

Study of media evaporation in Nunc Cell Factory systems

Abstract

The stability of physicochemical properties of media is important for cell culture, especially while using the Thermo Scientific™ Nunc™ EasyFill™ Cell Factory™ systems. The cell culture usually needs 3–5 days or even more in a static culture cycle. This study verifies the amount of evaporated medium in Nunc Cell Factory systems.

Introduction

Nunc Cell Factory systems have been used for anchorage-dependent cell culture in the fields of vaccines, cell therapy, and gene therapy. Osmolality and pH are important physicochemical parameters, that can be affected by evaporation. To assess the evaporation of media, a series of experiments was conducted to calculate the weight lost in a Nunc Cell Factory system with venting caps and another system with sealing caps.

Materials and methods

The 10-layer Nunc™ EasyFill™-2 Cell Factory system (Cat. No. 169173) with venting and sealing caps was used for this study.

The Nunc EasyFill-2 Cell Factory system has two narrow channels located at the corner of each layer; moreover, there are external filters or caps that are placed during culture. The Nunc EasyFill-2 Cell Factory system was filled with 1.5 L of phenol red solution and plugged with either venting caps or sealing caps. An even amount of liquid was distributed on each layer in the Nunc Cell Factory system.

We evaluated the possible weight loss from evaporation by calculating the weight of each Nunc Cell Factory system before and after 4 days of incubation in a CO₂ incubator at 37°C, with 5% CO₂ and 0% humidity.



Results and discussion

After 4 days of incubation, the weight of sealed Nunc Cell Factory system did not show significant loss. There was a weight loss of 2.5 g in the sealed system, which also could be caused by experimental error. In comparison, the weight loss of the vented system was 5.6 g, which may have been caused by evaporation (Table 1). This study indicated that the evaporation of medium in the Nunc Cell Factory system with venting caps and sealing caps resulted in 0.37% and 0.16% weight loss, respectively.

Table 1. Media evaporation analysis.

Type of Nunc Cell Factory system	Weight loss analysis			
	Pre-incubation weight	Post-incubation weight	Weight change	Relative weight loss
With vented caps	3,701.7 g	3,696.1 g	-5.6 g	0.37%
With sealed caps	3,727.2 g	3,724.7 g	-2.5 g	0.16%

Conclusion

Based on this study, the low level of media evaporation in the Nunc Cell Factory systems is accepted during routine cell culture.

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