How a SATRA Lab Used LPGC to Cut Helium Use by 89% and Run Times by 50%

In this roundtable discussion, Restek's Whitney Dudek-Salisbury sits down to talk with chemists from SATRA to learn how they made some remarkable productivity improvements in their lab. By switching a time-consuming, conventional GC-MS method for azo dye arylamines to a much faster low-pressure GC-MS (LPGC) method, they significantly reduced both analysis time and helium consumption. Let's hear their story.

Whitney: Thank you for joining me today. Can you start by telling us a bit about your organization and the work you do?

Rebecca: Of course, Whitney. SATRA is an independent research and testing organization accredited by UKAS to ISO 17025. Most of our work in the chemistry laboratory involves routine testing of customer samples of footwear, leather, and PPE products. Turnaround time and instrument capacity are crucial to maintaining customer satisfaction and meeting tight deadlines.

Whitney: That sounds interesting but also very challenging. From my own experience in the lab, I can certainly understand how important instrument cycle time and capacity are to keeping a lab running efficiently. What are some of the analyses that you run most often?

George: One of the most frequently run methods in our chemistry laboratory is for azo dyes. We perform these tests multiple times each week, primarily on textile samples, although we also test leather samples. We were analyzing these samples using a conventional GC-MS method, but we were consuming a lot of helium which, as you know, is expensive and in short supply. In addition, the long analysis times and large number of samples could make it tough to meet tight turnaround times.

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- *LPGC Rxi-35Sil MS, 0.32 mm ID (cat.# 11806)*
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The chemistry lab at SATRA significantly reduced helium use and increased sample throughput by switching to LPGC.

Whitney: **I understand you've recently switched to using low-pressure GC-MS (LPGC). How has this change impacted your testing process?**

Rebecca: We've seen significant improvements in several areas. Switching from conventional GC-MS to LPGC has reduced our run time for arylamines by more than 50%, including GC ready time. The data for a single sample is now available for analysis four times faster, allowing us to complete larger runs within the 24-hour window stated in the EN 14362-1 and EN 17236-1 methods. This also speeds up dilutions and reruns, reducing the chance of sample deterioration and eliminating delays in reporting. In addition, the LPGC method reduced our helium consumption for arylamines analysis by 89%!

Whitney: **That's impressive! Have you also seen cost savings with this new method?**

Rebecca: Yes, we've estimated cost savings of over £1500 on helium consumption per year due to the reduced flow rate and rapid analysis time. We hope to increase this as we trial LPGC on other methods.

Whitney: **Can you tell us about the initial discussions and decisions that led to adopting LPGC?**

George: We were meeting one day to discuss the feasibility of switching our existing instruments and methods from helium to hydrogen to save money and address helium supply shortages. This would have required a significant investment and raised safety concerns, making it a long-term project. However, during our meeting, I received an email from Restek about LPGC. It seemed like a fantastic way to save money and time with minimal outlay.

Whitney: **How did you proceed after learning about LPGC?**

George: I arranged a meeting with our Restek rep, Sally Poole, who provided more information about the LPGC technique as well as a Restek method for arylamines. Sally was very supportive and helped us trial LPGC by arranging a column for method development.

Whitney: **How did the trial runs go?**

Rebecca: In the lab, we conducted a few test runs and were able to identify all the amines that we look for. The speed of the samples running through the column made method development extremely quick. Although some amines coeluted slightly, we could still identify all of the peaks using SIM.

Installing an LPGC column kit is simple because the analytical and restrictor columns are factory connected at Restek.

Whitney: **What were the results of using LPGC?**

Rebecca: The results were exactly what we were looking for. We reduced our run time from about 40 minutes (plus GC ready time) to just over 15 minutes. The faster analysis shown here also immediately reduced our helium consumption by 89%, which is a fantastic achievement for us!

Whitney: **How has this change affected your daily operations?**

George: As an end user, having a much quicker run allows me to increase sample throughput and reduce bottlenecks in testing. We plan to trial LPGC for other multicomponent tests that we run regularly, starting with our phthalates method, which can also take over 40 minutes.

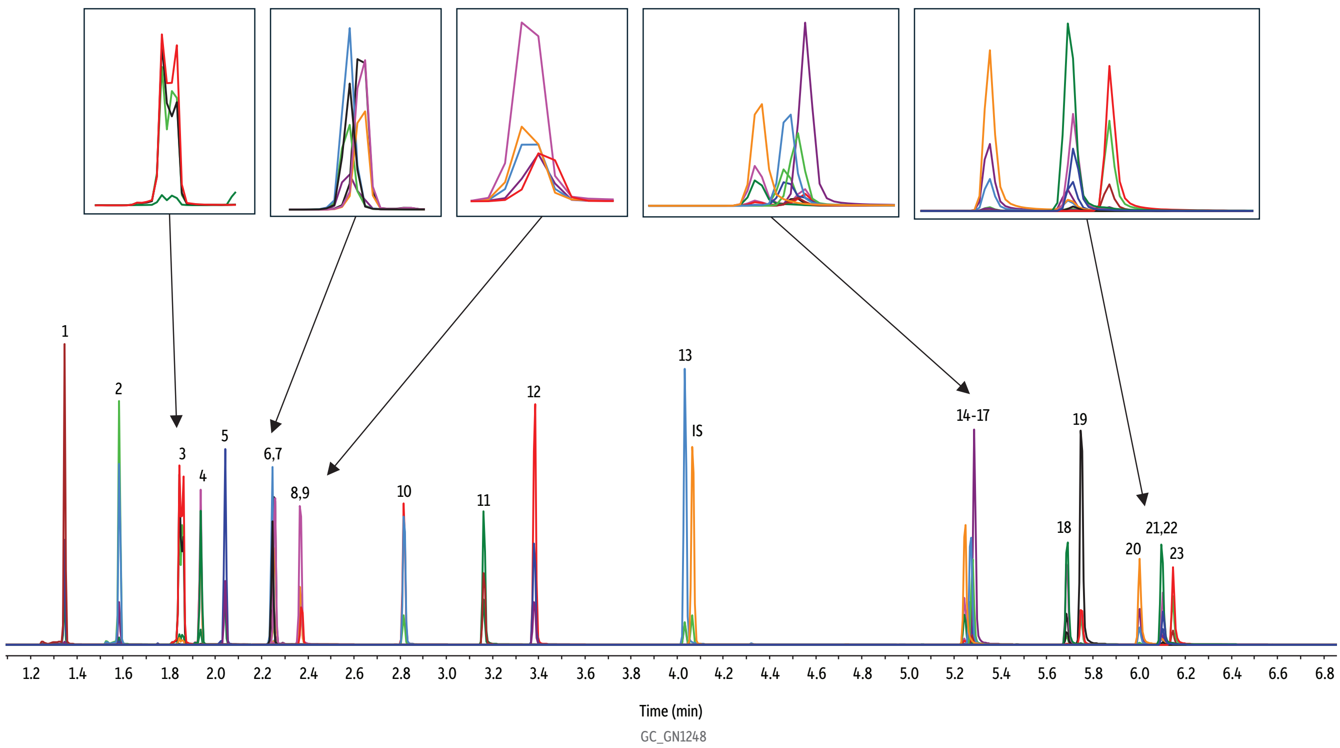
Whitney: **You've really made some great improvements to your arylamine method; are you already using it for customer samples?**

George: Yes, we have moved on to running live customer jobs with LPGC. The results have been great, and the speed allows us to check our standards and QC samples before going home, identifying potential problems early. This has been extremely beneficial for our analysts, including myself, as we can process a whole run in one go when we get in the following day.

Whitney: **This is a great example of how innovative solutions can help overcome traditional analytical challenges. Stories like this inspire all of us to keep pushing the boundaries of what can be done. Thank you so much for taking the time to talk to us!**

Interested in other LPGC applications? Learn more at **www.restek.com/LPGC**

SATRA's LPGC method for arylamines reduced run time by more than 50% and helium use by 89%.



Peaks	t_R (min)	Conc. (µg/mL)	Quant Ion
1. Aniline	1.346	1168.16	93
2. o-Toluidine	1.582	11.76	106
3. Xylidine	1.843	11.86	121
4. o-Anisidine	1.936	11.94	108
5. 4-Chloroaniline	2.042	12.05	127
6. p-Cresidine	2.247	12.07	122
7. 2,4,5-Trimethylaniline	2.253	11.93	120
8. 1,4-Phenylenediamine	2.365	12.19	108
9. 4-Chloro-o-toluidine	2.371	11.95	143
10. 2,4-Diaminotoluene	2.815	11.93	122
11. 2,4-Diamionanisole	3.161	12.13	123

Peaks	t_R (min)	Conc. (µg/mL)	Quant Ion
12. 2-Napthylamine	3.385	11.90	143
13. 4-Aminobiphenyl	4.033	12.02	169
14. 4,4'-Oxydianiline	5.249	12.31	200
15. 4,4'-Methylenedianiline	5.274	12.18	198
16. Benzidine-d8	5.28	5.26	192
17. Benzidine	5.286	12.27	184
18. 4,4'-Methylenedi-o-toluidine	5.691	12.16	226
19. 3,3'-Dimethylbenzidine	5.747	12.16	212
20. 4,4'-Thiodianiline	6.003	12.62	216
21. 3,3'-Dichlorobenzidine	6.097	12.28	252
22. 4,4'-Methylene-bis(2-chloroaniline)	6.103	12.38	231
23. o-Dianisidine	6.147	12.59	244

Column LPGC Rxi-35Sil MS column kit, includes 10 m x 0.32 mm ID x 0.25 µm Rxi-35Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector (cat.# 11806)
Standard/Sample Custom aryl amine standard
Diluent: Acetonitrile
Injection
Inj. Vol.: 0.75 µL splitless
Inj. Temp.: 280 °C
Oven
Oven Temp.: 55 °C (hold 0.5 min) to 100 °C at 70 °C/min to 300 °C at 35 °C/min
Carrier Gas He, constant flow
Flow Rate: 0.8 mL/min
Detector SIM/Scan
Scan Program:

Group	Start Time (min)	Scan Range (amu)	Scan Rate (scans/sec)
1	1	35-300	9.7

Transfer Line Temp.: 300 °C
Analyzer Type: Quadrupole
Source Temp.: 230 °C
Quad Temp.: 150 °C
Electron Energy: 70 eV
Tune Type: PFTBA
Ionization Mode: EI
Notes Data collected by SATRA, an accredited, independent research and testing organization in the UK.

More About SATRA

SATRA is an independent research and testing organization with facilities in the UK, Europe, and China. As well as testing and certifying products and components to European and international standards across a wide range of industry sectors, we accredit laboratories; design, manufacture, and install test equipment; and provide production efficiency solutions to customers around the world. SATRA is renowned as a leading technical authority for footwear and leather but also has world-class expertise in areas as diverse as furnishings, floor coverings, and PPE.

Learn more at www.satra.com

11800

Low-Pressure GC (LPGC) Column Kit

Leverage your MS vacuum to significantly speed up separations.

Ideal for fast GC-MS and GC-MS/MS methods, Restek's low-pressure GC column kits are designed to install easily and reliably, making it simple to gain the speed boost and helium savings of LPGC.

- Up to 3.3x faster than conventional GC-MS.
- Saves money by reducing helium use up to 81%.
- Factory-coupled, leak-free kits make set up as simple as a column change.

LPGC kits are comprised of two factory-coupled columns: a 5 m narrow-bore restrictor column and a short, 0.53 or 0.32 mm ID analytical column in dimensions and phases optimized for LPGC-amenable analyses.

Temp. Limits	Description	qty.	cat.#
-60 to 325/350 °C	LPGC Rtx-5ms column kit includes 10 m x 0.32 mm ID x 1.00 µm Rtx-5ms analytical column and 5 m x 0.15 mm ID Hydroguard restrictor factory connected via SilTite connector	kit	11802
-60 to 340/340 °C	LPGC Rtx-5ms column kit includes 15 m x 0.53 mm ID x 1.00 µm Rtx-5ms analytical column w/1 m x 0.53 mm ID integrated transfer line and 5 m x 0.18 mm ID Hydroguard restrictor factory connected via SilTite connector	kit	11800
-20 to 300/320 °C	LPGC Rxi-624Sil MS column kit includes 10 m x 0.32 mm ID x 1.8 µm Rxi-624Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11804
-20 to 280/310 °C	LPGC Rxi-624Sil MS column kit includes 15 m x 0.53 mm ID x 3.0 µm Rxi-624Sil MS analytical column and 5 m x 0.18 mm ID Rxi restrictor factory connected via SilTite connector	kit	11803
40 to 340/360 °C	LPGC Rxi-17Sil MS column kit includes 10 m x 0.32 mm ID x 0.25 µm Rxi-17Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11805
50 to 340/360 °C	LPGC Rxi-35Sil MS column kit includes 10 m x 0.32 mm ID x 0.25 µm Rxi-35Sil MS analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11806
-20 to 290/310 °C	LPGC Rtx-200 column kit includes 10 m x 0.32 mm ID x 1.00 µm Rtx-200 analytical column and 5 m x 0.15 mm ID Rxi restrictor factory connected via SilTite connector	kit	11807

Want to know if LPGC is right for your analysis?
Check out **www.restek.com/QuickStartLPGC**