

Lab supply shortages

## Out of Stock

Research not only depends on your own workforce but also on commercial products provided by big lab supply companies. Availability of those, however, might be temporarily or permanently limited for various reasons. It's an annoyance in any case but, sometimes, this even means the end of the road for a whole research field...



Down to the last drop

Recently, Eric Wommack from the University of Delaware, USA issued a public call to the scientific world to “Save Viral Ecology”. Like the Arakan Forest Turtle or the Javan Rhino, which are currently listed as “critically endangered” by the World Conservation Union (IUCN), this field of research also faces an extremely high risk of extinction in the immediate future. What exactly has happened?

### Lack of support

When, in early 2008, lab supply giant GE Healthcare took over Whatman, the global leader in filtration technology, things were meant to go smoothly and everyone was thought to profit from this merger. Simply, a match made in heaven if you choose to believe the press release which cheerfully announced, “Combining the skills and knowledge of the two businesses will create significant added value for customers.” This “significant added value” found its expression in the discontinuation of certain filters with very small pore sizes (0.02  $\mu\text{m}$ ) called Anodisc filters. Anodisc filters, needed to collect marine viruses from seawater samples, are, however, extremely important for viral ecology work and now, after GE Healthcare decided to stop their production, it looks as though some projects have been forced to a grinding halt. Mathias Middelboe of the University of Copenhagen, Denmark, stresses in an email to *Lab Times*, “This is absolutely crucial for my research. Quantification of viruses by this method is essential for our work – especially on benthic viruses, which cannot be quantified by other methods.” Markus Weinbauer of the Laboratoire d’Océanographie de Villefranche sur Mer, France,

is also affected by the corporate decision to discontinue Anodisc filters, “I am about to submit a project, where I have to omit a part of the research because it cannot be done anymore.”

GE Healthcare didn’t care too much to notify their valued customers about the discontinuation or offer any support. Thus, Middelboe and Weinbauer reacted with disbelief when they first heard about it in an e-mail from Eric Wommack, which circulated in the international scientific community some time ago, “First, I thought it was a joke,” said Weinbauer. According to Middelboe, not even local dealers of Whatman products had any idea! So there was only speculation about possible reasons for the production stop as the demand is most certainly high. “I am quite sure that the market is big world wide and, since their development, they have not been able to cover the demands (i.e. long waiting times for receiving the orders). Viral ecology is a research field in huge progress and with an increasing number of research groups and students working on this,” Middelboe explains.

### Incomprehensible decisions

The decision to stop the production becomes even more incomprehensible when you take into account that Whatman was the sole producer of these filters, appropriate for viral ecology research, and, as Middelboe confirmed, a growing number of researchers depends on them. This case, however, aptly illustrates how modern research heavily relies on big companies and the decisions they make based on economical reasons rather than out of consideration for their customers’ needs. It might be as simple as marketing a new, more expensive product or because the pro-

duction costs exceed the selling price of the end product, which might have been the cause of the discontinuation in the Whatman case.

### No happy ending

Anthony Contento, plant scientist from Iowa State University, USA, also suffered following the discontinuation of a specific product. He wrote in a blog comment about the filter discontinuation, “A similar thing happened to our lab when GIBCO BRL was bought out by Invitrogen. We used to buy specific plant cell culture media from GIBCO. The formulation was just right for our cell lines. Unfortunately, when Invitrogen took over they stopped production on all plant cell media. We were lucky, since our Invitrogen rep sold us two years worth of media for a song. But after that second year, we weren’t able to find a replacement. It’s still a problem for our research to this day.”

Often, though, companies do offer a replacement product, similar or related to the discontinued item, but of course whenever you’re trying something new you have to re-write and optimise your long-trusted protocol, which can be a very time-consuming effort. And in some cases you might never get the same results again.

### All that is left is silence

But even if the new executives, after a company acquisition, decide to keep the product, not everything necessarily ends “happily ever after”. In a blog comment, a staff member of a large pharmaceutical company that purchased good quality antibodies very cheaply from Wave Biotech before it was taken over by GE Healthcare, points out, “[The] quality rapidly went downhill

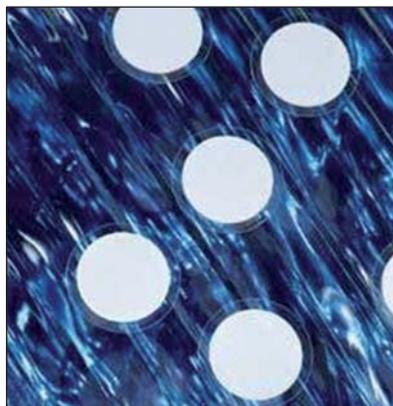
while prices doubled in less than five years.” So in the end, they decided to find an alternative supplier, disappointed about the lack of customer service at GE Healthcare, too.

Back to our viral ecology researchers, filter sufferers from all around the world tried to prevent the



**Will viral ecology soon be as dead as a dodo?**

worst case scenario and so, in a desperate attempt to make their voices heard, they joined forces to persuade GE Healthcare to reconsider their decision of serious consequence. Middelboe had hoped that GE Healthcare, “would change the decision if they came to a realisation of the demand for those specific products and the negative impact of their discontinuation”. But so far, the company remains silent and thus, if nothing happens, labs will soon run out of their now precious Anodisc filters. The conse-



**Anodisc filters, the bone of contention**

quence being that viral ecology research and many other projects suffering from this corporate decision will eventually be silenced.

It's not always an economical decision made by a company, however, that gets research projects or even a whole health care system into serious trouble. There can be many reasons why supply of a certain agent or drug suddenly or gradually stops. This can range from manufacturing problems or shortage of raw materials to an increased demand during a flu epidemic such as we recently experienced.

The official cause for the short supply of recombinant Factor VIII in late 2000, for example, was down to problems within the production process or, to be exact, a bacterial contamination in a

facility of the manufacturer, Bayer. At around the same time, another drug, called Isuprel, used on a daily basis for cardiac pacing studies was suddenly no longer available because the US Food and Drug Administration, FDA, had suspended the US licence of the sole producer of the bulk drug isoprenaline and thus the manufacturer, Abbott Laboratories, was forced to halt production. Ironically, no one really saw the shortage coming. "It's inexpensive and it's old. You wouldn't expect it to run out," said pharmacologist Jon Horton at the time.

Drug shortages due to several reasons were, however, not only a phenomenon ten years ago (see article "Running on empty" at <http://drugtopics.modernmedicine.com>) but this problem is present all the time (for recent examples, see reports by the European Medicines Agency, EMEA and the National Electronic Library for Medicines, NeLM, which lists 50 drugs that are on short supply in the UK at the moment, amongst them medicines to treat obesity (Xenical), depression (Cipralext) as well as schizophrenia and bipolar disorder (Zyprexa). (<http://drugtopics.modernmedicine.com/drugtopics/article/articleDetail.jsp?id=117984>))

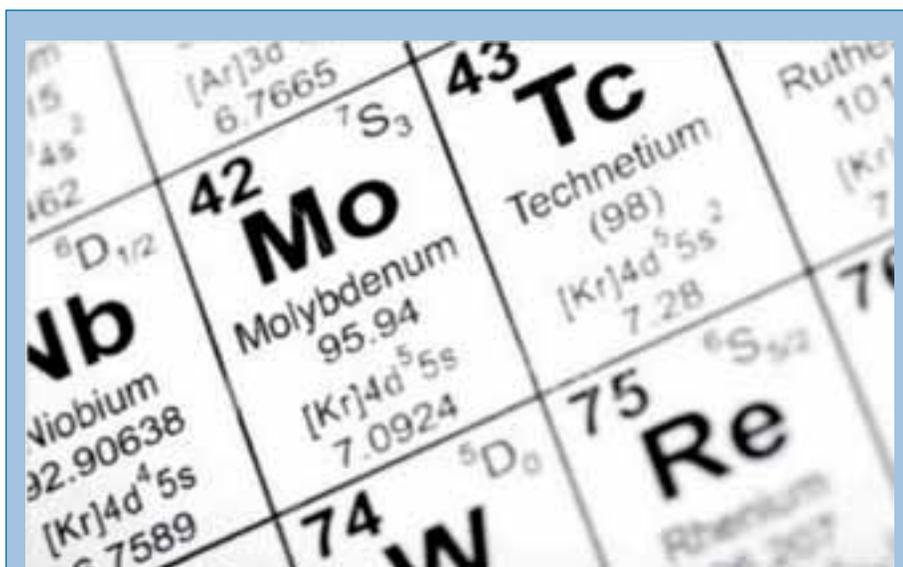
### Solvent solutions

Another common cause for under-supply is the shortage of raw materials, from which the final product is synthesised or produced. Reasons for the limited availability of source materials can be manifold, as the acetonitrile (ACN) case illustrates. ACN, a common solvent employed in applications like HPLC, is produced in small amounts during acrylonitrile manufacture, a compound which is used in the plastic industry to produce, for example, car parts or Lego bricks. As with isoprenaline, no one ever expected it to run out but then came the Summer Olympics in Beijing, Hurricane Ike, during which production factories in China and the US had to shut down, and, on top of it, the global economic recession. All of those events led to a decrease in the production of the raw material, acrylonitrile, and without acrylonitrile there's logically no acetonitrile.

### Become creative!

It's surprising, how quickly a researcher's life can change, caused by events that you wouldn't necessarily connect with the availability of a certain everyday chemical or product. The only thing you can do, no matter whether you're a scientist or a company executive, is to become creative...

In a situation like this, where availability is low and therefore demand is high, the companies naturally reacted by increasing the prices. At least five times was demanded for the same amount of the now extremely valuable liquid. Researchers start-



## The Big Isotope Crisis

Recently, the medical world was struck by another shortage crisis, which dramatically affects diagnostic options for doctors world-wide. The shortage was caused by the shut down of two of the five nuclear reactors that together produce the world's largest share of the radioisotope, molybdenum-99. As the molybdenum decays, it releases technetium-99m, which is used in nuclear medicine for a wide range of medical tests or treatments including radio-immune therapy of Non-Hodgkin lymphoma or imaging of infections within the body, cancer spread and heart function.

One of the advantages of technetium-99m is that it has a half-life of only six hours but this feature has now turned out to be its downfall because it can't be stored and, therefore, needs to be produced constantly. The ageing reactors, however, are not up to that task anymore. Both the 52-year old facility in Canada and the 47-year old reactor in the Netherlands couldn't go back into operation after irregularities were found during routine maintenance; a small leak in the containment vessel in Canada and gas bubbles in the cooling system with the Dutch reactor.

Fixing these takes longer than expected and now doctors are close to experiencing a disaster: important scans need to be delayed or substituted by less effective, more expensive and more harmful methods, which, in some cases, aren't even covered by the patient's health insurance. To tackle the issue in the EU, a Task Force was set-up with representatives from the European Commission, the Heads of Medicines Agencies (HMA) and the European Medicines Agency (EMA). Short-term and long-term plans, like the future capacity of production and possibilities for alternatives to radiopharmaceuticals, were discussed at a meeting in late 2008 and thus, it seems that for now the crisis has been averted, at least in Europe. In the US it's still another story...

ed to panic but, together, tried to find solutions for the problem, helping each other out in an otherwise so competitive scientific world. In a forum, alternative protocols were exchanged; substitutes were discussed as well as ways in which to recycle ACN from the waste. Some noble heroes even offered their extra stocks, “I have three containers available. Call me on xxx”.

### A fruitful relationship?

But whenever there's a high demand for something rare, dubious companies, as seen in the same forum, try to make some extra cash by offering presumably low quality products or worse. “None of these folks offering the product are on my list of checked-reliable ACN suppliers and I fear that the shortage is attracting vultures of any kind...”, was the sceptical comment from one scientist in the forum.

Necessity, however, is also the mother of invention and so, in contrast to previous examples, industry and research worked together to find a solution.

Almost every major company that sells acetonitrile provides at least a bulletin or, like Agilent Technologies, an online “ACN Solutions Center” with tips and tricks on how to overcome this crisis. Many companies (e.g. Merck Chemicals, Thermo Fisher Scientific, to name but a few) offer new, thinner columns, Merck calls them “ACN saver columns”, as a means of saving existing stocks, or they developed improved instrumentation (Shimadzu).

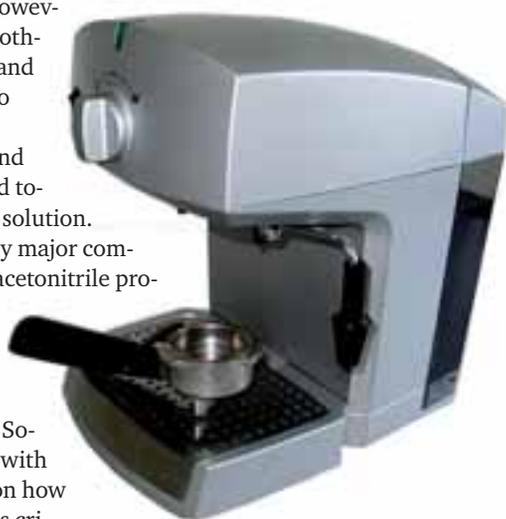
Good news then for all labs because acetonitrile availability doesn't seem to be critically endangered for too much longer; according to the latest brochure by the Carl Roth GmbH, acetonitrile is “available again”. The technical support at Sigma Aldrich also confirmed in an email to *Lab Times* that, “currently, we do have ACN products in stock. [But] it is hard for us to predict about the future availability”.

All in all, it seems that no matter the reason, dependent or independent of corporate decisions, when supplies of your everyday research tools run out and you're not able to order a new batch, it usually means your projects will take much longer for you to finish. Worst case scenario could mean that you won't be able to finish it at all.

### Modern dependencies

This, however, aptly demonstrates just how much a modern researcher's life depends on those larger-than-life companies and what they are willing or sometimes even able to produce or sell. But as in the case of ACN, a shortage also provides the opportunity to improve protocols, methods and, in the best case, brings researchers and companies closer together. And that can't be bad for science, after all...

KATHLEEN GRANSALKE



Semi-automatic espresso machine made of ABS: Acrylonitrile Butadiene Styrene