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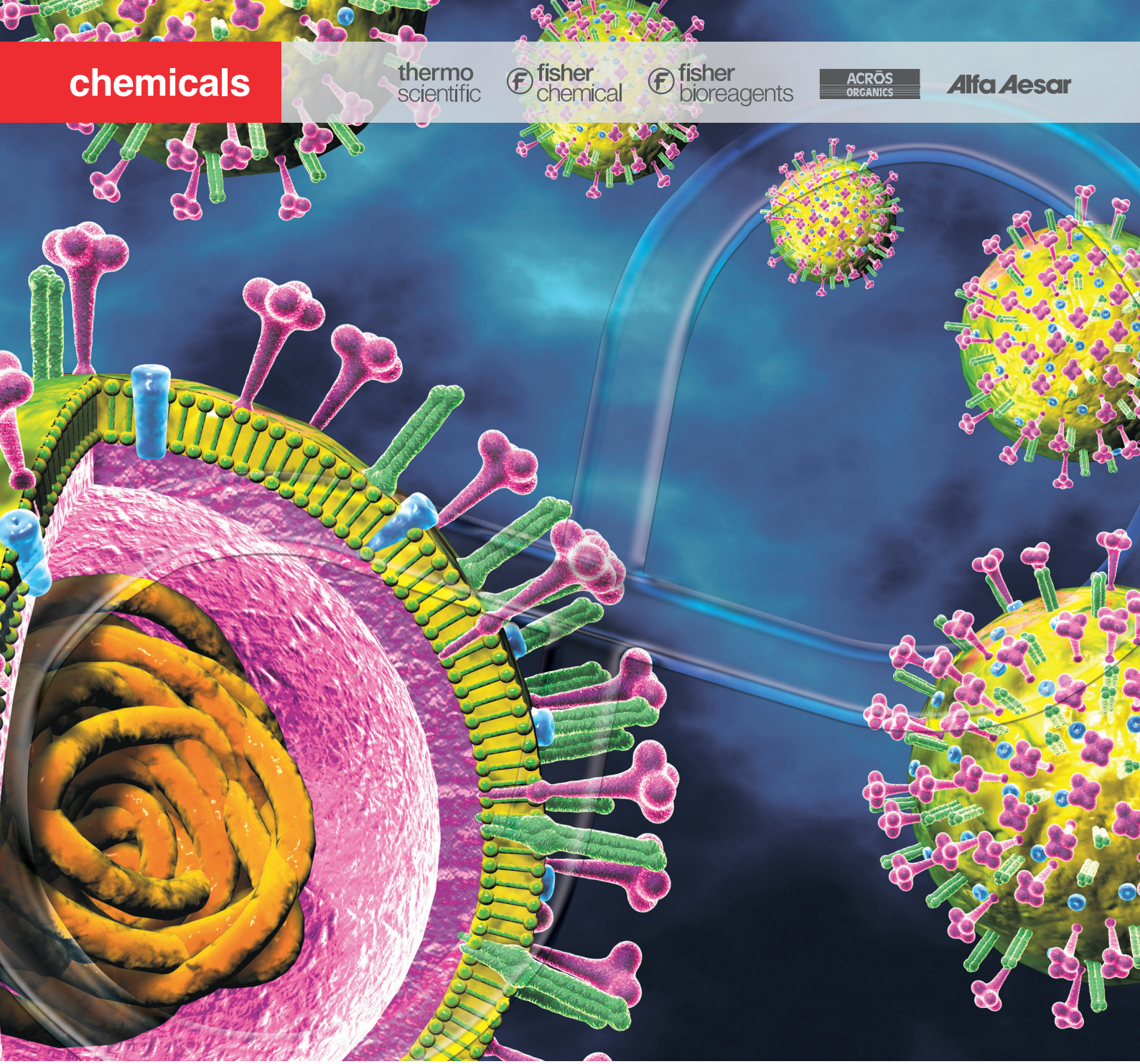

Guanidinium Thiocyanate (GITC)

Lysis buffers for nucleic acid extraction

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Lysis Buffers to Extract Viral RNA

Guanidine thiocyanate is a potent chaotropic agent; thus, by interfering with the hydrogen bond network in aqueous solutions, it has a destabilising effect on macromolecules, especially proteins.
It is commonly used in cells and the lysis processes in virus particles to extract nucleic acids, as it denatures RNAse and DNAse enzymes[1] that would otherwise damage the extract.[2]

GITC lysis buffers to extract viral RNA are in growing demand, linked to the use of polymerase chain reaction (PCR) based assay.

Buffer composition (as reported by Scallan et al.[3]):

4 M Guanidinium thiocyanate (GITC)

55 mM* Tris-HCl

25 mM EDTA (Ethylenediaminetetraacetic acid)

3 % (v/v) Triton X-100

0.01 % (w/v) Bromophenol blue

(***NOTE**: calculated from the total amount of 0.1 M Tris pH 7.6 added, diluted by the degree of volume expansion observed when the GITC goes into solution)

Method to produce one litre of 4M Guanidinium thiocyanate (GITC)/ Triton X-100 Lysis buffer:

1. 472.75 g of GITC is brought into solution initially by adding 400 ml of 0.1 M Tris HCl pH 7.6. This will require heating in a 65°C water bath and some shaking of the vessel (but with lid well secured). According to scientific literature, once fully dissolved the volume of the solution was 600 ml
2. Make up to 750 ml with 0.1 M Tris HCl pH 7.6
3. Add 50 ml of 0.5 M EDTA, mix
4. Add 30 ml Triton-X-100, mix
5. Volume made up to 1 L with 0.04 % (w/v) Bromophenol blue (DEPC-treated water can be used instead)

Note: Always read the chemical safety data sheet associated with the chemicals and carry out a full risk assessment.

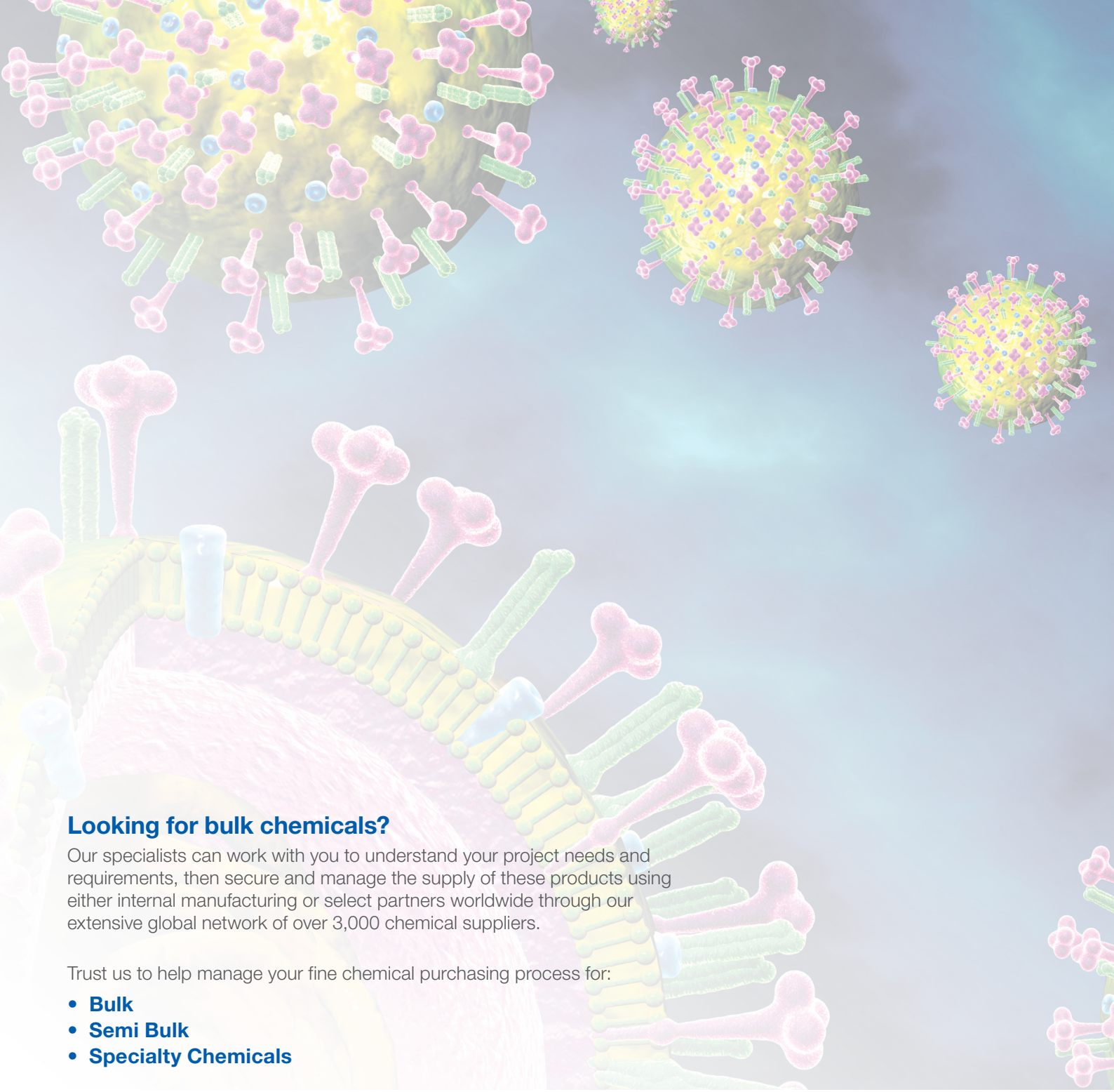
Within our Thermo Fisher Scientific Laboratory Chemicals portfolio we offer all the necessary products to prepare this lysis buffer solution with the correct specifications and in a range of convenient pack sizes. We also offer specialized custom services and can provide the products in bulk quantities if required.

Fisher Scientific Cat. No.	Brand	Description	Pack size*
11352888	Alfa Aesar	Bromophenol Blue, ACS	5g
11468716	Alfa Aesar	Bromophenol Blue sodium salt	10g
11308967	Alfa Aesar	Bromophenol Blue sodium salt, 0.04% w/v aq. soln.	100mL
11329886	Acros Organics	EDTA, disodium salt dihydrate,99+%, for molecular biology, DNAse, RNAse and Protease Free	500g
15450457	Alfa Aesar	Ethylenediaminetetraacetic acid, Electrophoresis Grade, 99.4+%	100g
10503345	Fisher Bioreagents	Guanidine thiocyanate powder Assay: >=99.0 %	1Kg
10741244	Acros Organics	Guanidine thiocyanate, 99% (Argentometric Titration: >=98.5 %)	1Kg
11454777	Alfa Aesar	Guanidine thiocyanate, 99% Assay (Argentometric Titration: ≥98.5 to ≤101.5%)	2.5Kg
11975601	Acros Organics	Guanidine thiocyanate, for molecular biology Argentometric Titration >=99.0 %	100g
15486719	Alfa Aesar	Guanidine thiocyanate, Molecular Biology Grade - Assay (Titration): 99.0% min.	50g
10790872	Acros Organics	Hydrochloric acid, ACS reagent, ca. 37% solution in water	500mL
11463443	Fisher Chemical	Hydrochloric acid, AR, 1.18 SG ~37% (Assay: >= 35 and <= 38%)	2.5L
10163243	Fisher Bioreagents	Tris Base, Molecular Biology Grade	1Kg
15446989	Alfa Aesar	Tris(hydroxymethyl)aminomethane, ultrapure, 99.9%	1Kg
15855348	Thermo Scientific	Tris, 99.0-101.0% (dry basis), Thermo Scientific	1Kg
15845368	Thermo Scientific	Tris, 99.8-100.1% (dry basis), Molecular Biology Grade, Ultrapure, Thermo Scientific	1Kg
10671652	Acros Organics	Triton® X-100, 98%, for molecular biology, DNAse, RNAse and Protease free	100mL
15428059	Alfa Aesar	Triton® X-100, Electrophoresis Reagent	100mL
15456979	Alfa Aesar	Water, Endotoxin-free	500mL
10505854	Fisher Bioreagents	Water, Molecular Biology Grade	1L
10191231	Acros Organics	Water, for molecular biology, DNAse, RNAse and Protease free	1L
15805408	Thermo Scientific	Water, RNase-free, DEPC treated, Molecular Biology Grade, Ultrapure, Thermo Scientific	1L

*Other pack sizes available

Bulk and semi-bulk quantities available

Thermo Fisher Scientific is an approved supplier for several pharmaceutical organizations globally. Several products, including **Guanidinium Thiocyanate** are available in bulk and semi-bulk quantities in full compliance with local regulations and EU REACH registration.



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References

1. McGookin R (1985) RNA extraction by the guanidine thiocyanate procedure. *Methods Mol Biol* 2:113-6.
2. Chomczynski P, Sacchi N (1987) Single-step method of RNA isolation by acid guanidinium thiocyanate-phenol-chloroform extraction. *Anal Biochem* 162(1):156-9.
3. Scallan M F, Dempsey C et al. (2020) Validation of a Lysis Buffer Containing 4 M Guanidinium Thiocyanate (GITC)/ Triton X-100 for Extraction of SARS-CoV-2 RNA for COVID-19 Testing: Comparison of Formulated Lysis Buffers Containing 4 to 6 M GITC, Roche External Lysis Buffer and Qiagen RTL Lysis Buffer. *bioRxiv* ePub: 1-6 (This article is a preprint and has not been certified by peer review)

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