



BB1120 Odlingsteknologi 6,0 hp

Cultivation Technology

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Fastställande

Kursplan för BB1120 gäller från och med VT12

Betygsskala

A, B, C, D, E, FX, F

Utbildningsnivå

Grundnivå

Huvudområden

Bioteknik, Teknik

Särskild behörighet

Completed upper secondary education including documented proficiency in English corresponding to English A. For students who received or will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows: documented proficiency in mathematics corresponding to Mathematics A. Specific requirements in mathematics, physics and chemistry are corresponding to Mathematics E, Physics B and Chemistry A.

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

After completion of the course the student should:

Knowledge and understanding

- know and describe the principle historical development of bioproducts and bioprocesses and the characteristics of common production organisms
- describe the content of different types of common media
- be able to describe the flux leading to overflow metabolism in *E. coli*, *S. cerevisiae* and animal cells
- understand why and how growth occurs and substrate is consumed in cultivation
- know and describe the common kinetic models for consumption of substrate, maintenance requirements and formation of different products categories
- know and describe common types of bioreactors including the auxiliary equipment. Be able to describe the mixing patterns and the parameters that effects the mixing in those reactors.
- understand how oxygen and carbon dioxide is transported between gas and liquid in bioreactors and the parameters that effect its efficiency
- know, describe and operate the common cultivation techniques used in bioprocessing

Skills and abilities

- be able to calculate the composition of a minimal medium on basis of the components commonly used
- be able to outline and describe simple structured models of the cellular metabolism
- be able to calculate total, volumetric and specific activities and yields in bioprocesses, know the meaning of these concepts and use them to describe the process performance
- be able to derive mass balances for cell, byproduct and product accumulation, substrate and oxygen consumption for different cultivation techniques
- be able to set up Matlab simulations on basis of mass balances and relevant kinetic models
- be able to draw the principal progress of process variables for the cultivation concepts
- be able to plan, operate and evaluate the performance of bioprocesses
- be able to perform oxygen transfer capacity measurements and be able to outline mixing time measurements in bioreactors

Ability to judge and to adopt a standpoint

- be able to speculate on how different environmental conditions affect growth and byproduct formation
- be able to evaluate the reason to why growth ceases in batch cultivation
- be able to discriminate on the use of a specific cultivation concept depending on its benefits and drawbacks in relation to the product and process requirements
- be able to reflect on the effect on process economy with respect to choice of medium, bioreactor and cultivation technique for a specific process and product

- be able to declare how variations in feed, stirring, airflow and cultivation volume affects the cultivation performance

Kursinnehåll

Kurslitteratur

Larsson G, Compendium in Cultivation technology.

Examination

- LAB1 - Laborationer, 1,0 hp, betygsskala: P, F
- TEN1 - Tentamen, 4,0 hp, betygsskala: A, B, C, D, E, FX, F
- ÖVN1 - Simuleringsövning, 1,0 hp, betygsskala: P, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

Övriga krav för slutbetyg

- Approved simulation exercise
- Participation in 3 workshops
- Participation in study visit
- Approved lab exercise
- Approved examination

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.