# The Corning® 5L Erlenmeyer Flask Provides an Ideal Choice for Efficient Scale-up of Suspension Cells

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**SnAPPShots**

*A brief technical report from the Corning Applications Group*

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## Introduction

As the bioprocess industry grows, there is a corresponding growth in demand for single-use containers that can efficiently culture large quantities of cells. To aid in this effort, Corning has developed a 5L Erlenmeyer flask with the same footprint as a traditional 3L Erlenmeyer flask. The 5L shape has been optimized for increased gas exchange compared to the more traditional Erlenmeyer flask designs. Due to gas exchange limitations, most traditionally shaped Erlenmeyer flasks can only accommodate approximately one third of the stated volume of the vessel. Corning's new vessel design allows for the culture volume to be increased to greater than one half of the stated volume of the vessel without compromising cell viability or density. The increased volume ratio results in a greater number of cells (higher cell yield) cultured in less space. In this study, we demonstrate that the Corning 5L Erlenmeyer flask exhibits enhanced performance compared to a competitor's 5L Erlenmeyer flask when culturing a suspension cell line commonly used for baculovirus production.

## Materials and Methods

Sf9 cells (Life Technologies Cat. No. 12659-017) were thawed and cultured in Sf900™ II SFM (Life Technologies Cat. No. 10902104) at a density of 1 x $10^6$ to 8 x $10^6$ cells/mL in a Gallenkamp floor model orbital shaker at 27°C. After cell expansion, Sf9 cells were seeded into either a Corning (Cat. No. 431684) or competitor 5L Erlenmeyer flask at a density of 1 x $10^6$ cells/mL. Cells in 2.5L of medium were rotated at 90 rpm while cells in 3.5L of medium were rotated at 100 rpm. Cells were counted daily on the Nova BioProfile® Flex analyzer for 4 days. These studies were repeated one additional time for a total of 4 vessels per condition for 2.5L studies and 2 vessels per condition for 3.5L studies.

## Results

Throughout the 4 day studies, the viability of Sf9 cultures were maintained above 98%, irrespective of the vessel or rpm that was utilized (Figures 1 and 2). After 4 days of growth at 2.5L of medium, the competitor vessel exhibited statistically lower cell

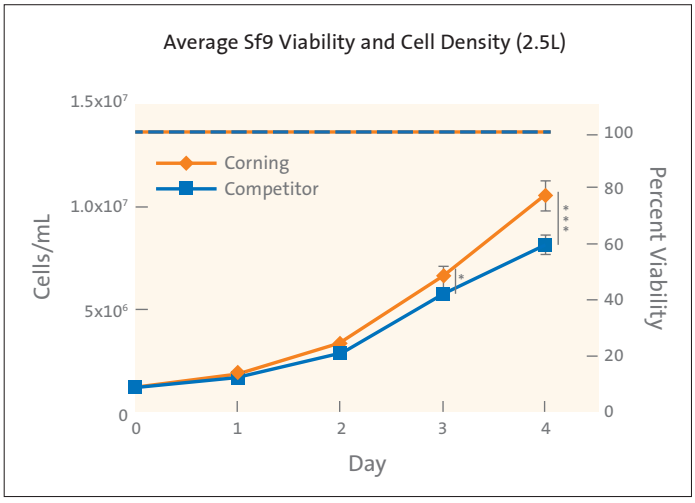


**Figure 1.** Sf9 viability was maintained above 98% regardless of which vessel was used (right axis). After 3 days of growth in 2.5L, the competitor vessel exhibited lower cell densities compared to the Corning 5L Erlenmeyer flask (left axis). Two way ANOVA * = p<0.05, ***p<0.001, n = 4.

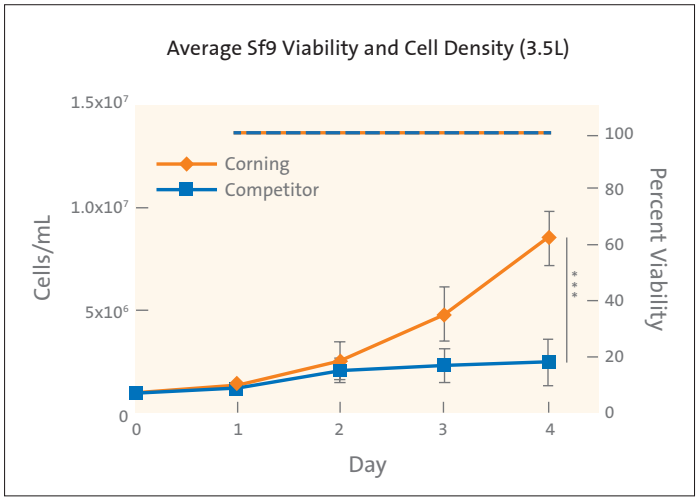


**Figure 2.** Sf9 viability was maintained above 98% regardless of which vessel was used (right axis). After 4 days of growth in 3.5L, the competitor vessel exhibited statistically lower cell densities compared to the Corning 5L Erlenmeyer flask (left axis). Two way ANOVA ***p<0.001, n = 2.

densities compared to the Corning® 5L Erlenmeyer flask (Figure 1). When the volume was increased to 3.5L of medium, the Corning vessel performed similarly to that at 2.5L of volume and statistically out-performed the competitor 5L flask at 3.5L of culture medium (Figure 2).

## Conclusions

- The Corning 5L Erlenmeyer flask can be used to generate greater cell yields when compared to a traditional 3L Erlenmeyer flask utilizing the same footprint.
- Sf9 cell viability was equivalent when cells were cultured in the Corning or competitor 5L Erlenmeyer flasks.
- After 3 days of growth, Corning 5L Erlenmeyer flasks exhibited statistically higher cell yields compared to the competitor equivalent when 2.5L of medium was used.
- Similar cell densities were obtained in the Corning 5L Erlenmeyer flasks when cells were cultured in 2.5L or 3.5L of culture medium.
- Corning 5L Erlenmeyer flasks exhibited statistically higher cell yields compared to the competitor equivalent when 3.5L of medium was used.

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