

# Baffled Erlenmeyer Flasks Increase Medium Aeration for Better Cell Culture Performance



## SnAPPShots

A brief report  
from the Corning  
Applications Group

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## Introduction

Proper aeration and the ability to maintain consistent agitation are essential for the growth of suspension cell cultures. Equally important is to meet these needs in a gentle and reproducible way. Erlenmeyer flasks with baffles have been thought of as inconsistent and overly aggressive on suspension cultures, until now (1,2). Here, we demonstrate that new baffled Erlenmeyer flasks from Corning generate significantly higher aeration than plain Erlenmeyer flasks which can have important implications in cell health, cell production and yield.

## Methods and Results

Sf9 insect cells (Gibco Cat. No. 11496-015) were cultured in SF 900 II SFM (Gibco Cat. No. 10902) in a non humidified 28°C CO<sub>2</sub> independent orbital shaking incubator, rotating at 150 rpm. Three 500 mL Erlenmeyer flasks (Corning Cat. No. 431401) per condition were seeded at  $8 \times 10^5$  cells/mL and monitored for 4 days. One mL sample was taken for daily cell counts. For metabolic sampling, 0.8 mL samples were examined using a NOVA Bioprofile® analyzer for nutrients, metabolites and gases. For cell cycle analysis, at least  $1 \times 10^6$  cells were fixed and stained using Cell Cycle Reagent (Guava). Samples were stored at 4°C until analysis was performed with the Guava EasyCyte Mini to evaluate cell cycle distribution between culture conditions. Each study was repeated three times.

As can be seen in Figure 1, baffled Erlenmeyer flasks generated significantly greater air saturation than plain Erlenmeyer flasks. On average, the baffled Erlenmeyer flask showed a 48% greater aeration content than the plain Erlenmeyer flask, which was statistically significant (two tailed t test,  $p < 0.05$ ).

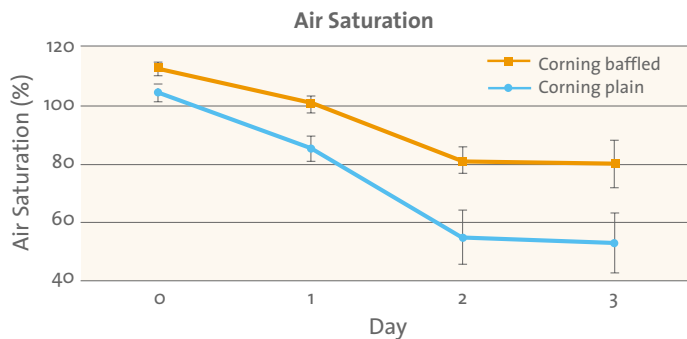


Unique baffled design with a molded-in "1/3 Fill" line for customer convenience on all 125 mL, 250 mL, 500 mL, and 1L baffled Erlenmeyer flasks.

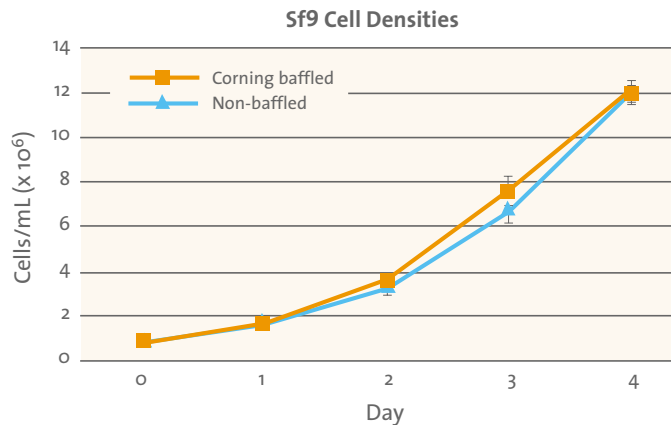
Figure 2 shows daily cell counts from both baffled and plain Erlenmeyer flasks. Although no significant difference in cell yield between erlenmeyers was found, it has been shown that protein expression with some cells can be amplified by increasing the cultures' oxygen supply (3,4).

The cell cycle profile of Sf9 cells cultured in plain and Corning® baffled Erlenmeyer flasks was assessed with the Guava EasyCyte Mini. Such analysis showed no significant difference in the cell cycle distribution of cultures grown in baffled versus plain Erlenmeyer flasks, Figure 3 (paired two tailed t test,  $p > 0.05$ ).

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**Figure 1.** Daily air saturation readings from Sf9 cultures in baffled and plain Erlenmeyer flasks. Data are the average of 3 independent studies. ( $\pm$ S.E., indicated by error bars,  $p < 0.05$ ).



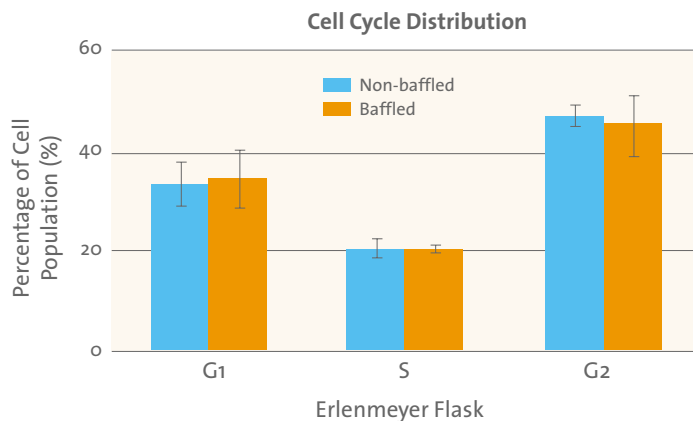
**Figure 2.** Daily cell counts from Sf9 cultures in baffled and plain Erlenmeyer flasks. Data are the average of 3 independent studies. ( $\pm$ S.E., indicated by error bars.)

## Conclusions

- ▶ Corning® baffled Erlenmeyer flasks increase O<sub>2</sub> content of cell culture media by 48% over plain Erlenmeyer flasks, using Sf9 cells.
- ▶ Corning baffled Erlenmeyer flasks attain equal Sf9 cell densities as standard Erlenmeyer flasks.
- ▶ There is no difference in the cell cycle distribution between Sf9 cells collected from baffled or plain Erlenmeyer flasks.

## References

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**Figure 3.** Cell cycle analysis results from 3 independent studies.

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