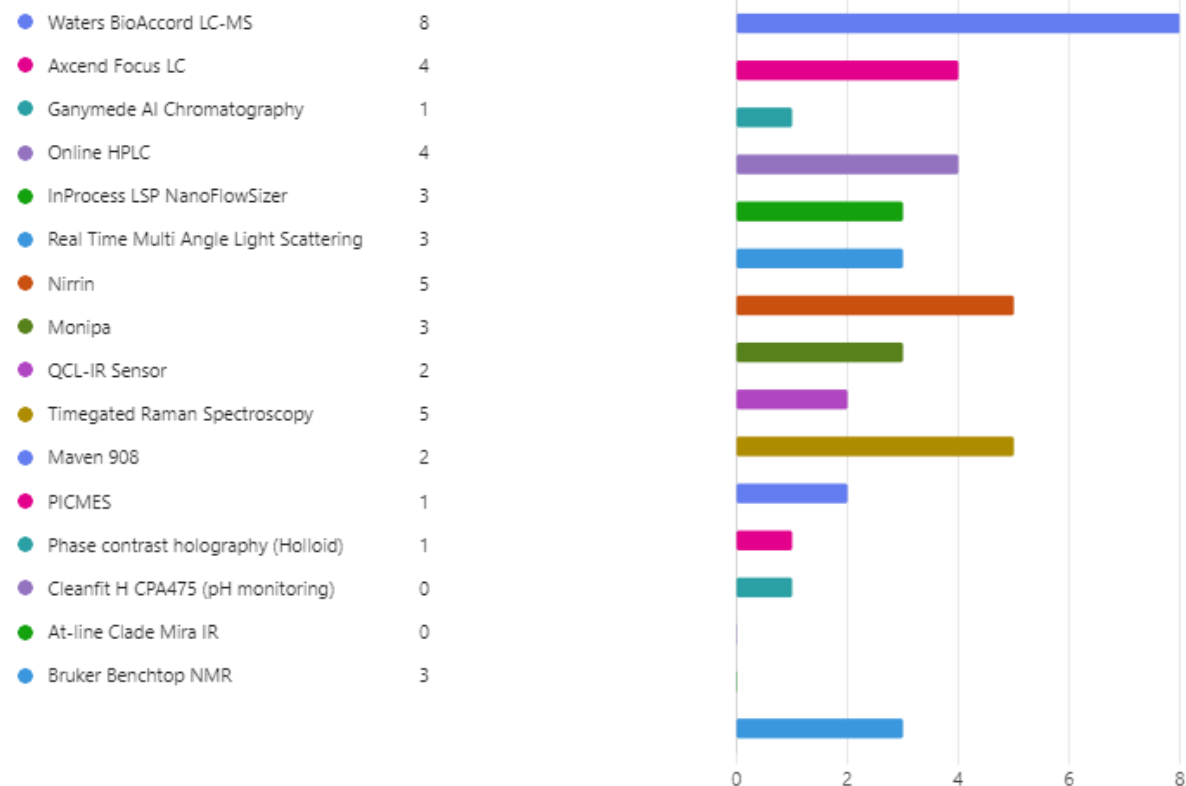
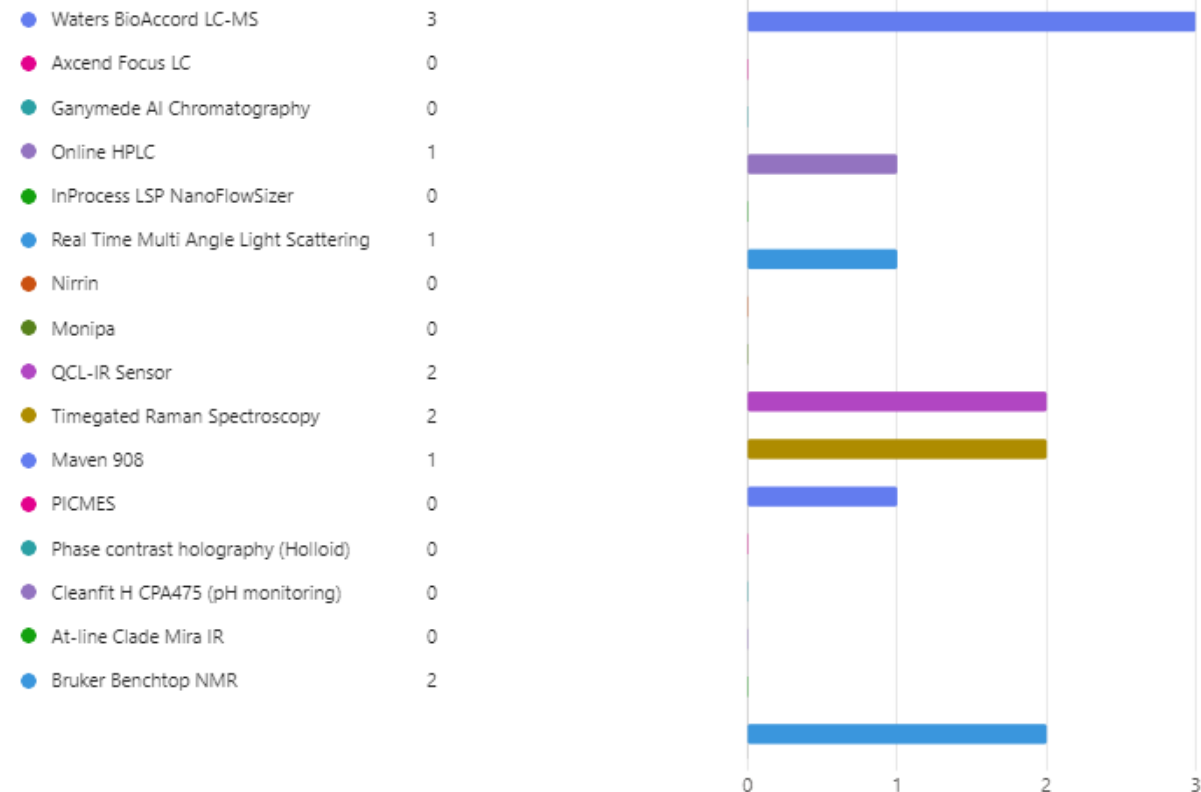


1. Out of the new technologies discussed, is your company currently using and/or evaluating any of these technologies?



2. Which of the new technologies discussed do you perceive has the highest potential in your domain/application/company?

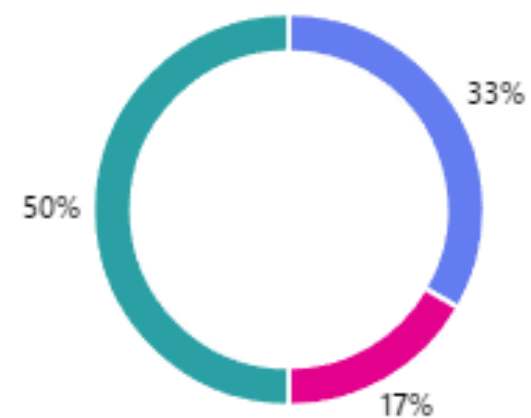


Q3: What sort of technologies would you like to see vendors create/modify further for GMP deployment?

- UV probes
- Ensure instruments are 21 CFR Part 11 compliant, cleanable/sterilizable, and easy for operators to interface with. The ability to access raw data from the instruments through standard means (e.g., OPC) **without the need for instrument-specific proprietary data transfer tools is key for integration into site automation / data capture systems.**
- I'd like to see suppliers broaden connectivity of their systems to PMS software's typically one of the main hurdles to do the GMP step is software compliance.
- NMR
- All of them
- DLS, MALS, Raman, IR
- Not interested in GMP deployment for our work
- Raman
- Cross-unit operation tracking, modeling, and control management
- Additional technologies for us in CGT space including particle detection/characterization etc
- Fast N-glycan measurements
- Vendors to provide more guidance on addressing Raman model transfer between scales

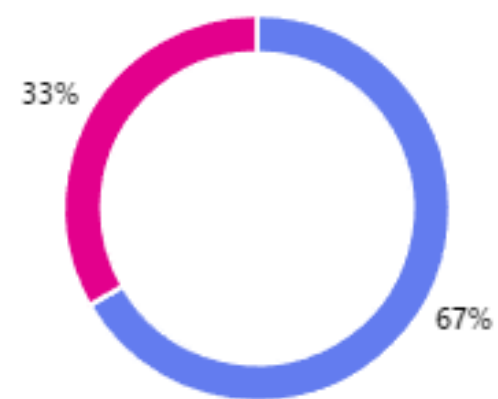
4. Is your company likely to adopt an on-line HPLC/LC-MS system for running analytics?

● Yes	4
● No	2
● Unsure	6

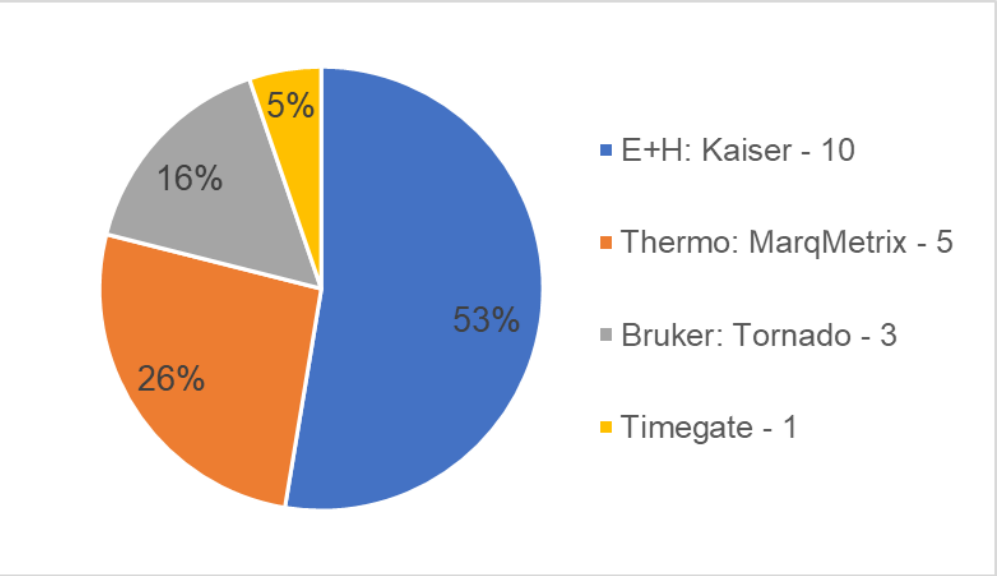


5. Is your company utilizing auto-sampling devices to automate analytical testing?

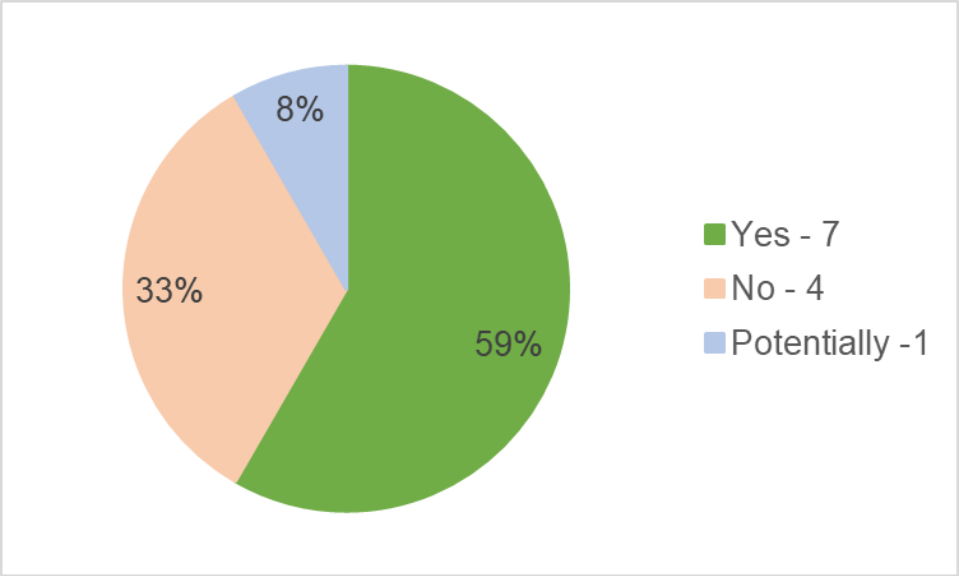
● Yes	8
● No	4



Q6: If you are using Raman spectroscopy for biologics, which analyzer/vendor is your company currently using?

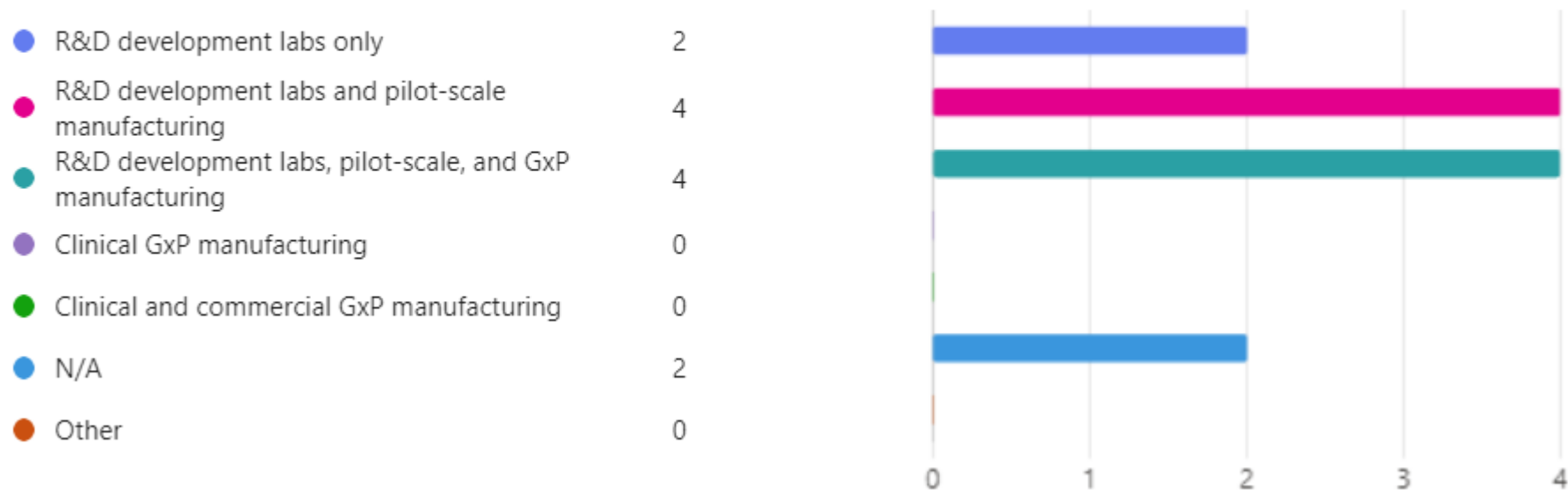


Q7: If you are currently using Raman spectroscopy, are there plans to invest and/or evaluate other Raman based technologies?



- Notes:**
- Potentially: E+H already deployed extensively across labs and plans so a new instrument/vendor would need to provide substantial benefits to justify investment
 - Always looking to broaden applicability
 - Yes: we have invested in Kaiser instruments at multiple facilities so the new technology would need to demonstrate substantial benefits

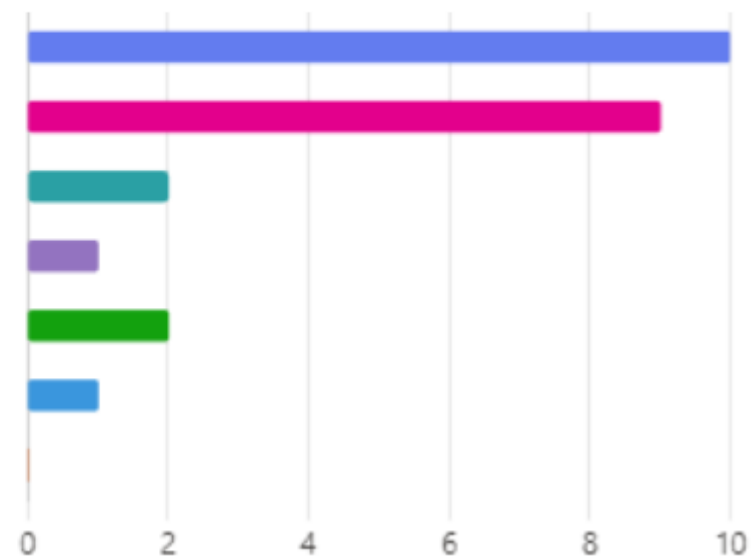
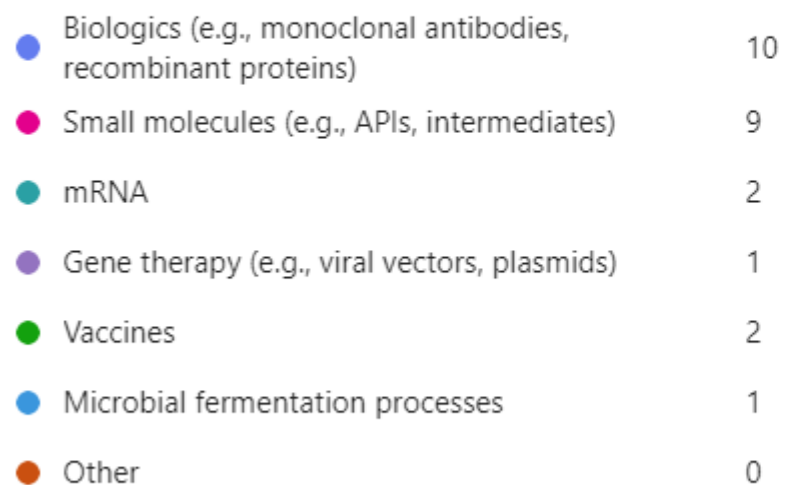
8. If your organization is using Raman spectroscopy, where is it currently being used



Notes: For the two responses for using Raman in development labs only

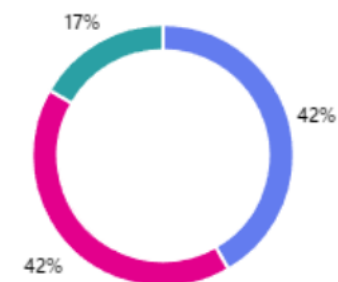
- One response has plans to transfer Raman method to GxP manufacturing in 3-5 years
- One response is uncertain on future plans to transfer to GxP

10. What modalities does your company use Raman spectroscopy for? (Select all that apply)



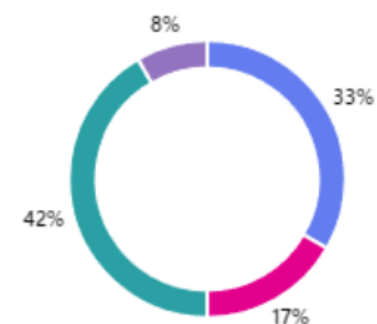
11. What are the primary applications of Raman spectroscopy in your organization? (select all that apply)

- | | |
|---|---|
| ● Process monitoring only | 5 |
| ● Process monitoring and control | 5 |
| ● Process monitoring and supervision (MSPC) | 2 |



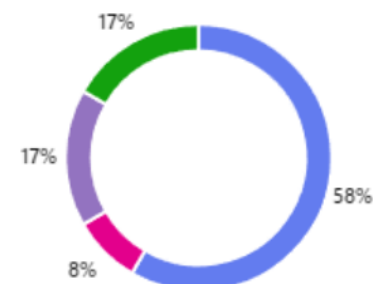
12. Is your company using Raman spectroscopy process control? If yes, what is being controlled?

- | | |
|--|---|
| ● Glucose at a set point | 4 |
| ● Glucose and amino acid feed (dual control) | 2 |
| ● Not currently using Raman for control | 5 |
| ● Other | 1 |

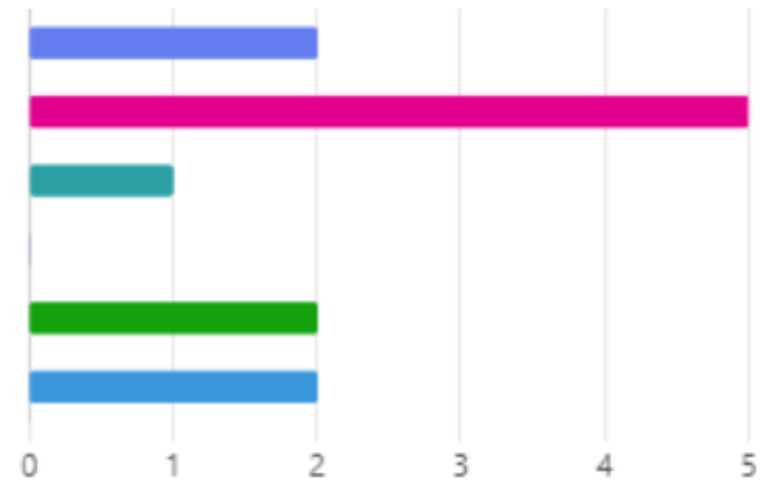
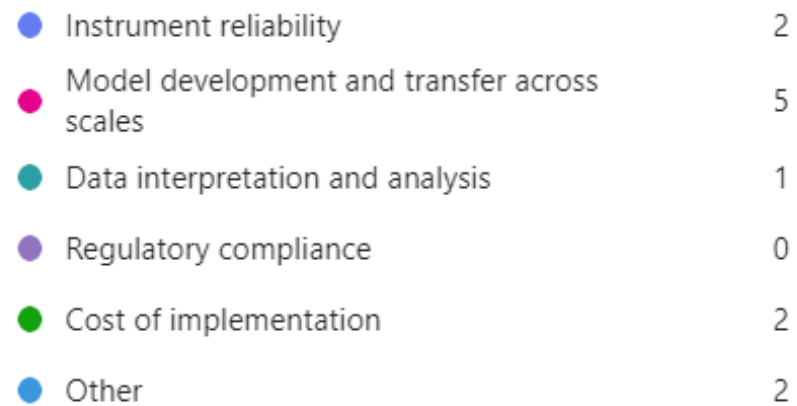


13. In which processes is Raman spectroscopy being used in your organization?

- | | |
|---|---|
| ● Upstream fed-batch processes | 7 |
| ● Upstream perfusion processes | 1 |
| ● Downstream protein purification processes | 0 |
| ● Continuous manufacturing | 2 |
| ● Other (please specify) | 2 |

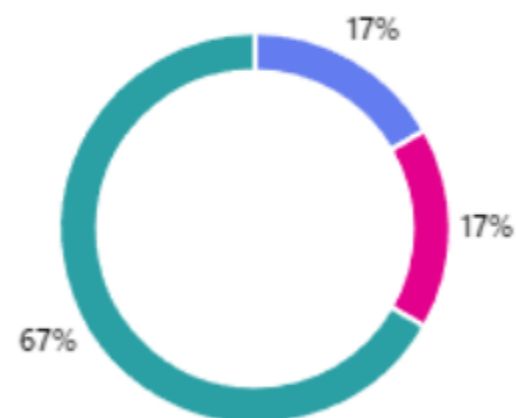


14. What challenges has your company faced with integrating Raman spectroscopy into manufacturing processes?



15. Has using Raman spectroscopy led to faster resolution of process deviations or variability?

● Yes	2
● No	2
● Unsure	8



16. What benefits has your company observed from using Raman spectroscopy? (Rank from most to least impactful)

- 1 Improved process efficiency
- 2 Enhanced product quality
- 3 Faster decision making
- 4 Reduced costs
- 5 Other

