

EXPANSION OF SERUM-FREE MEDIUM ADAPTED VERO CELLS USING  
ULTRAVIOLET/OZONE (UVO) TREATED POLYSTYRENE MICROCARRIERS

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## ABSTRAK

Kulture sel merujuk satu proses mengeluarkan sel daripada haiwan dan tumbuh di dalam persekitaran tiruan yang dikawal. Bidang kulture sel semakin penting terutamanya untuk perniagaan. Banyak sel telah digunakan untuk membuat produk biologi dan untuk pelbagai kajian penyelidikan. Sel Vero adalah antara salah satu sel yang diambil daripada buah pinggang Afrika hijau monyet. Banyak vaksin yang boleh didapati di pasaran hari ini adalah diperbuat daripada substrak sel Vero. Selain itu, sel Vero juga digunakan untuk kajian virologi, kajian kanser, dan kajian toksokologi. Mengikut tradisi, sel Vero dikulture dengan menggunakan media dengan serum. Penggunaan serum akan membawa banyak keburukan kerana ia akan meningkatkan risiko pencemaran, kelompok serum berlainan dengan kelompok yang lain, harga kultur meningkat, penulenan produk culture sel dihalang. Objektif eksperimen ini adalah untuk mengatasi masalah dengan membesarkan sel Vero di media tanpa serum. Pembesaran sel dilakukan secara berurutan daripada 100% media dengan serum ke 100% media tanpa serum. Setiap kali, peratusan media dengan serum berkurang sebanyak 25% dan media tanpa serum meningkat sebanyak 25%. Objektif eksperimen kedua ialah memperbanyakkan kulture sel Vero daripada T-kelalang ke bekas berputar. Sel Vero yang daripada 100% media tanpa serum akan membesar di bekas berputar dengan ultraungu/ozon menyalut polistirena microcarriers. Keputusan daripada eksperimen ini ialah sel Vero berjaya membesar di 100% media tanpa serum dengan lebih tinggi konsentrasi sel dalam jangka masa lebih pendek. Sel Vero juga berjaya membesar di bekas berputar dengan ultraungu/ozon menyalut polistirena microcarriers yang berharga rendah yang disediakan di makmal.

## ABSTRACT

Cell culture refers to a process by which cells are removed from an animal and grown in an artificial environment. The field of cell culture is becoming increasingly important over the years especially from the point of commercial values. Many cell lines have been used for the production of many biological products as well as for a variety of research studies. Among these cell lines are Vero cell which is derived from the kidney of African green monkey. A lot of vaccines available in market today are prepared using Vero cells as substrate. In addition, Vero also has been widely used in many virology, cancer and also toxicological studies. Traditionally, Vero cells are cultured using medium that are supplemented with serum. The use of serum however has many drawbacks as it may increase the risk of contamination, has high batch to batch variability, increase the cost of culturing, interferes with the purification of cell culture products etc. In this experiment, experiments were carried out with the aim to overcome these problems by adapting Vero cells into serum-free medium. Adaptation were carried out sequentially from 100% serum supplemented medium (SSM) to 100% serum-free medium (SFM). In each adaptation, the percentage of SSM in culture medium was reduced by 25% while SFM percentage was increased by 25%. Another objective of this experiment was to upscale the culture of Vero cells from T-flask to spinner vessel. Vero cells that have been adapted to 100% SFM were grown in spinner vessel using ultraviolet/ozone (UVO) treated polystyrene (PS) microcarriers. Results from experiments revealed that, Vero cells were successfully adapted to 100% SFM with higher peak cell concentration and shorter doubling time when compared to culture of Vero cells in 100% SSM. Further, Vero cells also have been successfully cultured in spinner vessel by using low cost UVO treated PS microcarriers that have been self-prepared in the laboratory.