

FORMULATION, FILL FOR A VACCINE WITH ALUM ADJUVANT

GOAL: Develop a cGMP formulation and fill process for a vaccine combined with an alum adjuvant from a small-scale research process

CHALLENGE: To engineer a scaled-up process suitable for GMP manufacturing and fill, ensuring homogeneity of the suspension during the filling process. A key formulation challenge was that the two solutions to be mixed had similar densities (vaccine and alum adjuvant), and the solutions had to be mixed and separated several times during the process.

OUTCOME: FB scientists successfully developed a complex multi-day formulation process with a novel flotation device for washing steps and stirring methodology for filling suspension. Process was successfully conducted both in an engineering run and at 2,500 vial scale which were shipped to the clinical trial on time.

PROCESS DEVELOPMENT STEPS:

- Sourced all raw materials
- Developed wash and mixing protocol, while keeping product recovery rate high
- Experimented to determine optimal way to separate the vaccine (or wash) from the alum solution at GMP scale after mixing, holding and wash steps
- Solution was to engineer a custom cap for the vessel that had 3 tubes, a sterile filter and a flotation device to allow removal of the top layer of liquid only
- Determined optimal configuration and stir bar for use during filling of the suspension

cGMP ACTIVITIES:

- Engineering run of the 4 day formulation process and 1 day fill (20% scale)
- Final drug product manufacturing and fill of 2,500 vials
- Conducted all in-process tests and sampled for release testing
- Labeled and packaged vials
- Quality Control release testing completed; Quality Assurance reviewed all documents
- Product released and shipped for trial
- Designed and executed stability program concurrent with trial

