



The wise choice

Oligonucleotide Synthesis

High-quality reagents and solvents

Low water content

Improved yields

Tailored formulations



About us

Headquartered in **Barcelona (Spain)**, Scharlab has experienced outstanding growth over the last few decades. This has led to us having **direct presence in 7 countries** and enabled us to develop a worldwide presence through a distribution network covering over 100 countries.

The company was **established in 1949** in Barcelona under the name of FEROSA as an organic compound synthesising company. In 1954, this company was bought by Paul Scharlau, a second-generation German in Spain. He then reached an agreement with the German company Dr. Theodor Schuchardt to distribute their laboratory chemicals and to manufacture under licence in Spain.

In 1970, Schuchardt was sold to Merck-Darmstadt and FEROSA had no alternative but to start selling chemicals under a different name. Thus, the **Scharlau brand was born in 1971**. Thousands of purification processes were consequently perfected to offer reagents of exceptional purity.

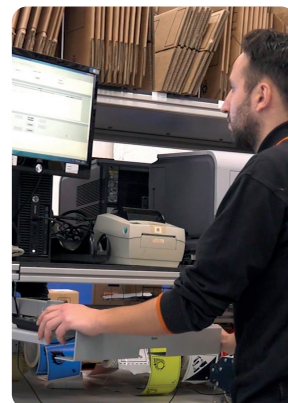
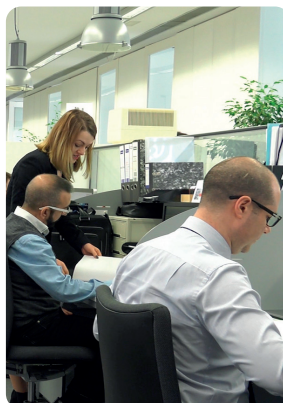
In 1980, Paul Scharlau passed away and his son, Werner, took his place. The company then focused on providing **high purity solvents** in general and HPLC solvents in particular.

Between 1990 and 1997, the company added new product families to its portfolio, making a transition from a solvent manufacturer to a fully-fledged reagent company. Since then, the company has added new business lines such as **culture media for microbiology, laboratory glassware and chromatography accessories**. Today, the company offers a complete portfolio of laboratory supplies and operates under the Scharlab company name and Scharlau product brand.

Currently, Scharlab employs over 350 people.

Scharlab is a company dedicated to design, manufacture and distribute products and services supporting scientists to achieve a better world.

Scharlab does not belong to a private equity fund, which means it can focus on long-term goals that **guarantee stability for both its customers and its team.**



Quality and the environment

Scharlab is committed to complying with or exceeding our clients' needs through the implementation of a total management system, which includes **exceptional quality service and products, conservation of the environment and guaranteeing its employees' health and safety.**

Since 1995, Scharlab has implemented a quality system following **ISO 9001** requirements. The company has continually extended the system to include environmental requirements according to **ISO 14001**. Scharlab also complies with the requirements under **Spanish law 31/1995** regarding risk prevention. The latest step has been ISO 13485 with respect to health products, whose requirements are already in place and are only waiting certification.

Scharlab has a total management manual which includes all the disciplines where the procedures are recorded, and information documented for continuous improvement.

Located in a rural area surrounded by forest, **environmental conservation is one of the company's main concerns.** Scharlab works towards guaranteeing that natural resources and raw materials are used efficiently. Our facilities have been designed to reduce the company's environmental impact.



Scharlab works towards supplying **cleaner, safer products** and takes the conservation of the environment into account when working on future projects. Scharlab is continually seeking cleaner, safer ways for packaging and mainly uses (when safety allows) external cardboard packaging with recycled paper filling to ease the elimination and reuse of waste. Additionally, Scharlab provides a returnable packaging service for HPLC solvents and more common grades.

Scharlab is inscribed in the Spanish **Registry of carbon footprint, offsetting and CO₂ removal (RD 163/2014)**. This means that Scharlab measures its carbon footprint and is committed to reducing its environmental impact.

The company has a License for Prior Sanitary Operation of Sanitary Product Facilities awarded by the Spanish Agency for Medications and Sanitary Products (License No: 6997-PS) for import and export manufacturing activities. Its register in the European database, Eudamed, has been completed successfully.



www.scharlab.com

Using our **website** when searching for products, you will not only save time, but also find the best product information.

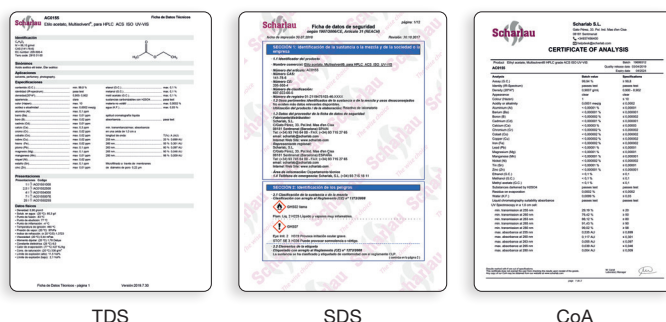
Our **search engine is optimised** to enable you to find all our products easier and more intuitively.

Search by description, by Scharlab's reference, by CAS or by cross-referencing, in the same field.

With the same structure as our **general catalogue**, you can browse through the **7 major product lines (Chemicals, Microbiology, Glassware, Chromatography, Consumables, Equipment and Safety).**

On each **product page**, you will find all its related information and are given the option of downloading the technical documentation (TDS, SDS and CoA).

Consult, review and download our publications: product brochures, catalogues, offers, etc. Access our promotions and video tutorials.



TDS

SDS

CoA

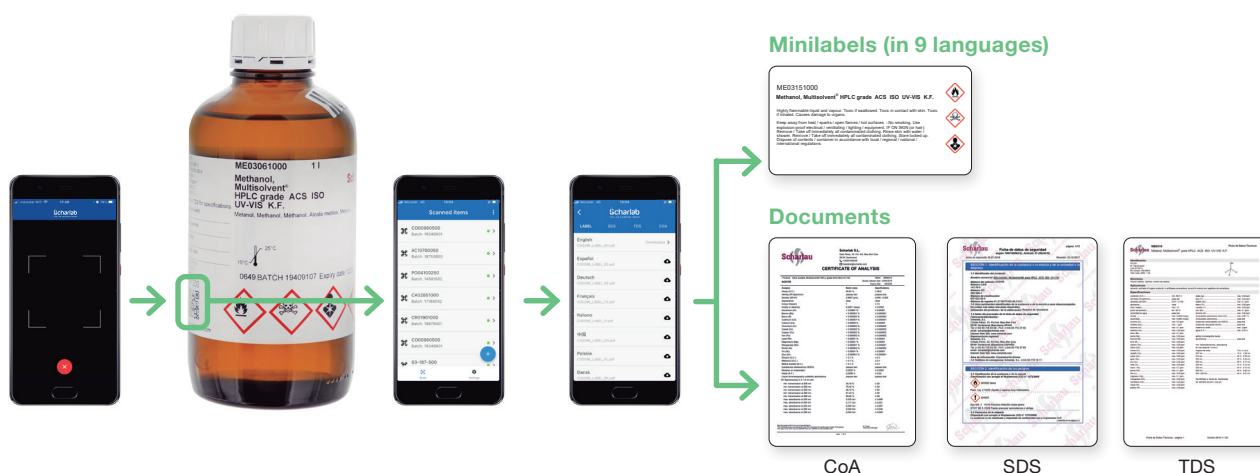
Scharlab Reader App

The Scharlab Reader App lets you obtain technical documents and mini safety labels by simply scanning the QR code on your Scharlau bottle.

Instantly, at any time, users can download mini safety labels, Certificates of Analysis (CoA), Technical Data Sheets (TDS) and Safety Data Sheets (SDS) for their Scharlau products.

- The SDS are available in 16 languages (English, Spanish, German, French, Italian, Chinese, Polish, Danish, Portuguese, Australian English, Finnish, Greek, Hungarian, Norwegian, Romanian and Swedish) and the mini safety labels in 9 languages (English, Spanish, German, French, Italian, Chinese, Polish, Danish and Portuguese).

- The mini safety labels include colour hazard symbols, hazard indications (H) and precautionary statements (P). As they are downloaded from our website, the user can always access the most updated versions.
- The user interface is available in 6 languages (Spanish, English, Italian, French, German and Portuguese).



Helpdesk service

Our **helpdesk** members can find the right products for your needs, whether if your enquiry relates to a chemical product, a culture medium, a glassware item, chromatography columns, a filter, a cartridge for solid-phase extraction, a PPE or any equipment item.

We can also help with any after-sales queries. You may contact our helpdesk, if you need a certificate, a manual, any additional information, or recommendation, for use of the product purchased. Our helpdesk can also respond to delivery time requests and prices for new orders.

Custom-made products

The challenges facing professionals in laboratories and industry research centres vary. To address these needs, in addition to our comprehensive catalogue, we offer a wide range of solutions developed by our R&D department and certified by our laboratory. Among them are chemicals, culture media, glassware and standards and mixes of organic compounds and pesticides. We also manufacture for other brands.



Introduction

While the Scharlau catalogue of chemicals has always included products to cover all techniques, this new catalogue specialises in oligonucleotide synthesis as we make a firm commitment to expand our products and services in this field.

The catalogue contains a full range of chemicals widely used throughout all laboratories that synthesise oligonucleotides. Solvents and auxiliary reagents, deblocking solutions, activators, capping agents, oxidants and cleavage agents are available in the specific grade for each application.

Our full range of products for oligonucleotide synthesis is manufactured according to the highest quality standards and undergoes rigorous, specialised quality control tests to ensure they are fit for purpose. We pay special attention to the purity and a low water content in all products used in applications where moisture could interfere with the synthesis.

The range is intended to simplify the search for chemicals used in the synthesis of oligonucleotides. For information on more products, please see our website or send an email to: helpdesk@scharlab.com.

Reagents and Solvents for Oligonucleotide Synthesis

The new Scharlau range of reagents and solvents for oligonucleotide synthesis comprises all the necessary mixtures and compounds. This includes deblocking, activation, capping and oxidation reagents, among others, all with a very high purity and low water content. Scharlau acetonitrile, with an extremely low water content and of the specific quality required for this application, completes the range.

The product line aims to meet the demands of our customers in the field of oligonucleotide synthesis, covering both laboratory and large-scale production requirements.

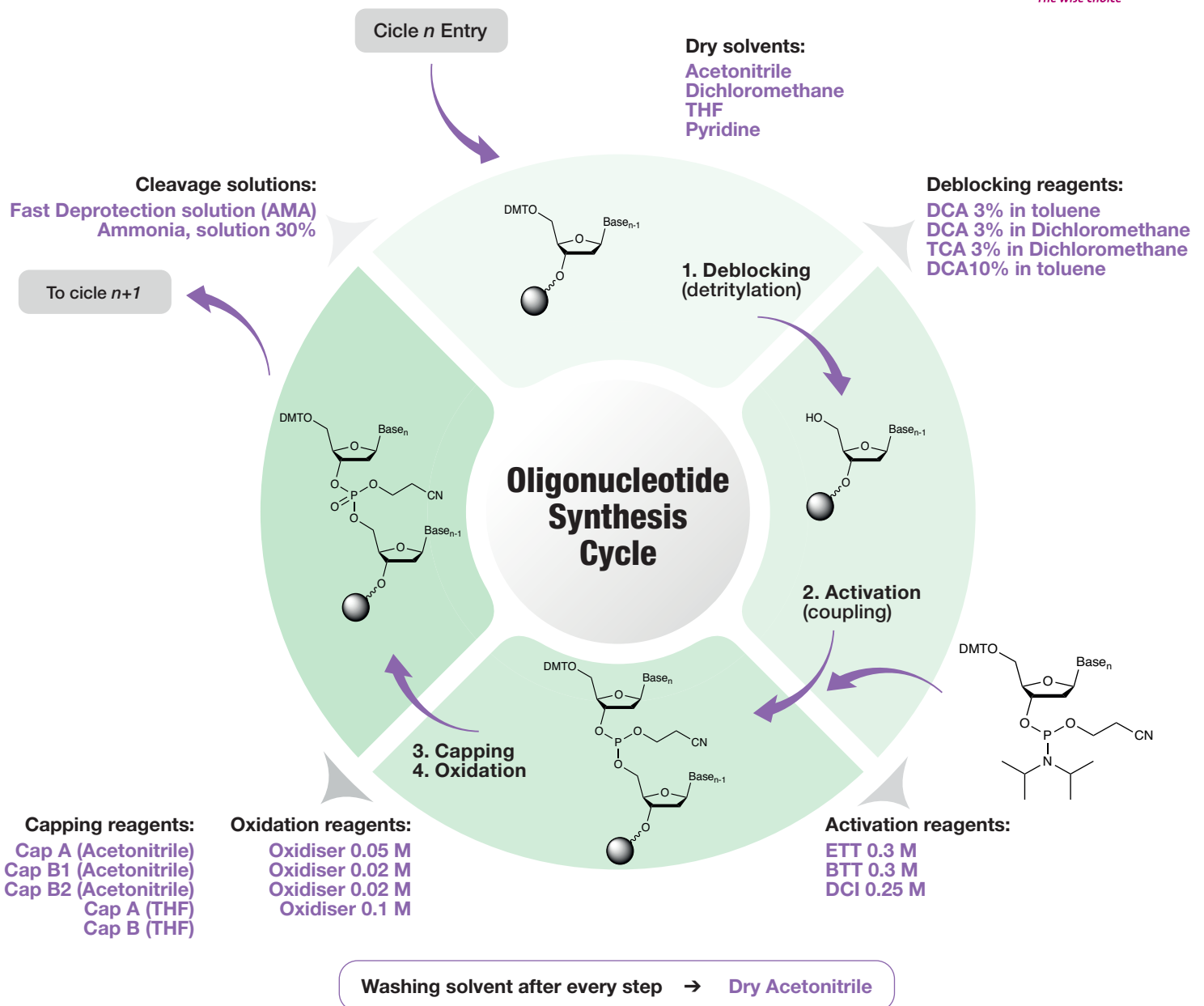


We also offer custom-made solutions to meet the specific needs of your laboratory.

The solutions are developed by our R&D department and undergo quality control and certification in our laboratories.

Multiple containers and drums are available.

Send us your request and we shall study it in detail.



The absence of water is a key factor in the reaction yield. The amount of water in the reagents and solvents is inversely proportional to the final yield of the synthesis.

Scharlab supplies especially processed and purified reagents, solvents and mixtures for coupling reactions, deprotection, washing, etc., that return optimal yields. All Scharlab products have a very low and tested water content.

Scharlab oligonucleotide synthesis products are manufactured following strict quality standards and undergo stringent, specialised quality and adequacy control tests to guarantee their correct performance in the field, with a special focus on purity and a low water content. Furthermore, they have already been validated by laboratories specialised in oligonucleotide synthesis who have corroborated their excellent performance.

Characteristics:

- High purity
- Low water content
- Multiple containers and formats

Benefits:

- High-quality reagents and solvents
- Improved yields
- Tailored formulations

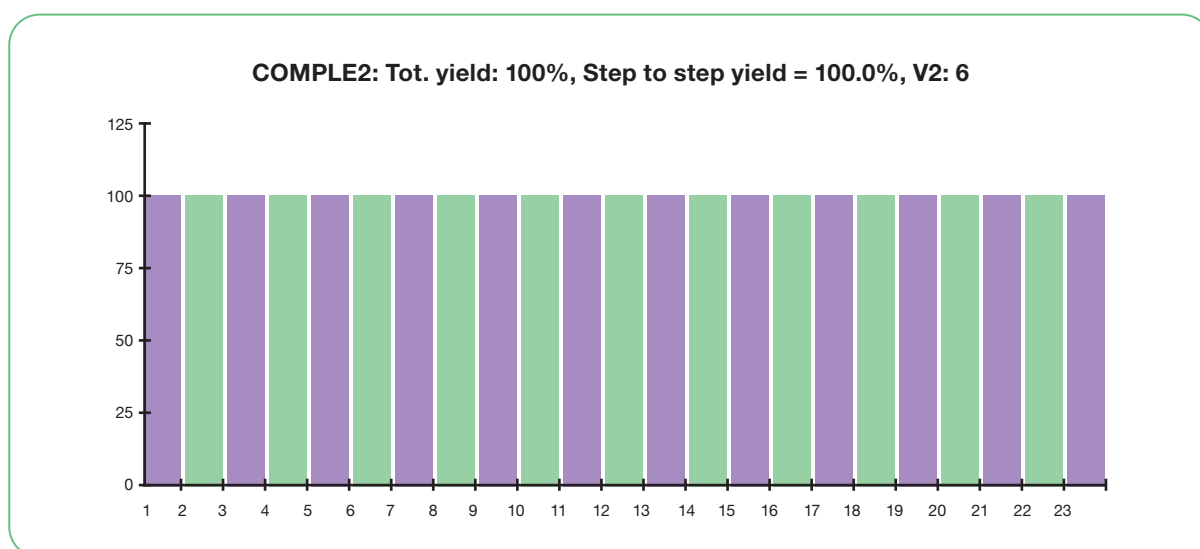
Solvents and mixtures are available in formats ranging from 2.5 L glass bottles up to 200 L stainless steel drums, so we can adapt our supply to any requirements. Please don't hesitate to contact us for more information.

Oligonucleotide synthesis performance using Scharlau Acetonitrile

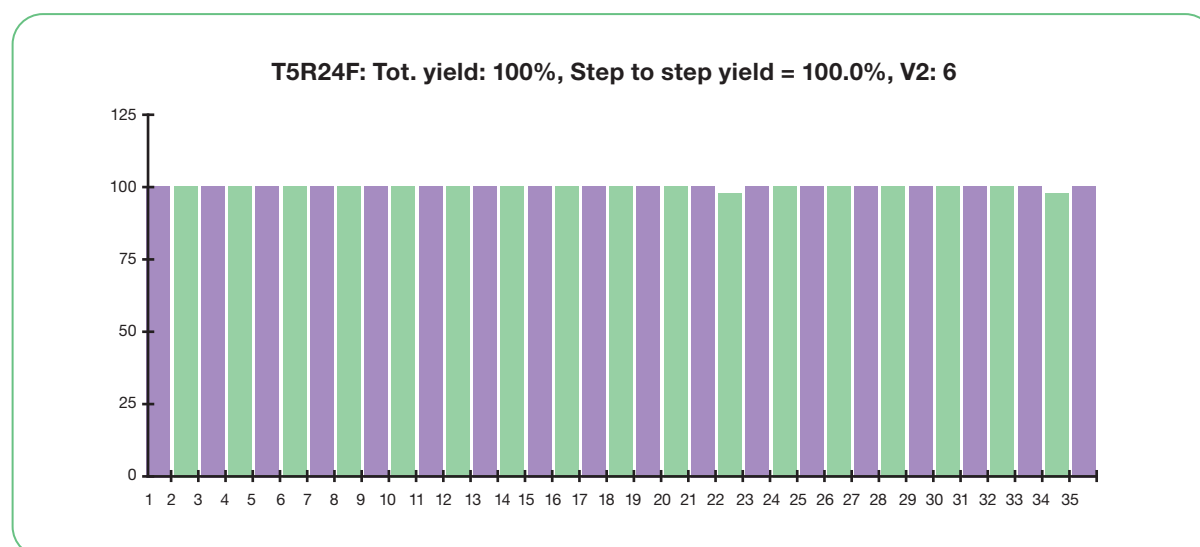
The Scharlau Acetonitrile max 30 ppm H₂O (p/n AC0336) was analysed for oligonucleotide solid-phase synthesis. This solvent was used to dissolve the phosphoramidites and to wash the solid support during oligonucleotide assembly. Several oligonucleotides (DNA and RNA) of different length were prepared. Coupling yields were recorded on different days after phosphoramidite dissolution. The purity of some oligonucleotides was also analysed by HPLC. In addition, ³¹P was used to measure the hydrolysis of dC CE phosphoramidite once dissolved in acetonitrile.

DNA synthesis

Sequence 1: 5' TTT TGC ATA CGA ACC TAT ACG AGA 3' 24 mer DMT ON 24 h after dissolution of the phosphoramidites.



Sequence 2: 5' TTT TGA TGG CAA AAG TAT TAG ACT TTA CAA GGT TAT 3' 36 mer DMT OFF 24 h after dissolution of the phosphoramidites.



Sequence 3: 5' TAG ATG GGG TGC GGG CCT CTT CGC GCA AGG CGT TTT TCT CGT ATA GGT TCG TAT GC 3' 56 mer
DMT ON 48 h after dissolution of the phosphoramidites.

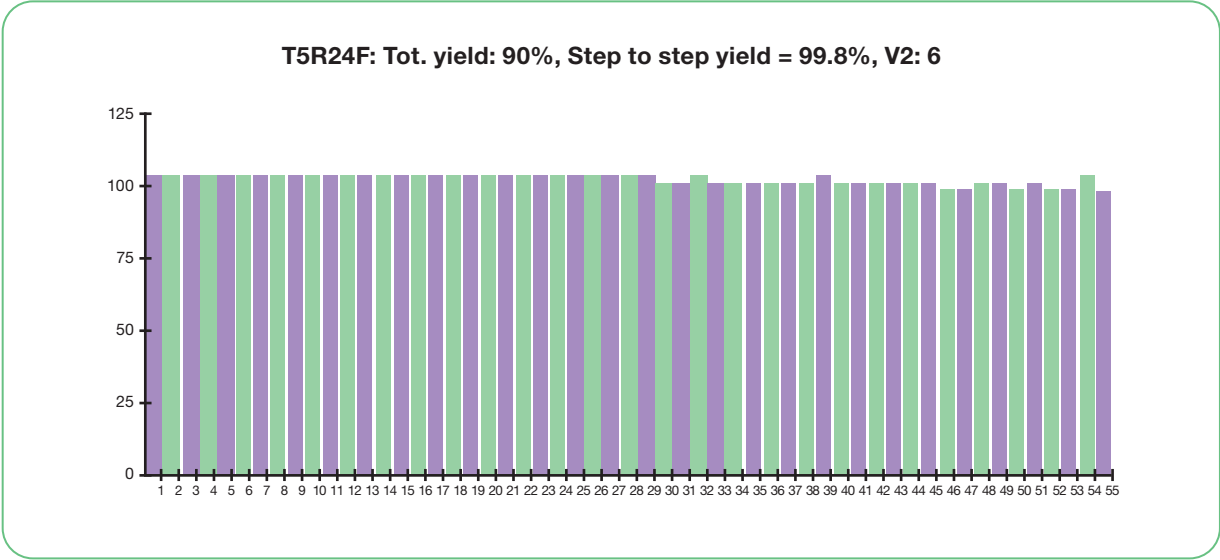
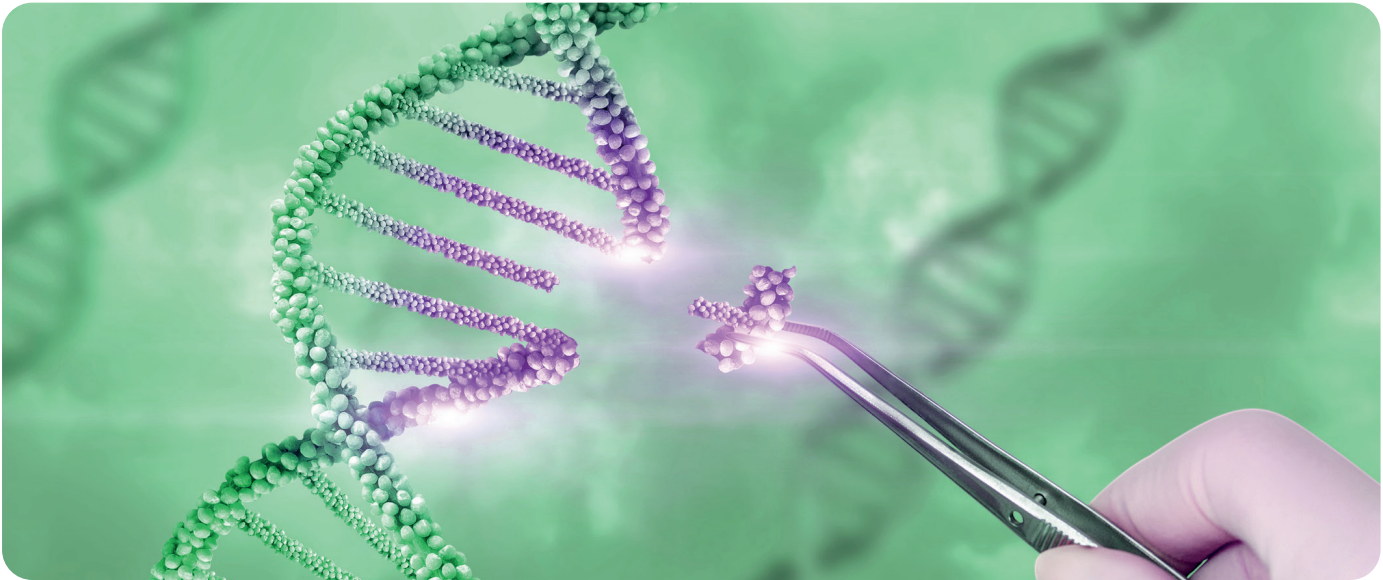


Table 1. DNA oligonucleotide sequences, total yield and average step yield obtained from each synthesis after different times of dissolution of the phosphoramidites with Scharlau acetonitrile (max. 30 ppm H₂O).

Oligonucleotide DNA	Total Yield (%)	Step Yield (%)	Time after phosphoramidite dissolution
Seq 1 (24 mer)	100	100	24 h
Seq 2 (36 mer)	100	100	24 h
Seq 3 (56 mer)	90	99.8	48 h

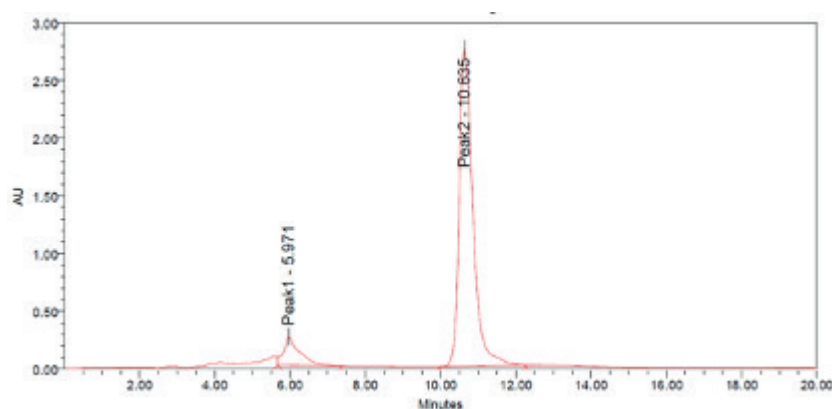


Oligonucleotide synthesis performance using Scharlau Acetonitrile

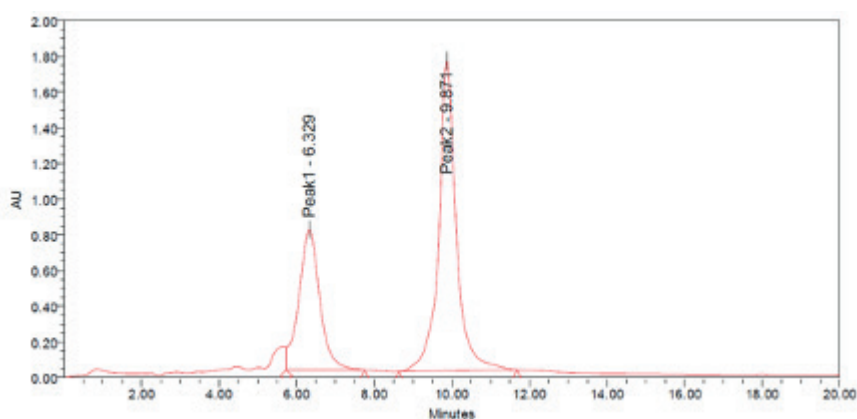
Reverse-phase HPLC chromatograms of synthesised oligonucleotides

For long or modified oligonucleotides, RP-HPLC is an excellent technique to analyse and purify crudes with moderate step yields. In this case, the DMT group of the last phosphoramidite is not removed during synthesis, so the full-length sequence (with a hydrophobic DMT trityl group) is retained in the column, while shorter sequences (without a DMT group or undesired) are washed off. Sequence 3 with 56 bases was analysed with DMT ON HPLC program. The retained peaks correspond to the full-length sequences. After purification, these oligonucleotides give a single peak in the HPLC chromatogram (DMT off program).

DMT OFF program. Sequence 2: 5' TTT TGA TGG CAA AAG TAT TAG ACT TTA CAA GGT TAT 3' 36 mer DMT OFF 24 h after dissolution of the phosphoramidites.

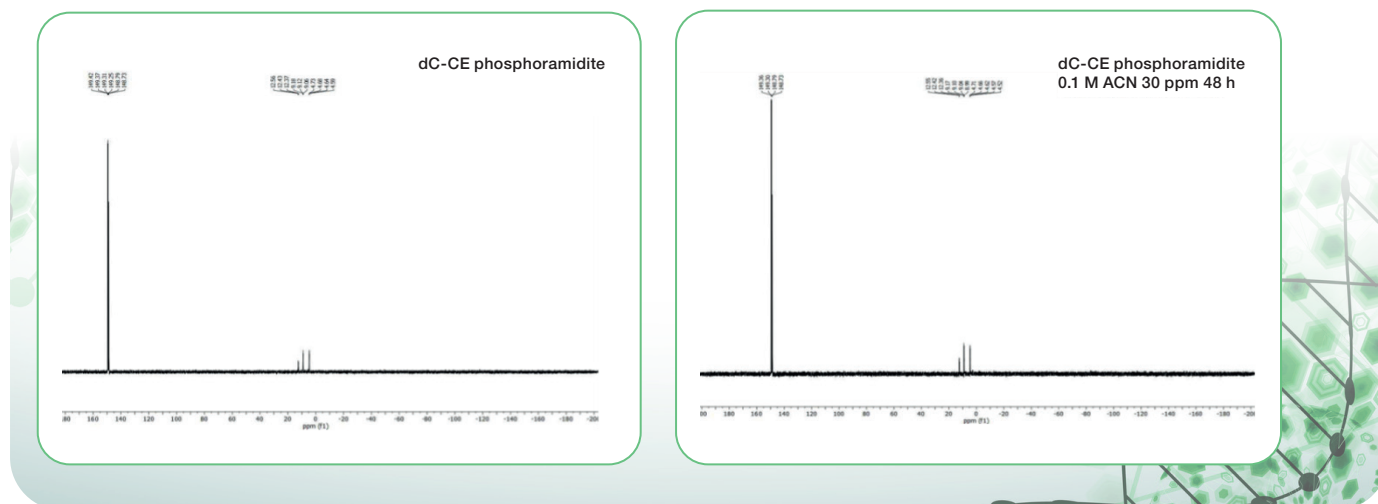


DMT ON program. Sequence 3: 5' TAG ATG GGG TGC GGG CCT CTT CGC GCA AGG CGT TTT TCT CGT ATA GGT TCG TAT GC 3' 56 mer DMT ON 48 h after dissolution of the phosphoramidites.



³¹P NMR Study

Finally, the hydrolysis of the phosphoramidites was studied by phosphorous ³¹P NMR spectroscopy. The phosphoramidites were exposed to the Acetonitrile max. 30 ppm H₂O for 48 h, before being dried and dissolved in deuterium chloroform. The ³¹P NMR spectrum was recorded in a Bruker (400 Hz).



HPLC profiles of the oligonucleotide showed a major peak corresponding to the desired oligonucleotide. The stability of the phosphoramidite solutions prepared with both Scharlab acetonitrile purities was analysed. No differences were observed in the initial phosphoramidite after 48 h of preparation according to the ³¹P NMR spectrum.

In conclusion, Scharlab Acetonitrile max 30 ppm H₂O (p/n AC0336) is a **suitable solvent for oligonucleotide synthesis**.

Scharlab AC0336 Acetonitrile, max. 30 ppm H₂O was used for the preparation of DNA and RNA oligonucleotides. This solvent was used to dissolve phosphoramidite monomers and for solid support washes during synthesis. This acetonitrile purity resulted in an excellent solvent for oligonucleotide synthesis, with a step-to-step yield of 100% for DNA and RNA synthesis after 24 h of phosphoramidite dilution. With a purity of 30 ppm, a step-to-step yield of 99.8% was obtained for a 56 mer DNA oligonucleotide after 48 h of dilution.

HPLC profiles of the oligonucleotide showed a major peak corresponding to the desired oligonucleotide. The stability of phosphoramidite solutions prepared with Scharlab acetonitrile max. 30 ppm H₂O was analysed. No differences were observed in the initial phosphoramidite after 48 h of preparation according to the ³¹P NMR spectrum.

Anna Aviñó, PhD

INSTITUTE FOR ADVANCED CHEMISTRY OF CATALONIA (IQAC-CSIC)

CENTRO DE INVESTIGACIÓN BIOMÉDICA EN RED (CIBER) BIOENGINEERING, BIOMATERIALS AND NANOMEDICINE (BBN).

→ **Complete study available**, please contact us at helpdesk@scharlab.com

Ordering information

Solvents and Auxiliary Reagents

Extremely pure solvents with a minimal water content that guarantee outstanding efficiency in oligonucleotide synthesis. Acetonitrile is the ideal solvent for use as a washing solution during DNA synthesis.

Art. No.	Description
AC0336	Acetonitrile, for DNA synthesis (<30 ppm H ₂ O)
AM0254	Ammonium acetate, for analysis, ExpertQ®, ACS, Reag. Ph Eur
CL0338	Dichloromethane, dried (<50 ppm H ₂ O), ExpertQ®
PI0124	Pyridine, dried (< 100 ppm H ₂ O), ExpertQ®
TE0223	Tetrahydrofuran, dried (< 50 ppm H ₂ O), ExpertQ®
AC3142	Trifluoroacetic acid, for peptide synthesis

► NOTE: Consult available packagings.



Deblocking Solutions

Deblocking solutions are mixtures of trichloroacetic acid (TCA) or dichloroacetic acid (DCA) in dichloromethane or toluene. They are used to remove the dimethoxytrityl (DMT) protecting group from the functional 5' hydroxyl of nucleotides that are already incorporated in a growing nucleic acid and before the addition of the next phosphoramidite.

Art. No.	Description
ME0772	DCA Mixture, Deblock 10% (v/v) in Toluene
ME0785	DCA Mixture, Deblock 3% (v/v) in Dichloromethane
ME0794	DCA Mixture, Deblock 3% (v/v) in Toluene
ME0773	TCA Mixture, Deblock 3% (w/v) in Dichloromethane

► NOTE: Consult available packagings.



Activators

Activation reagents are mixed with phosphoramidite solutions during the extension step. The activator reacts with the amidite group to form a highly reactive intermediate by creating an internucleotide linkage with the demethylated 5' hydroxyl group on the growing oligonucleotide chain.

Art. No.	Description
ME0775	Activator 0.25 M DCI (4,5-dicyanoimidazole) in Acetonitrile
ME0774	Activator 0.3 M BTT [5-(benzylthio)-1H-tetrazole] in Acetonitrile
ME0784	Activator 0.3 M ETT [5-(ethylthio)-1H-tetrazole] in Acetonitrile

► NOTE: Consult available packagings.



Capping Agents

Capping solutions are used after the phosphoramidite reaction/coupling step. Capping agents cap any unreacted 5' hydroxyl groups (1-2%) with an acetyl group, thus protecting them from reacting in subsequent steps of the synthesis. The unreacted fragments are blocked so the chain cannot grow any longer, preventing the formation of long oligonucleotides with incorrect sequences.

Art. No.	Description
ME0787	Cap A (Acetonitrile/Acetic Anhydride, 75/25, v/v)
ME0780	Cap A (Acetonitrile/N-Methylimidazole, 80/20, v/v)
ME0776	Cap A (THF/2,6-Lutidine/Acetic Anhydride, 80/10/10, v/v/v)
ME0788	Cap B (Acetonitrile/2,6-Lutidine/N-Methylimidazole, 50/30/20, v/v/v)
ME0777	Cap B (THF/N-Methylimidazole, 84/16, v/v)
ME0781	Cap B1 (Acetonitrile/Acetic Anhydride, 60/40, v/v)
ME0782	Cap B2 (Acetonitrile/Pyridine, 40/60, v/v)

► NOTE: Consult available packagings.



Ordering information

Oxidisers

Oxidisers promote the oxidation of unstable trivalent phosphotriester into a stable pentavalent phosphotriester using iodine as a mild oxidising agent and water as the oxygen donor.

Art. No.	Description
ME0779	Oxidiser, 0.02 M (THF/Water/Pyridine/Iodine, 66/12/22/0.60, v/v/v/w)
ME0786	Oxidiser, 0.02 M (THF/Water/Pyridine/Iodine, 90.6/9.0/0.4/0.43, v/v/v/w)
ME0783	Oxidiser, 0.05 M (Water/Pyridine/Iodine, 10/90/1.27, v/v/w)
ME0778	Oxidiser, 0.1 M (THF/Water/Pyridine/Iodine, 77/2/21/2.54, v/v/v/w)

► NOTE: Consult available packagings.

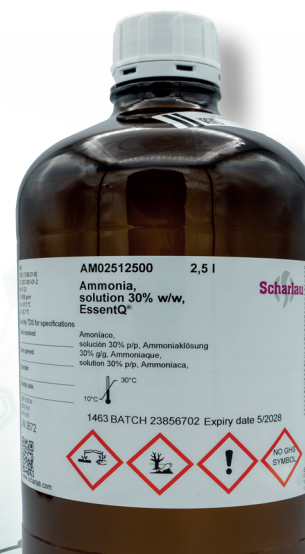


Cleavage Solutions

Cleavage solutions separate the oligonucleotide from its solid substrate. This can be done using a standard solution of ammonia 30% or with a rapid deprotection solution (AMA).

Art. No.	Description
ME0789	AMA (Fast Deprotection Solution) (30% Ammonia and 40% Methylamine, 50:50, v/v)
AM0251	Ammonia, solution 30% w/w , EssentQ®

► NOTE: Consult available packagings.





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Internal Use

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