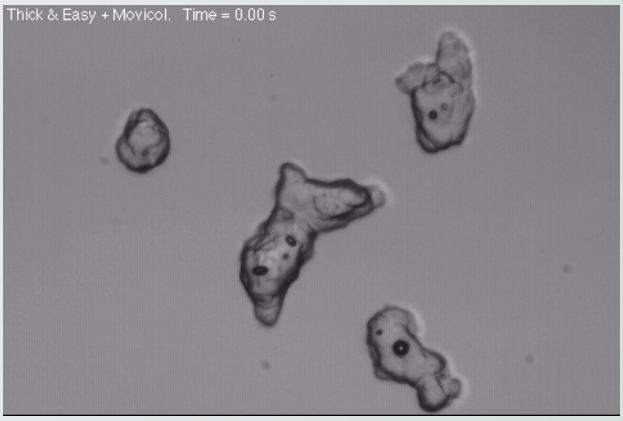
28

COMBINING WITH DRUGS, E.G. LAXATIVES

Starch + Water



Starch + Water + Movicol



29

Why Thickening Drinks Accurately for People With Dysphagia is so Challenging

Dr Ben Hanson

Associate Professor, University College London
IDDSI board member

ben.hanson@iddsi.org @BenHansonMech

30