

## Centrifugal Separations in Biotechnology

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### Abstract

Protein recovery is very important yet most difficult in the recombinant DNA process for making intermediate drug substance (e.g. antibiotics) as the amount of protein is dilute and separation by sedimentation is slow due to the small density difference between phases. Centrifugal separation is used to separate liquid containing dissolved protein from the host cells such as mammalian cells and yeast. It can also be used to separate by centrifugal classification inclusion bodies containing protein from smaller cell fragments after lysing bacteria such as *E. coli*. Repeated washing and separation are required to achieve the product purity. Centrifugation is also used extensively in the insulin production. Disk stack and tubular centrifuges are commonly employed. On a smaller scale, DNA separation and purification can be done using a test tube centrifuge equipped with an ultrafiltration membrane module realizing both sedimentation and filtration under centrifugal force. In this work, various biotech applications requiring centrifugation are discussed. Numerical simulation and testing are both used complementarily both in small and production scales.

### Biography

Wallace Leung has worked in solid liquid separation since 1977. He is well known in centrifugal separation and membrane processes. He was director of technology for Bird/Baker for 18 years during which he has developed many new centrifuge technologies that are used worldwide. He holds 36 US patents. His recent research interest is in air filtration using nanofiber filter. He is presently President of Advantech Engineering, Atlanta, GA, USA, and holds also joint appointments as director and chair professor at the Hong Kong Polytechnic University. He was 2000 chairman of AFS and 2000-2004 INDEFI chair.