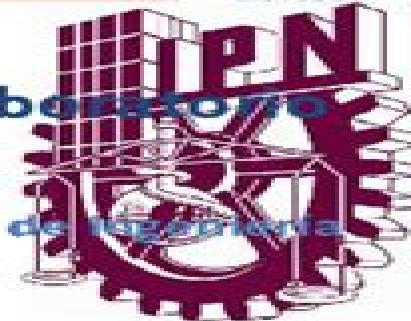


Instituto Politécnico Nacional

Manual de Prácticas de Laboratorio de Bioseparaciones

**Unidad Profesional Interdisciplinaria de Ingeniería
Campus Guanajuato**



2011

Manual De Laboratorio De Bioseparaciones

Emma Reynoso Rodríguez

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Procesos de separación de biotecnología industrial Francisco Javier Recasens Baxarías, 2018-02-15 La biotecnología moderna se basa en la ingeniería genética pero sin los procesos posteriores de separación y purificación a escala de producción ninguno bioproducto puede llegar a ser una realidad comercial. Este libro es el resultado de la experiencia del autor en la docencia y el desarrollo experimental de procesos en la industria y la universidad. Se estudian en este libro los procesos de filtración, disrupción celular, centrifugación, precipitación, floculación, extracción, adsorción, desorción, cromatografía, cristalización y secado aplicados a las industrias biotecnológicas, haciendo énfasis en los fundamentos y en el cambio de escala. Tabla de materias: Tabla de contenido. Español. Castellano. Prefacio. 1 Procesos de bioseparación. 1.1 Qué separamos en la bioseparación. 1.2 A qué es debido el elevado coste de bioseparación. 1.3 Características de los procesos de separación. 1.4 Diagrama de bloques de un ejemplo de recuperación de los antibióticos. 1.5 Conclusiones. 2 Filtración. 2.1 Factores que intervienen en la filtración. 2.2 Medios filtrantes y filtros industriales. 2.3 Teoría de la filtración. 2.4 Filtración a presión constante. 2.5 Torta incompresible. 2.6 Torta incompresible y compresible. 2.7 Datos de compresibilidad. 2.8 Mejora de la velocidad de filtración. 2.9 Selección de un filtro continuo a presión constante. 2.10 Cálculo del caudal medio. 2.11 Cálculo del lavado. 2.12 Volumen de lavado. 2.13 Tiempo de lavado. 2.14 Cálculo de un filtro industrial a partir de datos de laboratorio. 2.15 Consideraciones finales y recomendaciones. 2.16 Notación. 3 Centrifugación. 3.1 Velocidad terminal en un fluido por acción de la gravedad. 3.2 Movimiento de una partícula en un campo centrífugo. 3.3 Tiempo de sedimentación en una centrifugación. 3.4 Centrofuga de cesta tubular: el valor Sigma. 3.5 Centrofuga de discos: valor Sigma. 3.6 Utilidad de la teoría Sigma. 3.7 Concepto de rendimiento de una centrifugación. 3.8 Cambio de escala. 3.9 Pruebas en una máquina piloto. 3.10 Centrofuga filtrante. 3.11 Ultracentrifugación en biología molecular y biotecnología. 3.12 Coeficiente de sedimentación. 3.13 Determinación del peso molecular con la ultracentrifugación analítica. 3.14 Sedimentación en un gradiente de densidad. 3.15 Consideraciones finales. 3.16 Nomenclatura. 4 Disrupción celular. 4.1 La membrana celular. 4.1.1 Resistencia mecánica de la membrana. 4.1.2 Smosis y choque osmótico. 4.2 Rotura celular con reactivos químicos. 4.2.1 Detergentes. 4.2.2 Solventes. 4.2.3 Enzimas y antibióticos. 4.3 Disrupción mecánica. 4.3.1 Homogeneización. 4.3.2 Termodinámica. 4.3.3 Molinos de bolas. 4.4 Consideraciones finales. 5 Floculación. 5.1 Fundamentos de la floculación. 5.2 La estabilidad de los coloides liofílicos. 5.2.1 La doble capa eléctrica. 5.2.2 La concentración de coagulación. 5.3 Regla de Schulze-Hardy. 5.4 La coagulación de coloides industriales. 5.5 Los floculantes sintéticos industriales. 5.6 Los floculantes en biotecnología. 5.7 Consideraciones finales. 5.8 Diseño del floculador de planta. 5.9 Notación. 5.10 Precipitación. 5.11 La solubilidad de las proteínas. 5.11.1 Estructura y tamaño. 5.11.2 Carga eléctrica de la proteína en disolución. 5.11.3 Efecto de los solventes no solvientes en el medio. 5.11.4 Precipitación por efecto salino. 5.11.5 Molaridad sobre el efecto de las sales. 5.11.6 Ecuación de Cohn. 5.12 Precipitación por calor. 5.13 Cinética de precipitación de proteínas en un tanque agitado. 5.14 Mezcla rápida. 5.15 Nucleación. 5.16 Floculación browniana. 5.17 Crecimiento pericítico. 5.18 Floculación por esfuerzos de corte del agitador. 5.19 Agregación.

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