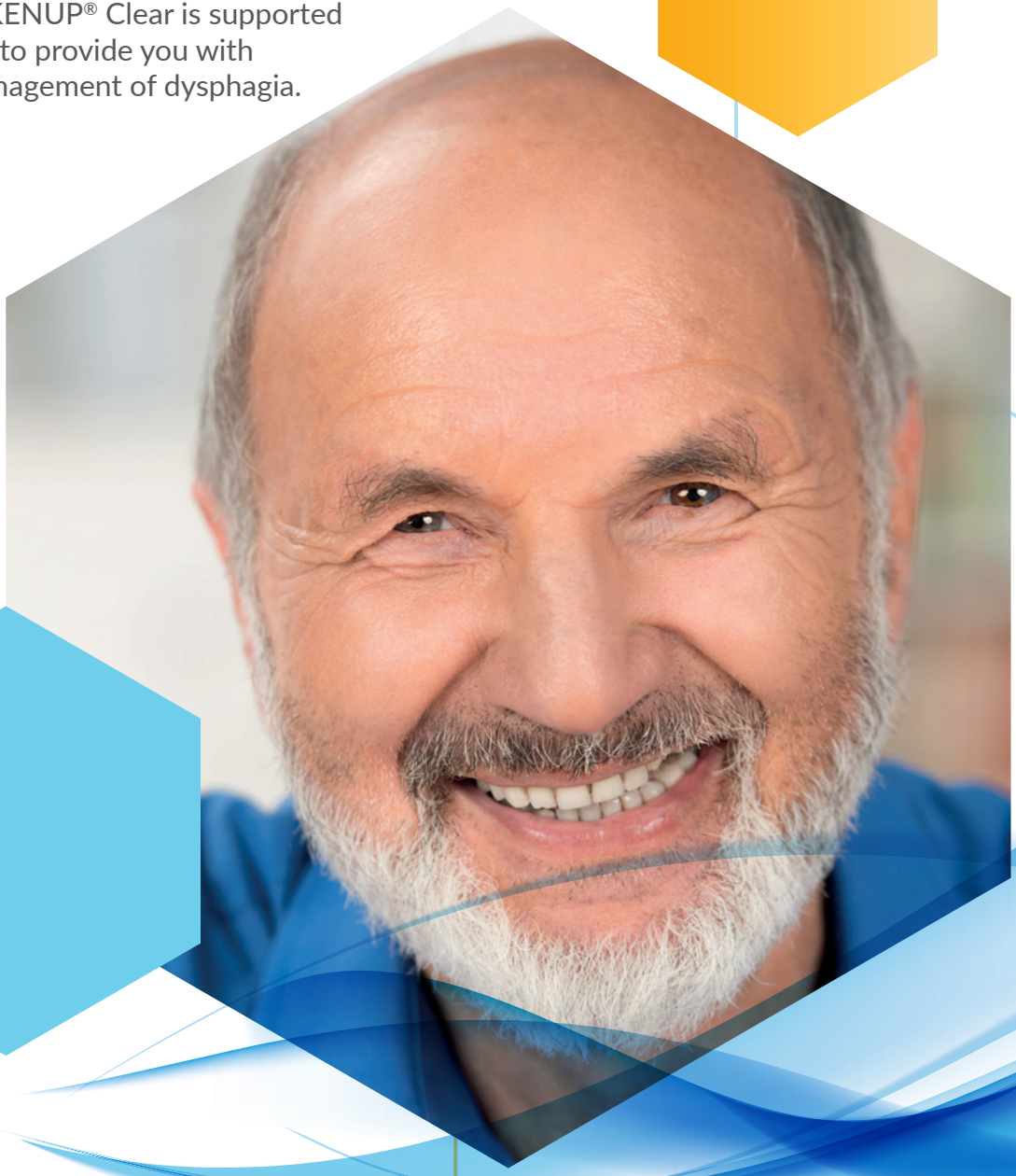
resource®
ThickenUP® clear

Evidence-based Dysphagia Management

RESOURCE® THICKENUP® Clear is supported by clinical evidence to provide you with evidence-based management of dysphagia.



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IDDSI
International Dysphagia Diet Standardisation Initiative
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Nestlé HealthScience

resource® ThickenUP® clear

The clear, reliable and trusted solution for people with dysphagia

EXCELLENT COMPLIANCE[1] | EASY TO PREPARE[1] | IMPROVED SWALLOWING SAFETY[2-4]

RESOURCE® THICKENUP® Clear is an exclusive xanthan gum-based powdered thickener from Nestlé Health Science.

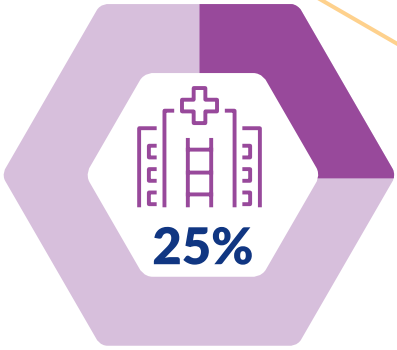
Beneficial features include preserving the natural appearance of the food and drink being thickened, ease of preparation and efficacy reported in several published studies. **RESOURCE® THICKENUP® Clear can improve safety in swallowing and quality of life for patients.**

The presence of dysphagia and its complications...

...are more common than you think

Dysphagia affects:

Approximately 13% of people in the community[5]



Approximately 25% of patients in hospitals[5]

At least 60% of elderly residents living in long-term care facilities[5]

50% of head and neck cancer patients[6]

25–81% of stroke patients[7]

15–87% of Parkinson's disease patients[8]

32–93% of Alzheimer's disease patients[7]

...are underdiagnosed

It is recognised by the European Union Geriatric Medicine Society (EUGMS) in a white paper that dysphagia is often underdiagnosed and untreated.[7]

Dysphagia symptoms can be identified with the EAT-10[9] swallowing screening tool, and clinical signs and care needs can be evaluated by performing a bedside Volume-Viscosity Swallow Test (V-VST).[10]

...have serious consequences

Dysphagia can:

- **Increase the risk of malnutrition,** with approximately 50% of older patients being malnourished or at risk. Those with pneumonia are at even greater risk.[11]
  - When malnutrition and dysphagia are combined, the risk of death in older adults is increased.[6]
- **Increase the risk of pneumonia** by 3 times in stroke patients, which increases to 11 times if the patient presents aspirations.[2]
  - Aspiration pneumonia is associated with a 3-fold increased risk of death compared with stroke patients without pneumonia.[2]

...can be effectively managed by changing the bolus viscosity

Evidence shows that increasing the viscosity of fluids to appropriate levels for people with dysphagia can reduce the risk of penetrations and aspirations, therefore improving the safety of swallow.[12]

There are currently two broad types of thickening agents that have been studied:

- **Starch-based thickening agents:** added to an aqueous solution, the starch granules capture water inside a polymer structure, increasing in size and establishing physical-chemical interactions with the components of the structure to raise viscosity. The final viscosity depends on the time that passes after preparation and the temperature of the mixture.
- **Thickening agents based on xanthan gum:** added to an aqueous solution, the soluble fibre dissolves and hydrates very rapidly, producing high viscous mixtures in low concentrations. Uniform, highly stable solutions result under different temperature and pH conditions.

Science-based solution gives confidence in the assessment and management of dysphagia

resource® ThickenUP® clear

Accurate assessment | **Safe, effective dysphagia management** | **Excellent compliance and tolerance**

RESOURCE® THICKENUP® Clear may **be used as a thickener in the assessment of dysphagia**[10,13]

(page 11)

Therapeutic effect of RESOURCE® THICKENUP® Clear **has shown to increase swallowing safety**[2-4]

(page 6–9)

RESOURCE® THICKENUP® Clear is **supported by real world evidence**[1]

(page 10)

Indication:

- Patients with dysphagia (chewing and/or swallowing difficulty).

Efficacy of RESOURCE® THICKENUP® Clear on swallowing function

The effects of a xanthan gum-based thickener on the swallowing function of patients with dysphagia

Rofes L, Arreola V, Mukherjee R, Swanson J, Clavé P. Aliment Pharmacol Ther 2014;39(10):1169-79.

PRINCIPAL AIM

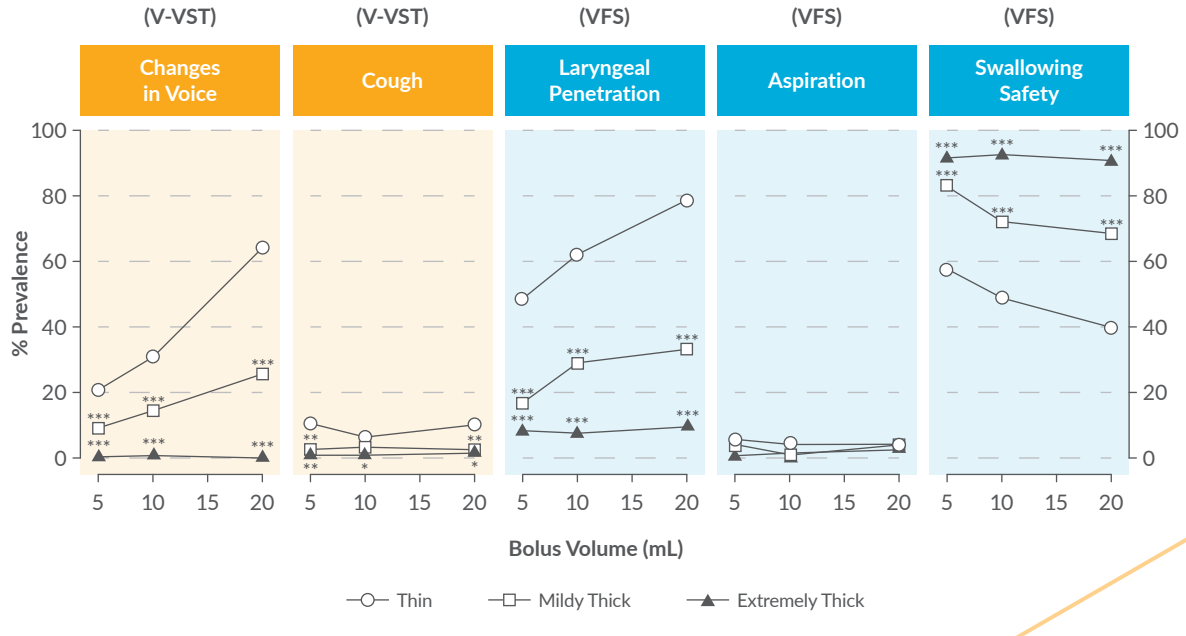
To assess the **efficacy of a thickening agent with an exclusive formula** based on xanthan gum (**RESOURCE® THICKENUP® Clear**) using a volume-viscosity swallow test (V-VST) and videofluoroscopy (VFS), on 120 adults with dysphagia associated with age and/or neurological pathology, as well as on 14 healthy volunteers. The study explored the effect of the xanthan gum-based thickening agent on swallowing physiology.

RESULTS

Increasing the viscosity of the bolus to "nectar-like" (Mildly Thick) and "spoon-thick" (Extremely Thick) viscosities using RESOURCE® THICKENUP® Clear resulted in:

- Increased swallowing safety in patients by reducing the prevalence of clinical signs of cough and voice effects measured by V-VST;
- A higher proportion of patients are able to swallow safely, demonstrated by VFS measures and reduced number of aspirations and penetrations.

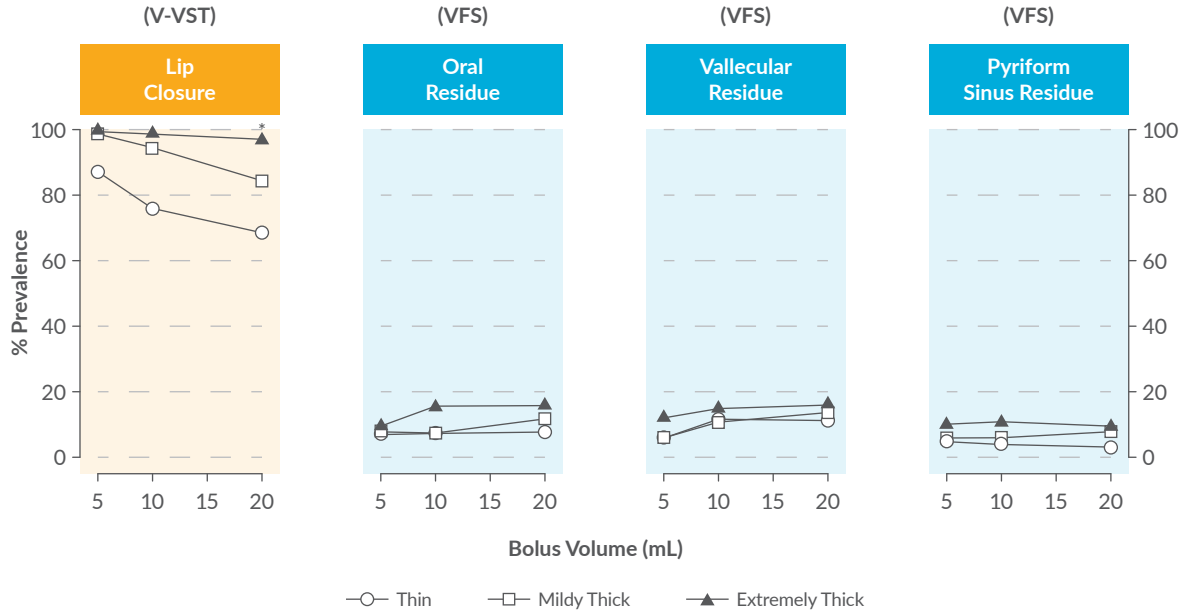
Fig. 1: Prevalence of signs of impaired safety issues measured by V-VST and VFS
(*P < 0.05, **P < 0.01, ***P < 0.001 vs. thin liquid)



RESULTS FOR SWALLOWING EFFICACY

The results of the VFS study showed that increased viscosity using **RESOURCE® THICKENUP® Clear did not increase oropharyngeal residue (pharyngeal residue measured in the vallecular and pyriform sinuses).** The increased viscosity of the bolus from thin liquid to Extremely Thick viscosity also showed a significant improvement in **patients' effective lip closure** when using the V-VST.

Fig. 2: Prevalence of signs of impaired efficacy measured by V-VST and VFS
(*P < 0.05 vs. thin liquid)



CONCLUSIONS

Use of **RESOURCE® THICKENUP® Clear** for dysphagia management effectively:

- Improves swallowing efficacy, oral control and the ability to form a bolus;
- Improves swallowing safety: reduces aspiration and penetration without increasing oropharyngeal residue.

Comparative efficacy of RESOURCE® THICKENUP® Clear on swallowing safety

A comparative study between modified starch and xanthan gum thickeners in post-stroke oropharyngeal dysphagia

Vilardell N, Rofes L, Arreola V, Speyer R, Clavé P. Dysphagia 2016; 31(2):169-79.

PRINCIPAL AIM

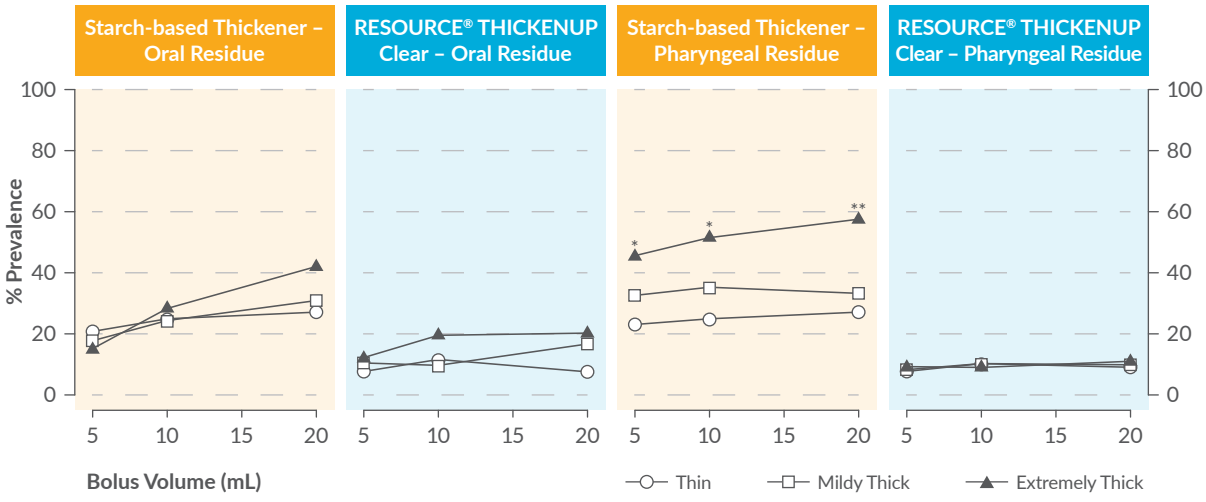
To compare the **safety and efficacy** of xanthan gum-based **RESOURCE® THICKENUP® Clear** to a starch-based thickener, using clinical (V-VST) and videofluoroscopic (VFS) exploration in 122 post-stroke patients with oropharyngeal dysphagia.

RESULTS

Both thickening agents reduced the number of penetrations as compared to thin liquid, by increasing the viscosity of the bolus administered to patients, as well as significantly improving the penetration-aspiration scale (PAS) score.

- **RESOURCE® THICKENUP® Clear** showed significantly lower oral and pharyngeal residues compared with the starch-based thickener.

Fig. 3: Prevalence of post-stroke OD patients with VFS signs of impaired efficacy of swallow for each volume, viscosity and thickener
(*P < 0.05, **P < 0.01 versus thin liquid)



CONCLUSIONS

Both starch-based thickener and **RESOURCE® THICKENUP® Clear** are proven effective to improve swallowing safety in post-stroke patients. However, thanks to its exclusive composition, **RESOURCE® THICKENUP® Clear shows greater efficacy than a modified starch-based thickening agent,** as it does not increase the prevalence of oral and pharyngeal residue, better avoiding the risk of aspiration after the swallow.

Effects of bolus rheology on aspiration in patients with dysphagia

Leonard RJ, White C, McKenzie S, Belafsky PC. J Acad Nutr Diet. 2014;114(4):590-4.

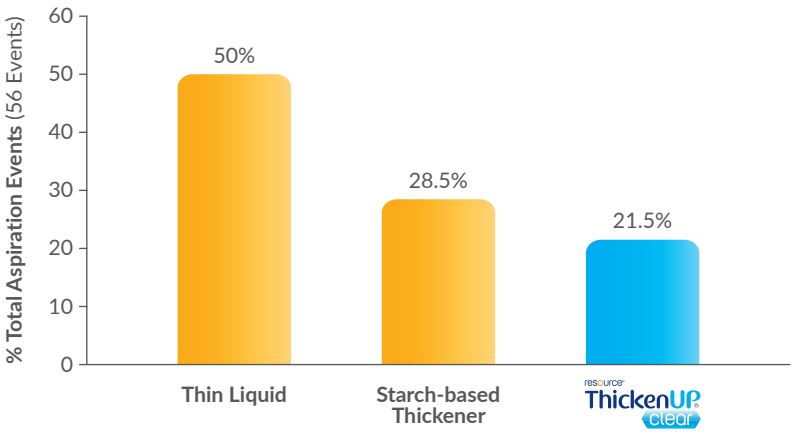
PRINCIPAL AIM

To compare the **effects of a thin liquid barium contrast fluid** with the same fluid thickened with xanthan gum-based **RESOURCE® THICKENUP® Clear** and a starch-based thickener, on swallowing safety in 100 patients with dysphagia.

RESULTS

The study revealed that **both thickeners reduced the number of aspirations** in patients with dysphagia, with a **statistically significant reduction in the incidence of penetration and aspiration using RESOURCE® THICKENUP® Clear** compared to the thin liquid. Likewise, the mean penetration-aspiration scale (PAS) scores were significantly lower with **RESOURCE® THICKENUP® Clear,** resulting in less aspiration/penetration than the thin liquid, while the difference between the starch-based thickener and the thin liquid was not significant.

Fig. 4: Division of total aspiration events, measured by VFS



CONCLUSIONS

Increasing the viscosity of the bolus with **RESOURCE® THICKENUP® Clear** improves swallowing safety in patients with dysphagia by reducing the risk of aspirations, which is also supported by a lower PAS score.

Real world evidence

Acceptance, compliance, and tolerance of a novel xanthan gum-based thickener on oropharyngeal dysphagia patients

Hibberd. Dysphagia 2011;26:432–475.

PRINCIPAL AIM

To assess the **acceptance, compliance and gastrointestinal (GI) tolerance** of xanthan gum-based thickener **RESOURCE® THICKENUP® Clear,** in aged care residents with dysphagia.

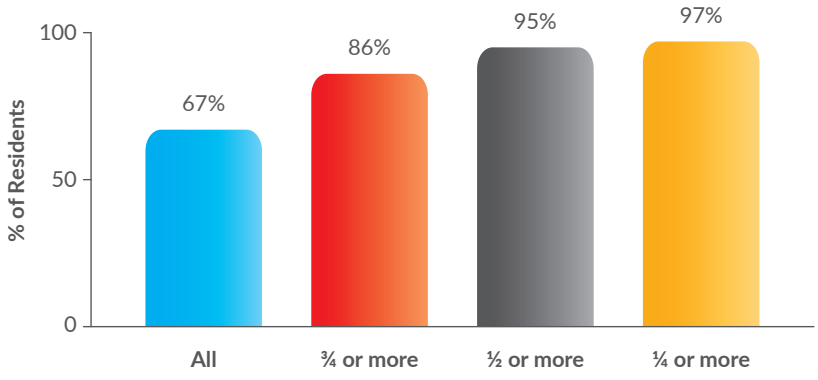
Over two weeks, a real world study was conducted to observe the use of **RESOURCE® THICKENUP® Clear** as part of everyday dysphagia management. The following measures were recorded: type of liquids and temperatures at which they were offered, compliance assessed according to the amount offered vs. the amount consumed, acceptance by the resident on ratings of preference, and assessment of tolerance by monitoring for eight symptoms commonly associated with GI intolerance.

RESULTS

The results with the xanthan gum-based thickening agent **RESOURCE® THICKENUP® Clear**, showed:

- It is useful to **thicken a wide range of liquids** at different temperatures;
- 94% of residents expressed a **high level of acceptance** of the thickened drink they consumed (maximum rating on the scale of acceptance proposed);
- 86% of residents consumed **¾ or more** of all liquids offered (see figure below);
- **No symptoms of GI intolerance** were reported in the sample studied.

Fig. 5: Amount of drink consumed vs. amount offered



CONCLUSIONS

A high degree of satisfaction was observed with **RESOURCE® THICKENUP® Clear** on the basis of its sensory characteristics, good compliance, excellent gastrointestinal tolerance and wide versatility in use with different drinks at different temperatures.

RESOURCE® THICKENUP® Clear can be used as a thickener in tools used in the assessment of dysphagia

Matching the rheological properties of videofluoroscopic contrast agents and thickened liquid prescriptions

Popa Nita S, Murith M, Chisholm H, Engmann J. Dysphagia 2013;28(2):245-52.

PRINCIPAL AIM

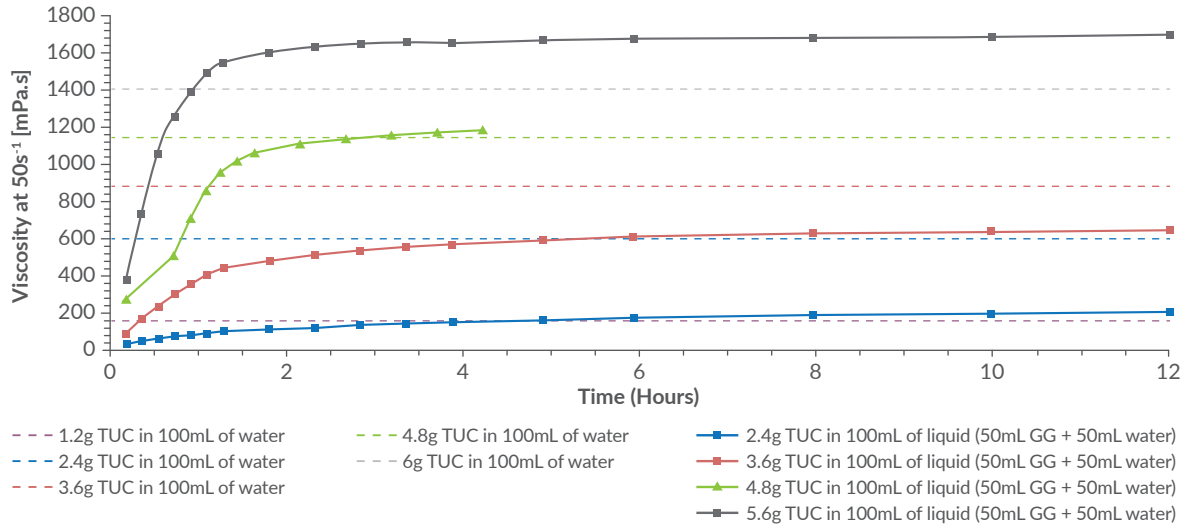
To assess the rheological properties of common videofluoroscopic contrast agents and liquids thickened with two commercial thickening agents (**starch-based thickener and RESOURCE® THICKENUP® Clear**) used in the assessment of dysphagia.

RESULTS

It is feasible to match the viscosities of diagnostic fluids to thickness levels suitable for dysphagia if certain precautions are taken. **The time taken to reach the desired viscosity levels may vary depending on the contrast and thickening agents used.**

The below graph shows an example of how RESOURCE® THICKENUP® Clear (TUC) in water reaches desired viscosity levels rapidly and remains stable over time, while TUC in Gastrografin takes time to reach the desired consistency but then remains stable.

Fig. 6: Viscosity values of RESOURCE® THICKENUP® Clear (TUC) in Gastrografin (GG) measured over time



CONCLUSIONS

For accurate, dependable assessment of dysphagia, use only diagnostic contrast materials and thickening agents for which reliable, rheological data are available, like **RESOURCE® THICKENUP® Clear.**

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Nutrition Information

Average Quantity	Units	Per 1.2g Serve* Mildly Thick Level 2	Per 2.4g Serve* Moderately Thick Level 3	Per 3.6g Serve* Extremely Thick Level 4	per 100g
Energy	kcal / kJ	3.7 / 15	7.3 / 31	11.1 / 45	306 / 1290
Protein	g	0	0	0	1.0
Carbohydrate	g	0.74	1.5	2.22	62
- Sugars	g	0.02	0.04	0.6	1.8
Fat	g	0	0	0	0
Fibre	g	0.32	0.65	0.96	27
Sodium	mg	13	25	39	1060
Potassium	mg	4.8	9.6	14.4	400

*Prepared in 100mL of water.

Ingredients:
Maltodextrin (Corn, Potato), Xanthan Gum, Potassium Chloride. May contain Milk.

Recommendations:
Store in a cool dry place and use within 8 weeks of opening. All prepared products should be tightly covered and consumed within 6 hours at room temperature or within 24 hours if refrigerated. Must be used under medical supervision. For oral consumption only when mixed with food or drink. Not suitable as a sole source of nutrition. Only suitable from 3 years onwards.

Ordering Information

Presentation	Units Per Case	Product Code
900g can	6 x 900g	12114005
125g can	12 x 125g	12132987
1.2g sachet	12 x 24 x 1.2g	12151076

REFERENCES:
1. Hibberd J. (2011). Acceptance, compliance, and tolerance of a novel xanthan gum-based thickener on oropharyngeal dysphagia patients. *Dysphagia* 2011;26:432-475. **2.** Rofes L et al. (2014). The effects of a xanthan gum-based thickener on the swallowing function of patients with dysphagia. *Alimentary Pharmacology and Therapeutics*, 39(10):1169-79. **3.** Vilardell N et al. (2016). A Comparative Study Between Modified Starch and Xanthan Gum Thickeners in Post-Stroke Oropharyngeal Dysphagia. *Dysphagia*, 31(2):169-79. **4.** Leonard RJ et al. (2014). Effects of bolus rheology on aspiration in patients with Dysphagia. *Journal of the Academy of Nutrition and Dietetics*, 114(4):590-4. **5.** Cichero J. (2013). Thickening agents used for dysphagia management: effect on bioavailability of water, medication and feelings of satiety. *Nutrition Journal*, 12:54. **6.** García Peris P et al. (2007). Long-term prevalence of oropharyngeal dysphagia in head and neck cancer patients: Impact on quality of life. *Clinical Nutrition*, 26(6):710-7. **7.** Baijens LW et al. (2016). European Society for Swallowing Disorders – European Union Geriatric Medicine Society white paper: oropharyngeal dysphagia as a geriatric syndrome. *Clin Interventions in Aging*, 11:1403-1428. **8.** Roden, D F et al. (2013). Causes of dysphagia among different age groups a systematic review of the literature. *Otolaryngologic Clinics of North America*, 46:965–987. **9.** Belafsky PC, et al. (2008). Validity and reliability of the Eating Assessment Tool (EAT-10). *The Annals of otology, rhinology, and laryngology*, 117(12):919-24. **10.** Rofes L et al. (2014). Sensitivity and specificity of the Eating Assessment Tool and the Volume-Viscosity Swallow Test for clinical evaluation of oropharyngeal dysphagia. *Neurogastroenterology & Motility*, 26:1256-65. **11.** Carrion S, et al. (2017). Nutritional status of older patients with oropharyngeal dysphagia in a chronic versus an acute clinical situation. *Clinical Nutrition*, 36(4):1110-16. **12.** Steele CM, et al. (2015). The Influence of Food Texture and Liquid Consistency Modification on Swallowing Physiology and Function: A Systematic Review. *Dysphagia*, 30:2–26. **13.** Popa Nita S et al. (2013). Matching the rheological properties of videofluoroscopic contrast agents and thickened liquid prescriptions. *Dysphagia*, 28(2):245-52.

RESOURCE® THICKENUP® Clear is a food for special medical purposes for the dietary management of people with swallowing difficulties. Must be used under medical supervision.

For more information call **1800 671 628** or visit **www.nestlehealthscience.com.au**

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