RESOURCE® THICKENUP® CLEAR CLINICAL EVIDENCE

Committed to evidence-based medical nutrition

For healthcare professional use only

Nestlé HealthScience

RESOURCE® THICKENUP® CLEAR IS THE ONLY GUM-BASED THICKENING AGENT SUPPORTED BY OVER SIX YEARS OF CLINICAL EXPERIENCE AND WITH SEVEN PUBLISHED STUDIES[1-7]

Suitable for adults and children above 3 years of age

Efficacy proven in seven published studies[1-7]

The first xanthan gum-based thickener Since 2011

RESOURCE® THICKENUP® CLEAR IS EASY TO USE, PROMOTES OUTSTANDING COMPLIANCE, AND IS SAFER AND MORE EFFECTIVE[2,3-5]

OUTSTANDING COMPLIANCE[5]

- Tasteless and odourless
- Transparent
- Lump-free

85%
state that it helps improve compliance*

VERY EASY TO PREPARE[2,3]

- Thickens and stabilises rapidly and maintains stability in a range of hot and cold liquids

88%
state that it is easier to use thanks to easy mixing*

SAFER AND MORE EFFECTIVE[2,3]

- Does not continue to thicken over time.
- Improves the ability to form the bolus[3]
- Being amylase resistant, ensures a stable consistency during the entire swallowing process[7]
- Reduces the number of penetrations and aspirations[2,3]
- Amount of oral and pharyngeal residue is reduced compared to a starch-based thickening agent[2]

80%
confirm that it works better than the thickening agents they recommended before*

*Study conducted with 130 healthcare professionals (doctors, nurses and speech therapists) in comparison with starch-based thickening agent.[6]

RESOURCE® THICKENUP® CLEAR: EFFICACY PROVEN IN SEVEN PUBLISHED STUDIES

EFFECTS OF BOLUS RHEOLOGY ON ASPIRATION IN PATIENTS WITH DYSPHAGIA
Leonard RJ et al. J Acad Nutr Diet. 2014 Apr;114(4):590-4

A COMPARATIVE STUDY BETWEEN MODIFIED STARCH AND XANTHAN GUM THICKENERS IN POST-STROKE OROPHARYNGEAL DYSPHAGIA
Vilardell N et al. Dysphagia. 2016 Apr;31(2):169-79

THE EFFECTS OF A XANTHAN GUM-BASED THICKENER ON THE SWALLOWING FUNCTION OF PATIENTS WITH DYSPHAGIA
Rofes L et al. Aliment Pharmacol Ther. 2014 May;39(10):1169-79

MATCHING THE RHEOLOGICAL PROPERTIES OF VIDEOFLUOROSCOPIC CONTRAST AGENTS AND THICKENED LIQUID PRESCRIPTIONS
Popa Nita S et al. Dysphagia. 2013 Jun;28(2):245-52

ACCEPTANCE, COMPLIANCE, AND TOLERANCE OF A NOVEL XANTHAN GUM-BASED THICKENER ON OROPHARYNGEAL DYSPHAGIA PATIENTS
Hibberd J et al. Dysphagia 2011;26:432-475

PERFORMANCE-BASED PREFERENCE FOR A NOVEL XANTHAN GUM-BASED THICKENER AMONG CLINICIANS TREATING DYSPHAGIA PATIENTS.
Herentry K, et al. Poster presentation clinical area. European Geriatric Medicine. 2011;2(S24-S206.).

SENSITIVITY AND SPECIFICITY OF THE EATING ASSESSMENT TOOL AND THE VOLUME-VISCOSITY SWALLOW TEST FOR CLINICAL EVALUATION OF OROPHARYNGEAL DYSPHAGIA.
Rofes L, Arreola V, Mukherjee R, Clavé P Neurogastroenterol Motil 2014 Sep;26:1256-65

EFFECTS OF BOLUS RHEOLOGY ON ASPIRATION IN PATIENTS WITH DYSPHAGIA

Leonard RJ et al. J Acad Nutr Diet. 2014 Apr;114(4):590-4

AIM

To investigate the effects of viscosity on aspiration in patients with dysphagia.

MATERIALS AND METHODS

- Prospective double-blind clinical trial with the participation of 100 patients with dysphagia
- Three bolus types assessed: thin liquid barium contrast fluid (THIN); liquid barium thickened with a conventional starch-based agent (STARCH); and a xanthan gum-based (GUM) thickener, Resource® ThickenUp® Clear
- Fluoroscopic study to evaluate presence or absence of aspiration
- The 8-point Penetration-Aspiration Score (PAS) to describe penetration and aspiration events

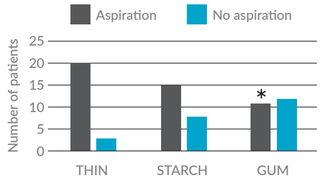
RESULTS

Presence or absence of aspiration (primary outcome).

- A total of 23 patients (23%) with dysphagia demonstrated aspiration on one or more bolus types
- These patients demonstrated 56 events of aspiration: 28 (50%) on THIN; 16 (28.5%) on STARCH; and 12 (21.5%) on GUM; (p<0.05 thin vs. gum)]
- There was significantly less aspiration on gum-thickened vs thin contrast agent (p<0.05)

FIGURE 1.A

Prevalence of aspiration episodes



*THIN vs GUM: P<0.05

TABLE 1

Number of patients in each PAS category, according to bolus type

	PAS score							
Bolus type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
THIN	71	11	2	1	1	0	9	5
STARCH	77	11	1	1	1	1	4	4
GUM	(87)	7	0	0	1	0	3	(2)

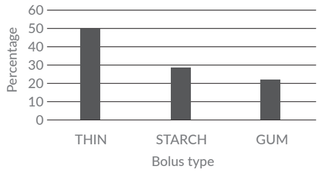
Score of 1: no aspiration/penetration
Score of 8: material below the vocal folds with no attempt to eject

Score on Penetration-Aspiration Scale (PAS) (secondary outcome).

- There was a difference in PAS scores across the three bolus types
- PAS scores were significantly lower for GUM than for THIN (p<0.001)

FIGURE 1.B

Percentage of total aspiration events (56 events)



CONCLUSION

Compared with a thin liquid barium contrast fluid, Resource® ThickenUp® Clear is effective in reducing the incidence of aspiration and penetration. Therefore, Resource® ThickenUp® Clear has a potential to enhance swallowing safety in patients with dysphagia.

A COMPARATIVE STUDY BETWEEN MODIFIED STARCH AND XANTHAN GUM THICKENERS IN POST-STROKE OROPHARYNGEAL DYSPHAGIA

Vilardell N et al. Dysphagia. 2016 Apr;31(2):169-79

AIM

To compare the therapeutic effects of two types of thickeners, modified starch (MS) and xanthan gum (XG), Resource® ThickenUp® Clear, on swallow safety and efficacy in chronic post-stroke oropharyngeal dysphagia (OD) patients.

MATERIALS AND METHODS

- Retrospective study with the participation of 122 patients (46 MS and 76 XG)
- Three viscosities (thin liquid, nectar-like† and spoon-thick†) and three volumes (5, 10, 20 ml) were assessed
- Clinical volume-viscosity swallow test (V-VST) and videofluoroscopic (VFS) exploration to evaluate the effect of both thickeners on efficacy and safety of swallowing
- The 8-point Penetration-Aspiration Score (PAS) to describe penetration and aspiration events
- The oropharyngeal swallow response was assessed during the VFS study

RESULTS: SAFETY OF SWALLOW

- Both thickeners similarly improved safety of swallow. Prevalence of safe swallowing significantly increased with enhanced viscosity (p<0.001 vs liquid)
- An increase of bolus viscosity reduced the prevalence of voice changes

FIGURE 2.A

Prevalence of safe swallow on V-VST

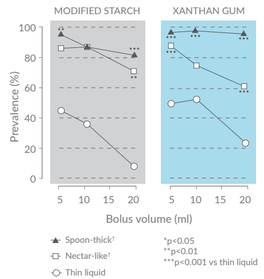
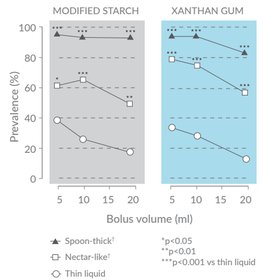


FIGURE 2.B

VFS signs, for each volume, viscosity and thickener



†Dysphagia diet liquid stage descriptors in UK[15]:
Nectar-like (51-350 cP): Stage 1 or syrup
Honey-like (351-1750 cP): Stage 2 or custard
Spoon-thick (>1750 cP): Stage 3 or pudding

PENETRATION-ASPIRATION SCALE (PAS)

- Penetration-Aspiration Scale score was significantly reduced with increased viscosity with both thickeners
- The level of protection achieved at spoon-thick† viscosity was similar, but the XG thickener offered a greater therapeutic effect at nectar-like† viscosity (p<0.01 vs. MS)

EFFICACY OF SWALLOW

- V-VST: Patients on MS reported higher prevalence of pharyngeal residue at spoon-thick viscosities
- VFS: MS increased oral and pharyngeal residues at nectar-like† and spoon-thick† viscosities but XG did not
- XG thickener improved efficacy of swallow more than MS despite patients in XG group having worse nutritional status and swallowing complaints

OROPHARYNGEAL SWALLOW RESPONSE

- Timings of airway protection mechanisms and bolus velocity were not affected by either thickener

FIGURE 3

PAS score for each thickener and viscosity

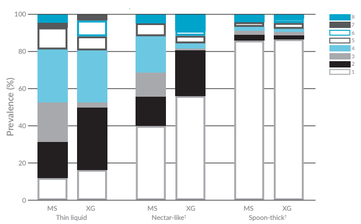
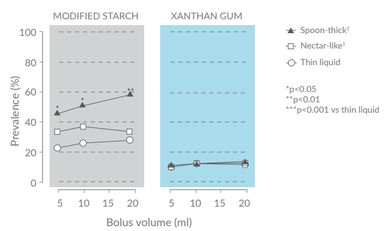


FIGURE 4

Prevalence of pharyngeal residue on VFS signs, for each volume, viscosity and thickener



CONCLUSION

Thickening liquids with MS and Resource® ThickenUp® Clear produces a strong therapeutic effect on safety of swallow in chronic post-stroke OD patients. Increasing bolus viscosity with MS or Resource® ThickenUp® Clear strongly and similarly improved safety of patients; in contrast only MS thickeners increased oropharyngeal residue.

†Dysphagia diet liquid stage descriptors in UK[15]:
Nectar-like (51-350 cP): Stage 1 or syrup
Honey-like (351-1750 cP): Stage 2 or custard
Spoon-thick (>1750 cP): Stage 3 or pudding

THE EFFECTS OF A XANTHAN GUM-BASED THICKENER ON THE SWALLOWING FUNCTION OF PATIENTS WITH DYSPHAGIA

Rofes L et al. Aliment Pharmacol Ther. 2014 May;39(10):1169-79

AIM

To assess the therapeutic effect of a xanthan gum-based thickener (Resource® ThickenUp® Clear) on patients with oropharyngeal dysphagia (OD).

MATERIALS AND METHODS

- A total of 120 patients with OD and 14 healthy volunteers participated in the study
- Three viscosities (thin-liquid, nectar-like† and spoon-thick†) and three volumes (5, 10 and 20ml) were assessed
- Clinical volume-viscosity swallow test (V-VST) and videofluoroscopic (VFS) exploration to evaluate safety and efficacy of swallowing
- The 8-point Penetration-Aspiration Score (PAS) to describe penetration and aspiration events
- Timing of swallow response was assessed during VFS studies

RESULTS: SAFETY OF SWALLOW

- Increasing bolus viscosity with Resource® ThickenUp® Clear improved safety of swallow. It was demonstrated by a reduction in the prevalence of cough and voice changes in the clinical study and penetrations and aspirations during VFS

†Dysphagia diet liquid stage descriptors in UK[15]:
Nectar-like (51-350 cP): Stage 1 or syrup
Honey-like (351-1750 cP): Stage 2 or custard
Spoon-thick (>1750 cP): Stage 3 or pudding

FIGURE 5.A

Prevalence (%) of clinical signs

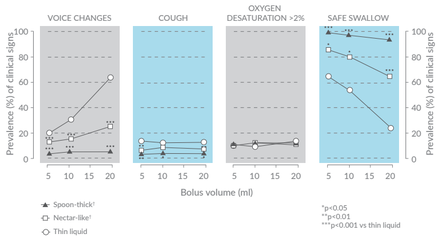
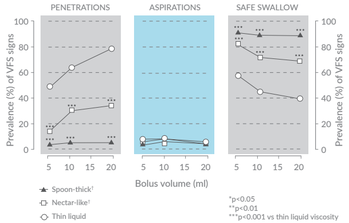


FIGURE 5.B

Prevalence (%) of VFS signs



PENETRATION-ASPIRATION SCALE (PAS)

- Penetration-Aspiration Scale was reduced from 3.24±0.18 at thin-liquid to 2.20±0.18 at nectar-like† (p<0.001) and to 1.53 ±0.13 at spoon-like† (p<0.001) viscosities

EFFICACY OF SWALLOW

- Increasing thin-liquid viscosity to spoon-thick improved the labial seal efficacy of patients (p<0.05) and increased the prevalence of pharyngeal residue symptoms by 18.9% (p<0.05). However, this increase in residue with increasing bolus viscosity was not seen on videofluoroscopy

OROPHARYNGEAL PHYSIOLOGY

Timings of swallow response

- Time to upper esophageal sphincter (UES) opening was increased at spoon-thick† viscosity to 427.5±24.3 ms (p=0.009 vs. thin liquid). Patients with safe swallow at spoon-thick viscosity presented a later time to laryngeal vestibule (LV) closure (427.8 ± 24.5ms, p<0.01) and UES opening. The mean velocity of a 5ml thin liquid bolus was significantly slowed with spoon-thick† viscosity (0.214 ±0.010m/s, p=0.019 vs. thin liquid)

FIGURE 6
Penetration-Aspiration Scale score
in each viscosity series

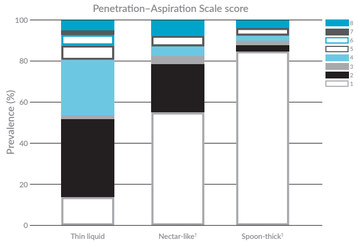
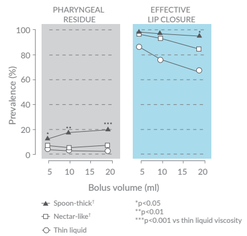


FIGURE 7
Prevalence of clinical signs of efficacy
for each bolus volume and viscosity



†Dyphagia diet liquid stage descriptors in UK[15]:
Nectar-like (51-350 cP): Stage 1/syrup
Honey-like (351-1750 cP): Stage 2/custard
Spoon-thick (>1750 cP): Stage 3/pudding

CONCLUSION

Resource® ThickenUp® Clear improves the safety of swallow without increasing residue providing a viscosity-dependent therapeutic effect in patients with OD.

MATCHING THE RHEOLOGICAL PROPERTIES OF VIDEO-FLUOROSCOPIC CONTRAST AGENTS AND THICKENED LIQUID PRESCRIPTIONS

Popa Nita S et al. Dysphagia. 2013 Jun;28(2):245-52

AIM

To highlight the importance of accurately characterising the rheological properties of materials used in the management of individuals with dysphagia, be it for diagnosis (videofluoroscopic contrast agent) or diet prescription (thickeners).

MATERIALS AND METHODS

- Shear viscosity measurements were performed over a range of shear rates from 0.01 to 100 s^{-1} and using a MCR 500 rheometer (Anton Paar). Sample temperature was maintained at 20°C by a Peltier module. At least three independent measurements were performed
- Thickener dispersion in water or videofluoroscopy contrast fluid was achieved by following supplier instruction

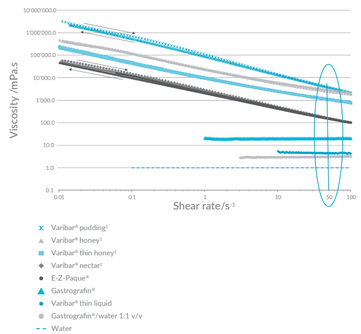
RESULTS

Contrast material and thickener solution of different consistencies

- A strong decrease in viscosity with increasing shear rate is observed for all the material except for Varibar® Thin Liquid and Gastrografin®(Figure 8)
- At 50 s^{-1} (NDD standard) all grades of the Varibar® range are clearly distinct and the order corresponds to the different stated levels
- For commercial thickeners dispersed in water, the dependence of viscosity on shear rate is similarly strong as for the more viscous contrast materials

FIGURE 8

Shear viscosity variation with shear rate for different videofluoroscopic contrast agents



‡The paper by Popa Nita S et al, 2013 references the target viscosity as below:
Nectar (300 mPa.s)
Thin Honey (1500 mPa.s)
Honey (3000 mPa.s)
Pudding (5000 mPa.s)

MATCHING VISCOSITIES OF DIAGNOSTIC FLUIDS AND THICKENER SOLUTION

- Very different behaviours were observed:
  a) Varibar® Thin Liquid and Resource® ThickenUp® Clear (RTUC), a straightforward match of viscosity was obtained between thickened contrast agent and thickened water and the viscosity values were constant over time (Figure 9)
  b) Gastrografin® and RTUC viscosity varied greatly over time and matching them with those of water/RTUC mixtures required an extensive rheological study (Figure 10)

‡The paper by Popa Nita S et al, 2013 references the target viscosity as below:
Nectar (300 mPa.s)
Thin Honey (1500 mPa.s)
Honey (3000 mPa.s)
Pudding (5000 mPa.s)

FIGURE 9

Viscosities of solution of Resource® ThickenUp® Clear (RTUC) reconstituted in water and in Varibar® Thin Liquid at nectar‡ consistency

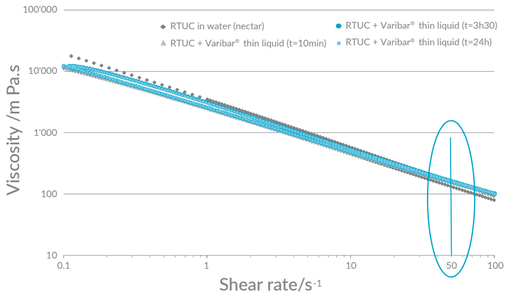
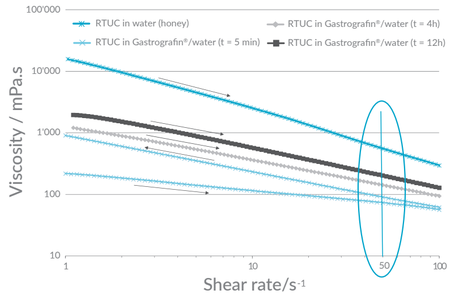


FIGURE 10

Viscosities of solution of Resource® ThickenUp® Clear (RTUC) reconstituted in water and in Gastrografin®/water (1:1 volume ratio) at honey‡ consistency



CONCLUSION

Nearly all materials tested showed a pronounced dependence of viscosity with shear rate. Results confirm that it is feasible (but not always straightforward) to "match" the viscosities of diagnostic fluids and thickened beverages if certain precautions are taken. It is recommended to use only diagnostic materials and thickening agents for which reliable viscosity data are available

ACCEPTANCE, COMPLIANCE, AND TOLERANCE OF A NOVEL XANTHAN GUM-BASED THICKENER ON OROPHARYNGEAL DYSPHAGIA PATIENTS

Hibberd J et al. Dysphagia 2011;26:432 -475

AIM

To assess the acceptance, compliance and gastrointestinal (GI) tolerance of a new thickening agent with 19 nursing home residents diagnosed with dysphagia.

METHOD

During a 2 week study period, all participants received intervention with liquids thickened to their prescribed level using Resource® ThickenUp® Clear.

Nursing and care staff recorded information (on type of liquid, level of thickening, resident acceptance and amount consumed) after each drink was consumed. In addition, data was collected on 8 symptoms of GI intolerance on a daily basis.

The amount of liquid consumed per day for each resident was calculated from the total drinks consumed in a week.

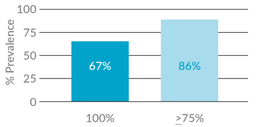
RESULTS

The results obtained with Resource® ThickenUp® Clear, showed:

- Its usefulness to thicken a wide range of liquids at different temperatures
- 94% of patients expressed a high level of acceptance of the thickened drink they consumed (maximum rating on the scale of acceptance proposed)
- 86% of patients consumed 75% of all the liquids offered. (See Figure 11)
- No symptoms of GI intolerance were reported in the sample studied

FIGURE 11

Degree of compliance according to the amount of thickened liquids prescribed



Amount of drink consumed vs. amount offered

CONCLUSION

Resource® ThickenUp® Clear was suitable for use in a variety of liquids and temperatures. Liquids served at their prescribed level of thickening were well-liked by nursing home residents, and no symptoms of GI intolerance were reported. Good acceptance and compliance was based on sensory characteristics, particularly noted was the clearness of the fluids.

PERFORMANCE-BASED PREFERENCE FOR A NOVEL XANTHAN GUM-BASED THICKENER AMONG CLINICIANS TREATING DYSPHAGIA PATIENTS

Herentry K, et al. European Geriatric Medicine. 2011;2(S24-S206.).

EXCELLENT COMPLIANCE[1]

Does not affect colour, taste and odour of hot or cold liquids or foods.

- Flavourless & Odourless
- No lumps in various liquids
- Practically transparent in water

98%

of professionals state that it helps improve compliance*

EASY TO PREPARE[6]

The results obtained with Resource® ThickenUp® Clear, Achieves a uniform level of viscosity in all hot or cold liquids.

- Dissolves rapidly in all liquids
- Same quantity for a given level of viscosity in all liquids

8/10

professionals like how It prepares the right In-mouth consistency[6]

IMPROVES SWALLOWING SAFETY[2-5]

Allows more effective treatment of swallowing difficulties.

Uniform viscosity, stable over time

- Form a bolus without residues[2]
- Withstands salivary amylase[3,7]
- No over-thickening with time[7]

Fewer penetrations and aspirations[2-4]

Reduces the amount of oral and pharyngeal residue as compared to a starch-based thickening agent[3]

80%

of professionals prefer it over the thickening agents they recommended before[6]

SENSITIVITY AND SPECIFICITY OF THE EATING ASSESSMENT TOOL AND THE VOLUME-VISCOSITY SWALLOW TEST FOR CLINICAL EVALUATION OF OROPHARYNGEAL DYSPHAGIA

Rofes L, Arreola V, Mukherjee R, Clavé P Neurogastroenterol Motil 2014 Sep;26:1256-65

AIM

To re-validate the accuracy of the Volume-Viscosity Swallow Test (V-VST) for Clinical Assessment by using a new thickening agent with an exclusive formula (ThickenUp® Clear) on 120 patients with oropharyngeal dysphagia associated with age and neurological pathology.

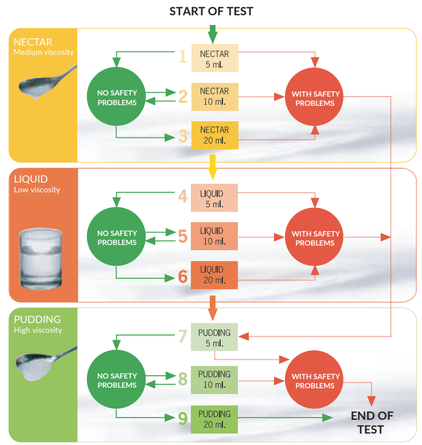
RESULTS

The study showed the V-VST using ThickenUp® Clear has high sensitivity in detecting patients with swallowing difficulty

- Sensitivity of 0.94 and specificity of 0.88 in detecting oropharyngeal dysphagia
- Sensitivity of 0.79 and specificity of 0.75 in detecting impaired efficacy
- Sensitivity of 0.87 and specificity of 0.81 in detecting impaired safety
- Sensitivity of 0.91 and specificity of 0.28 in detecting aspirations

FIGURE 12

Test flow.



CONCLUSION

The V-VST is a validated method of Clinical Assessment of dysphagia, a sequence of 3 sizes of bolus of 3 different viscosities thickened with ThickenUp® Clear, is reliable in detecting and guiding management of patients with oropharyngeal dysphagia.

NUTRITION INFORMATION

TYPICAL VALUES	1.2g/200ml LEVEL 1/SLIGHTLY THICK	2.4g/200ml LEVEL 2/MILDLY THICK	4.8g/200ml LEVEL 3/MODERATELY THICK	7.2g/200ml LEVEL 4/EXTREMELY THICK	100g
Energy kJ/kcal	15/3.7	31/7.3	61.8/14.7	92.7 / 22	1287/306
Fat (0% kcal) g	0	0	0	0	0
of which saturates g	0	0	0	0	0
Carbohydrate (81% kcal) g	0.74	1.5	3.0	4.5	62
of which sugars g	0.02	0.04	0.09	0.13	1.80
Fibre (18% kcal) g	0.32	0.65	1.30	1.9	27
Protein (1% kcal) g	0	0	0	0.07	1
Salt (=Na (g) x 2.5) g	0.032	0.064	0.13	0.19	2.7
Sodium mg/mmol	13/0.56	25/1.1	51/2.2	76 / 3.3	1060/46.1
Potassium mg/mmol	4.8/0.12	9.6/0.24	19/0.49	29 / 0.72	400/10.2

INGREDIENTS

Maltodextrin (corn, potato)
Xanthan gum
Potassium chloride

May contain milk (tin only)
Gluten free
Kosher certified/Halal certified

IMPORTANT NOTICE

Food for special medical purposes for the dietary management of patients with dysphagia (swallowing difficulties)

Use under medical supervision

Must only be consumed when mixed with food or drink. Unsuitable as a sole source of nutrition

Only suitable from 3 years onwards

STORAGE INSTRUCTIONS

Store in a cool dry place and use within 4 weeks of opening

All prepared products should be tightly covered and consumed within 6 hours at room temperature or within 24 hours if refrigerated

INDICATIONS

Resource® ThickenUp® Clear is ACBS approved, prescribable on FP10 (GP10 in Scotland) for patients requiring thickening of liquid or food for the management of dysphagia due to conditions such as:

- Stroke
- Parkinson's disease
- Muscular dystrophy
- Malignancies of the oral cavity and throat
- Motor neurone disease
- Multiple sclerosis
- Neurological disorders caused by injury or disease

PREPARATION INSTRUCTIONS FOR WATER, JUICE, TEA, COFFEE, MILK, ETC

POWDER FIRST

Use the dosage scoop included in the tin
For best results, add the powder to a clean, dry cup, glass, or beaker

ADD LIQUID

Add the liquid to the powder

STIR

Start stirring immediately, until the powder is completely dissolved

SERVE

Leave to stand for one minute before serving

RECOMMENDED DOSAGE FOR 200ml OF LIQUID

IDDSI FRAMEWORK	200ml liquids (water, juice, tea, coffee)	200ml oral nutritional supplements
LEVEL 1/SLIGHTLY THICK	1 scoop/sachet	-
LEVEL 2/MILDLY THICK	2 scoops/sachets	0.5-1 scoop/sachet
LEVEL 3/MODERATELY THICK	4 scoops/sachets	1-2 scoops/sachets
LEVEL 4/EXTREMELY THICK	6 scoops/sachets*	-

1 scoop/ sachet =1.2 g.
For food, add Resource® ThickenUp® Clear as needed to achieve the appropriate consistency.
* For level 4 extremely thick liquids, evaluated IDDSI compliant based on spoon tilt test.
It is the responsibility of the person administering Resource® ThickenUp® Clear to ensure that the liquid or food is mixed to the appropriate consistency.

STABILISATION AND STANDING TIME

1 min

For water, tea and coffee:
Wait 1 min before drinking

3 min

For other drinks e.g. milk:
Wait 3 min before drinking

Once it has reached its desired consistency Resource® ThickenUp® Clear does not continue to thicken over time

!

It is the responsibility of the person administering Resource® ThickenUp® Clear to ensure that the liquid or food is mixed to the appropriate consistency

Dysphagia training

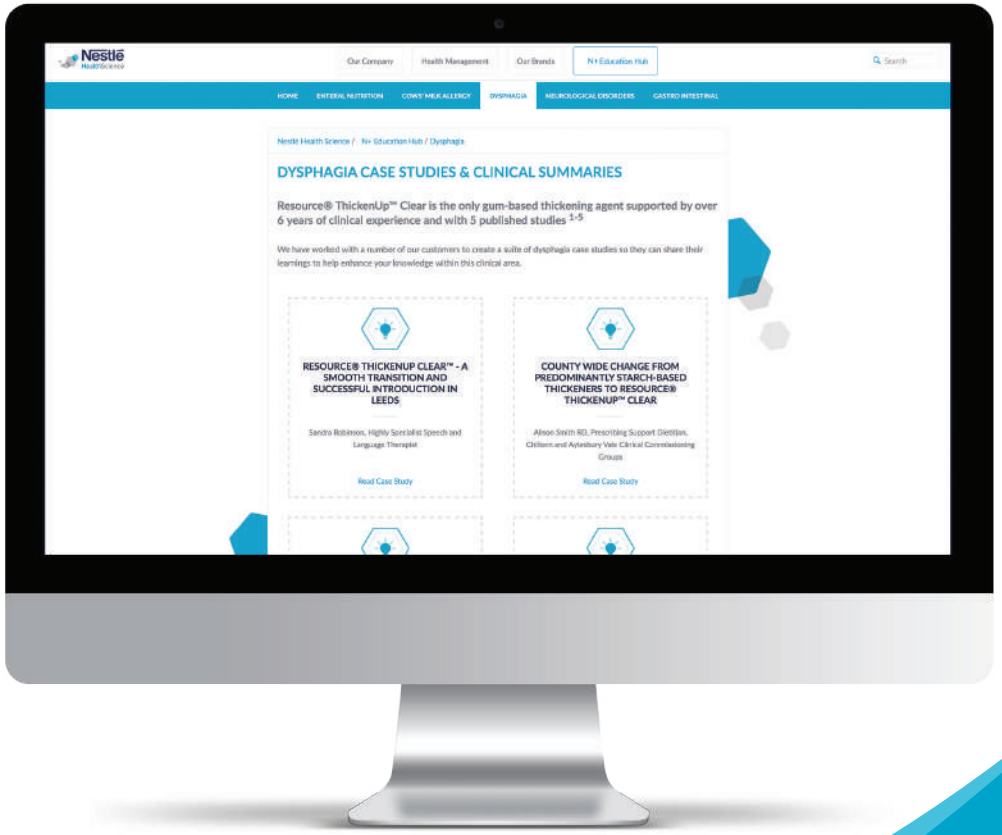
CONNECT. LEARN. DEVELOP.

VISIT THE NESTLÉ HEALTH SCIENCE N+ EDUCATION HUB FOR ADDITIONAL SUPPORT SERVICES:

- Request N+ dysphagia training
- Nestlé Health Science sample service
- Downloadable resources and tools
- Case studies and clinical summaries
- Patient support materials
- Videos and webinars

Register: nestlehealthscience.co.uk/nplus

For more information, please contact your local representative or call 00800 6887 4846 or 0800 000030.



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