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Using Barcodes to Streamline Workflows in an LC-MS Laboratory

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This is an Application Brief and does not contain a detailed Experimental section.

Abstract

MassLynx Software offers three potential workflows for handling barcodes. The least automated solution involves logging barcodes through the sample list. Using the OpenLynx Open Access Application Manager and OALogin automates the solution while needing the least amount of input data.

Benefits

- Automated sample login
 - Reduce errors and increase productivity
 - Integration with automated systems, including robotics and LIMS Simplified sample tracking through
 - entire workflow
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Introduction

Barcode labeling of plates and vials is becoming more prevalent in today's analytical laboratories. Barcodes allow

samples to be tracked through the analytical workflow and potentially have data downloaded from, and uploaded to, a LIMS system.

This allows for faster, more accurate data input into analytical systems and into the data system. There is no need to reenter the sample information at various work stations, saving time and eliminating transcription errors.

MassLynx Software offers three potential workflows for handling barcodes. The least automated solution involves logging barcodes through the sample list. Using the OpenLynx Open Access Application Manager and OALogin automates the solution while needing the least amount of input data.

Combining AutoLynx, a module of MassLynx, and SDMS Vision Publisher, an analytical electronic laboratory notebook capability of NuGenesis SDMS, creates the most automated solution, where all sample data is extracted from SDMS Vision Publisher when the barcode is logged.

Results and Discussion

Figure 1 shows the first workflow. This workflow, using the sample list, afforded the least amount of automation. Users had to manually open the Import Worksheet command in MassLynx before the barcode could be scanned. The text file referenced by the barcode needed to contain the most sample information, including at minimum SampleID, method, tray location, and vial location.

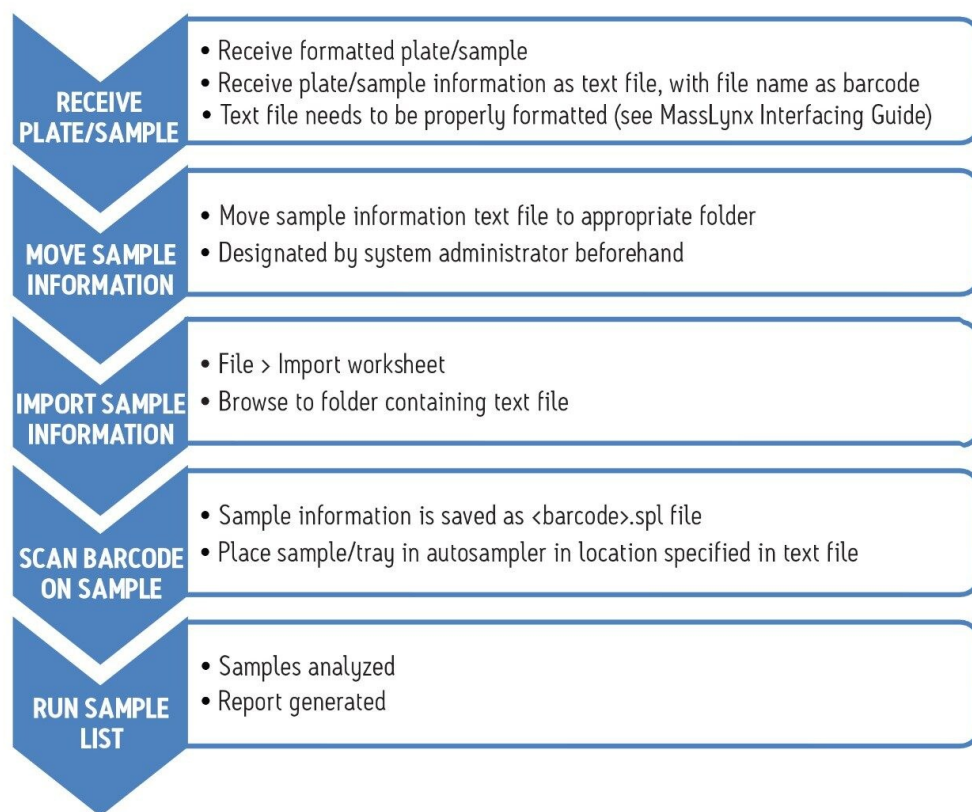


Figure 1. Barcode workflow when using the MassLynx sample list.

Using OALogin (Figure 2) increased the level of automation. In this workflow, users needed to only pick their name from a dropdown list. They could then scan the barcode and put their sample in the tray specified by the software. While a text file related to the barcode was needed, that text file could be empty.

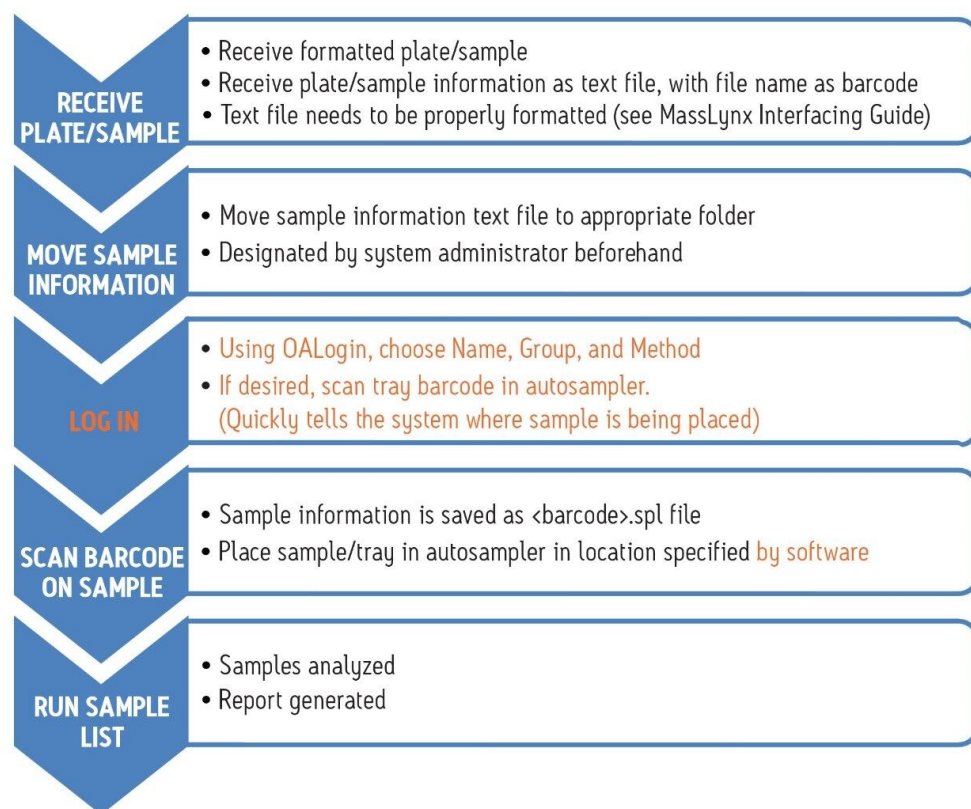
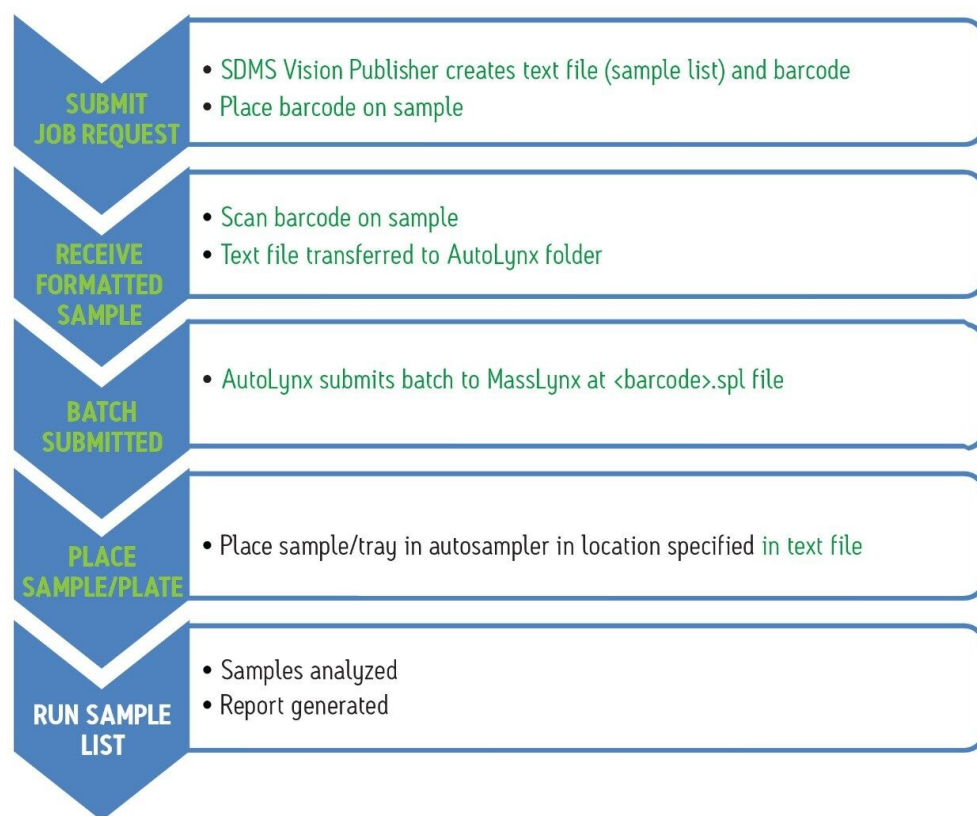


Figure 2. Barcode workflow when using OpenLynx OALogin.

The third workflow (Figure 3) gave the highest level of automation. A job request is submitted through SDMS Vision Publisher. SDMS Vision Publisher then creates a text file containing the necessary sample information and a barcode. The analytical methods could be specified when the job is initially requested, before the tray is created. Once the tray is created, SDMS Vision Publisher would know the vial locations and include those in the text file. When the samples are received, the barcode is attached to them. Scanning the barcode would submit the generated text file to AutoLynx and the plate would be analyzed.



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The three workflows presented reflect the levels of automation possible. The workflows are the same whether you have a plate or a single sample. The main difference between OALogin and the other options (sample list and AutoLynx) is the amount of information in the text file.

With OALogin, you could have nothing in the text file. When using barcode login with OALogin, OALogin needs to upload a text file, however that text file does not need to contain any information. OALogin can autopopulate the required fields if no information is supplied.

With the sample list and AutoLynx, you need at minimum the methods, the tray location and the vial location. The methods may be instrument specific, so you would need to know which instrument you are using beforehand, while the tray location would necessitate knowing the status of the instrument, i.e., which trays are being used.

With OALogin, you can pick both the method and tray location at the time of sample login, although you can have the software assign a tray location. You can also have the method and location contained within the text file, if desired.

The third workflow is the most amenable to integration with a robotics system. A robotics system could scan the plate and place it in the ACQUITY UPLC System autosampler. When the analysis was completed, the plate could be removed by the robotics systems and a new plate submitted. Implementing this workflow within a lab with robotics systems could mean that no human intervention was needed.

Conclusion

Using barcodes increased confidence in the analytical workflow. Samples can be easily tracked as they proceed from one step to another. Because of the reduced need to input specific sample information, there are fewer errors when entering information. All sample information is contained in files imported by scanning the barcode.

The automated sample workflow increases throughput, both by decreasing login times and by reducing reruns due to transcription errors. Integrating with existing robotics systems also increases throughput, by reducing the need for human intervention.

Finally, by incorporating the system into the SDMS Vision Publisher workflow, sample information can quickly flow into the analytical system and results can quickly flow out.

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NuGenesis SDMS <<https://www.waters.com/513068>>

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