

Thickening agents: what to consider when choosing a product?

Prepared by a UK Medicines Information (UKMi) team for NHS healthcare professionals
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Date prepared: June 2020

Background

Many patients with dysphagia are unable to safely swallow thin liquids due to the risk of aspiration, which can lead to pneumonia. These patients may require diet modification to alter food texture and fluid consistency e.g. thickened fluids (1). Thickened fluids can be swallowed more safely as they travel more slowly, allowing the patient more time to co-ordinate the swallow response (2).

Patients with dysphagia must be assessed by an appropriately trained health professional (a speech and language therapist [SLT]) who will determine the appropriate fluid consistency, food texture and other swallowing recommendations for the individual (1,3,4).

Fluid consistency and food texture is graded according to the International Dysphagia Diet Standardisation Initiative (IDDSI) framework which provides a common terminology to describe food textures and fluid consistency (5). It consists of a continuum of 8 levels ranging from 0 to 7, with drinks measured from Levels 0 to 4 and foods measured from Levels 3 to 7. Level 0 fluids are described as 'thin' (e.g. water), Level 3 as 'moderately thick' (the same consistency as liquidised food) and Level 4 fluids as 'extremely thick' (the same consistency as pureed foods) (5).

Thickening agents can be used to modify the consistency of thin liquids to IDDSI Levels 1, 2, 3 or 4. Products available have different characteristics. The main distinction is between starch-based and gum-based thickening agents and there are various brands of each available in the UK. This Medicines Q&A provides information on thickening agents and describes factors that may influence choice of product including differences between starch-based and gum-based thickening agents, patient factors and product information.

This Medicines Q&A will be complemented by two others: [How can people who need thickened fluids take medicines?](#) and [Thickening agents and thickened fluids: do they interact with medicines?](#)

Answer

Thickening agents are typically available as tubs (with scoops) or sachets of powder to be mixed with the liquid that needs thickening. Thickening agents must be mixed appropriately in order to produce the required IDDSI Level for the patient. Too thin and the patient is at risk of aspiration, too thick and the liquid can leave a residue that can be aspirated (6). Directions for mixing are product specific and are available on the product packaging, with instructions on the amount of powder (number of 'scoops') to be added to a specified volume of fluid to achieve IDDSI Levels 1, 2, 3 or 4 (7-15). The scoop size is not consistent between different products; always use the correct scoop for the product. The directions on the packaging will say whether to add powder to liquid or liquid to powder; this differs between products.

There are two main types of thickening agent: starch-based (typically modified maize starch) and gum-based. Gums include xanthan, guar, locust bean (aka carob) and carrageenan (16,17). Not all gum-based thickening agents have the same properties. In the UK, gum-based thickening agents are mostly xanthan gum-based (12-15). Different brands may also contain additional ingredients such as maltodextrin.

Starch is a food substance which is chemically inert and neutrally charged, consisting of linear amylose and branched amylopectin, two polysaccharides based on α -(d)-glucose (18-20). The highly branched starch molecules swell in contact with water to increase viscosity (2,19-20). Xanthan gum is a negatively charged polysaccharide gum that forms highly ordered rod-type chains, sometimes described as 'meshes of entanglement' that trap water and increase viscosity (19-21). Maltodextrin is a readily digestible carbohydrate with a nutritional value, which is also used to increase viscosity (22). Starch-based thickening agents were widely used in the 1990s but gum-based thickening agents have gained popularity more recently (2,16,20).

Factors that may influence choice of a thickening agent

Palatability

Thickened fluids are generally not pleasant to take and can be regarded as a beverage of necessity, not of choice (2). Lack of willingness to take thickened fluids is a common problem and patients have reported a dislike of altered textures and thickened liquids (23). Although some of the product literature states that thickening agents do not affect the taste of food or fluid, starch-based products in particular can impart a starch flavour and grainy texture which could affect palatability and compliance for some patients (20,24-27). Gum-based thickening agents may be more palatable with a 'slicker' result, although flavour of food and drink has been shown to deteriorate with increasing thickness regardless of thickening agent used (20).

Stability

Fluids thickened with starch may become thicker on standing, with samples reported to become up to 25% thicker over a 3-hour period; gum-based thickening agents are considered to be more stable over time (16). Manufacturers' recommendations vary from 'use within two hours' at room temperature to 'can be stored in the fridge for 24 hours' with no clear distinction between starch-based or gum-based products (7-15).

Starch-based thickening agents can be broken down by amylase in saliva, with the potential that the thickened liquids could thin out in the mouth (2,16,28). The effect of amylase on starch is reduced in very acidic liquids such as fruit juice or cola (2,28). Starch-based thickening agents have been safely used in practice, so this may not be clinically relevant in most circumstances (28). Xanthan gum is not affected by the action of amylase (16). Some brands of starch-based thickening agent purport to be amylase-resistant but may also contain xanthan gum (29).

Drug interactions with thickening agents

Thickening agents are intended to be mixed with food and drinks. Manufacturers of thickening agents generally do not have information on their use to thicken liquid medicines although some advocate mixing the thickening agent with liquid oral medicines, or using thickened liquids to take solid oral medicines on the advice of a pharmacist (30,31). If thickening agents are used to thicken liquid medicines, there is a potential for interaction.

Drug interactions are less likely with neutral starch-based thickening agents than with negatively charged xanthan gum-based products (32). There are few interactions of significance – the Medicines Q&A [Thickening agents and thickened fluids: do they interact with medicines?](#) will provide further information.

Of note is the interaction between macrogol laxatives (e.g. Movicol) and starch-based thickening agents, which creates a thin, watery liquid (33,34). As an alternative, xanthan gum-based thickening agents can be used to thicken macrogol laxatives and some (e.g. Thick & Easy Clear, Swalloweze Clear) have specific directions for this use (30,35).

It may be safer for the patient to use one thickening agent for all their liquids rather than have different thickening agents for different situations.

Many patients use thickened fluids to take solid oral medicines, typically crushed tablets or opened capsules. Not all medicines are suitable to give in this manner and it is important to check beforehand. It may be appropriate to administer the medicine in appropriately textured food - the Medicines Q&A [How can people who need thickened fluids take medicines?](#) will provide further information.

Patient factors

- **Allergies or specific diet requirements**

For patients with diabetes, or those on a ketogenic diet, consider the carbohydrate and sugar content of thickening agents. In some circumstances, a patient may require a low sodium diet. Tables 1 and 2 in the appendix to this document indicate the carbohydrate, sugar and sodium content of different thickening agents. This information is provided per 'scoop' and differs between products. The contribution of the thickening agent may not be significant - seek advice from a dietitian if needed.

Some patients may require a product that is gluten-free, lactose-free, kosher, halal or suitable for a vegetarian or vegan. Tables 1 and 2 in the appendix provide this information, where available.

- **Co-habitees and people in care homes**

For patients in care homes or living with other people who use thickened fluids, it may be practical to recommend the same thickening agent for all patients.

Prescribing a thickening agent

Thickening agents are not licensed as medicines. Many are classed as Food for Special Medical Purposes (FSMPs) intended for the dietary management, under medical supervision, of individuals who suffer from dysphagia (6). The composition and labelling of FSMPs is regulated by the European Commission (36).

Specific brands of thickening agents are listed in UK drug tariffs as prescribable for the management of dysphagia as approved by the Advisory Committee on Borderline Substances (ACBS). These can be prescribed on NHS FP10 prescriptions in England, Wales and Northern Ireland or GP10 prescriptions in Scotland when endorsed "ACBS" (37-39). Many products are available to buy without prescription, but should only be initiated under medical supervision following individual patient assessment.

Some areas may have a local formulary or contract where choice of thickening agent is restricted (40).

Because thickening agents are not licensed medicines, they do not have Summaries of Product Characteristics (SPCs). Information on their composition and directions for use are generally available on each manufacturer's website. Some information has been taken from the product information and provided in tables 1 and 2 in the appendix.

Ensure that patients and carers know how to prepare food and fluids to the correct IDDSI Level recommended for that specific patient. It is important to check any fluid is the appropriate consistency at the time of administration.

The amount of thickening agent to prescribe each month will differ for each patient. The amount used will depend on the IDDSI Level required and the patient's food or fluid intake. The shelf life of the

product once opened may also influence how much needs to be prescribed; this can be as short as four weeks/one month after opening (25,27).

Storage of thickening agents

Specified storage conditions for individual thickening agents are listed in tables 1 and 2 in the appendix.

A Patient Safety Alert was issued in 2015 following an incident where a care home resident died after accidental ingestion of thickening powder that had been left within reach (41). It advised that whilst it is important that products remain accessible, all those involved in patient care need to be aware of the potential risks to patient safety (41). Most thickening agents come in tubs, with easily removable lids. It could be considered best practice to store as per other medications, but at the very least out of reach of vulnerable patients.

Storage of thickened fluids in use

After preparation, some thickened fluids can be kept for 24 hours in a fridge and it may be practical to keep for use throughout the day (see appendix for storage of thickened fluids). Consider the risk of storing stock jugs in the fridge if patients have different IDDSI Level requirements e.g. in a nursing home.

Summary

- Many people with dysphagia require liquids to be thickened in order to swallow them safely.
- People with dysphagia must be assessed and reviewed by an appropriately trained healthcare professional (a speech and language therapist) who will recommend the appropriate fluid consistency and food texture for that individual.
- Fluid thickness and texture are measured on the IDDSI scale. Thickening agents can be used to modify liquids to the appropriate IDDSI Level for the patient.
- Thickening agents available in the UK are starch-based or xanthan gum-based. There are a number of differences between them.
- This Medicines Q&A describes the differences between starch-based and gum-based thickening agents and factors to consider when choosing a product.
- An appendix to this Q&A lists brands of thickening agents available and provides information on composition e.g. carbohydrate, sugar and sodium content. Additional information regarding suitability for patients with specific diet requirements (e.g. gluten-free, vegetarian) is included where available.
- Many products are available to prescribe at NHS expense; choice may be restricted by local contract or formularies.

Limitations

- This Q&A only addresses the characteristics and differences between starch-based and xanthan gum-based thickening agents.
- Only thickening agents that have current recommendations for IDDSI Levels and are prescribable on the NHS have been included in this Q&A, therefore not every product available has been considered.
- This document does not include information about the thickening of oral nutritional supplements. However, some products do provide some advice regarding this, as indicated on tables 1 and 2 in the appendix.
- This Q&A only considers use of thickening agents in adults.

Acknowledgements

Thanks to Paresh Parmar, Lead care of older people and stroke pharmacist, Northwick Park Hospital, London and the Northern Ireland Dysphagia Group for their helpful comments during preparation of this document.

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Appendix

Table 1: Starch-based thickening agents

Product (Manufacturer)	Ingredients	Storage conditions	Other comments
MULTI-THICK® (Abbott Laboratories Ltd) (1,2)	Modified maize starch (sulphur dioxide and sulphites)	Opened tins should be resealed using the lid provided and stored in a cool, dry place (not in the refrigerator). Use within 6 weeks of opening. If not used promptly after mixing – cover, refrigerate and use within 24 hours.	Gluten-free, milk-free. Clinically lactose-free. Suitable for vegetarians. Halal and kosher. <u>Each 2.7g scoop contains:</u> Carbohydrate 2.45g Sugar 0g Sodium 4.32mg (0.19mmol)
Nutilis® (Nutricia) (3)	Maltodextrin, modified starch (E1442), tara gum, xanthan gum and guar gum	Keep sealed and store in a cool, dry place (5-25°C). Once opened, use the contents within 2 months. Replace the lid firmly after use. Prepare per serving and use within 2 hours. Always discard any unfinished thickened food and beverages.	Gluten- and lactose-free. <u>Each 4g scoop contains:</u> Carbohydrate 3.5g Sugar 0.1g Sodium <3.6mg (0.16mmol)

Product (Manufacturer)	Ingredients	Storage conditions	Other comments
Resource[®] ThickenUp[®] (Nestle Health Science) (4,5)	Modified food starch (maize)	<p>Store in a cool dry place and use within 8 weeks of opening, replacing the lid firmly after use.</p> <p>All prepared products should be tightly covered and consumed within 6 hours at room temperature or within 24 hours if refrigerated.</p> <p>Discard any unfinished heated product.</p>	<p>Gluten-free.</p> <p>May contain milk – further dietary info on Nestle website.</p> <p>Halal.</p> <p><u>Each 4.5g scoop contains:</u> Carbohydrate 4.1g Sugar <0.09g Sodium 9mg (0.39mmol)</p>
Thick & Easy[®] Original (Fresenius Kabi) (6,7)	Modified maize starch (E1442) and maltodextrin	<p>Once opened, the tin should be resealed with the plastic lid provided and kept in a cool, dry location (room temperature) and in a relatively odour-free environment for 3 years.</p> <p>Thickened liquid can be stored in the fridge until ready to use.</p>	<p>Gluten and lactose-free.</p> <p>Halal and kosher.</p> <p>Suitable for vegetarians and vegans. Further information on allergens available from Fresenius Kabi.</p> <p><u>Each 1.5g scoop contains:</u> Carbohydrate 1.39g Sugar not listed Sodium: 2.61mg (0.11mmol)</p>
ThickenAid[®] (Aymes) (8)	Modified maize starch and maltodextrin	<p>Once opened, use within 1 month.</p> <p>Discard any unfinished thickened drinks after 4 hours.</p>	<p><u>Each 2.3g scoop contains:</u> Carbohydrate 2.1g Sugar 0g Sodium 4mg (0.17mmol)</p>

Table 2: Xanthan gum-based thickening agents

Product (Manufacturer)	Ingredients	Storage conditions	Other comments
Nutilis[®] Clear (Nutricia) (9)	Maltodextrin, xanthan gum and guar gum	Keep sealed and store in a cool, dry place (5-25°C). Once opened, use the contents within 1 month. Replace the lid firmly after use. Prepare per serving and use within 2 hours. Always discard any unfinished thickened food and beverages.	Gluten- and lactose-free. <u>Each 1.25g scoop contains:</u> Carbohydrate 0.72g Sugar 0.14g Sodium 19mg (0.8mmol) Use with caution in patients on a sodium-restricted diet.
Resource[®] Thicken Up[®] Clear (Nestle Health Science) (5,10)	Maltodextrin (corn, potato), xanthan gum, potassium chloride	Unopened store in a cool dry place, once opened consume within 4 weeks.	Gluten-free. May contain milk (tin only). Halal and kosher. Further dietary information is available on the Nestle Health Science website. Nestle Health Science provides information on the use of Resource Thicken Up Clear with oral nutritional supplements. <u>Each 1.2g scoop contains:</u> Carbohydrate 0.74g Sugar 0.02g Sodium 13mg (0.56mmol)

Product (Manufacturer)	Ingredients	Storage conditions	Other comments
Swalloweze[®] Clear (Nualtra) (11,12)	Xanthan gum (E415), maltodextrin and erythritol (E968)	Store in a cool dry place. Once opened, consume within 2 months.	Gluten- and lactose-free. Halal and kosher. Information available on Swalloweze [®] clear website regarding use with oral nutritional supplements. <u>Each 1.6g scoop contains:</u> Carbohydrate 0.9g Sugar 0.0g Sodium 19.2mg (0.83mmol)
Thick and Easy[®] Clear (Fresenius Kabi) (7,13)	Maltodextrin, xanthan gum, carrageenan and erythritol	Once opened, the tin should be resealed with the plastic lid provided and kept in a cool, dry location (room temperature) and in a relatively odour free environment. Shelf life once opened is 2 years if stored in the appropriate conditions. Thickened liquid can be stored in the fridge until ready to use.	Gluten- and lactose-free. Suitable for vegetarians and vegans. Halal and kosher. Further information on allergens available from Fresenius Kabi. <u>Each 1.4g scoop contains:</u> Carbohydrate 1.2g Sugar 0.0g Sodium 18.8mg (0.8mmol)

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Search strategy

1. Embase via NICE Evidence

(DYSPHAGIA/ + "THICKENING AGENT"/) (exp DYSPHAGIA/ + "THICKENING AGENT"/)
 (exp DYSPHAGIA/ + exp "THICKENING AGENT"/) (exp *DYSPHAGIA/ + *"ORAL DRUG
 ADMINISTRATION"/) (XANTHAN/ + exp "DRUG INTERACTION"/) ("THICKENING AGENT"/
 + exp "DRUG INTERACTION"/)

2. Medline via NICE Evidence

(thicken*.ti,ab + DEGLUTITION DISORDERS/) ("DEGLUTITION DISORDERS"/ +
 *"ADMINISTRATION, ORAL"/) (ADMINISTRATION, ORAL"/ + DEGLUTITION DISORDERS"/
 + "PHARMACEUTICAL PREPARATIONS"/) ("DEGLUTITIONS DISORDERS"/ +
 medication.ti,ab + thickened liquid.ti,ab) (medication.ti,ab + thickened liquid.ti,ab)
 ("DEGLUTITION DISORDERS"/ + VISCOSITY/) (thickened liquid.ti,ab +
 dysphagia.ti,ab)(thickeners.ti,ab + medication.ti,ab) (DEGLUTITION DISORDERS/ +
 thickeners.ti,ab)

3. In-house database/ resources

4. Manufacturers:

- (a) Abbott Laboratories. Communication by email on 05/06/2020.
- (b) Aymes International Ltd. Communication by email on 05/06/2020.
- (c) Fresenius Kabi. Communication by email on 03/06/2020
- (d) Nestle Health Science. Communication by email on 03/06/2020.
- (e) Nualtra. Communication by email on 02/06/2020.
- (f) Nutricia. Communication by email on 17/06/2020.

5. Internet search (Google; use of thickening agents with medicines, administering medicines to patients with dysphagia, crushing medication and giving with thickened fluids, speech and language therapy IDDSI, dysphagia guidance UK, stroke guidance UK)