Upstream Bioprocessing

Lesson 0: Course Outline

Introduction

Hello and welcome to this course on Upstream Bioprocessing.

A bioprocess is a specific process that uses complete living organism such as cells or their components (e.g., bacteria, enzymes, chloroplasts) to obtain desired products.

Bioprocesses have been around for thousands of years with for example wine, beer and cheese making being developed in the Mediterranean and Middle East.

In the production of alcohol, the living yeast cells combine with cereal grains as nutrients to form a system in which the organisms consume the nutrients for growth and produce alcohol and CO2 as products. This method of production is called fermentation.

Fermentation can also be seen when bacterial microorganisms are added to milk to produce yogurt.

In addition to nature's microorganisms, modern bioprocesses also use other agents, e.g. enzymes and cells from plants, insects, and animals, to produce various products, including organic acids, antibiotics, and therapeutic compounds.

Today' s bioprocesses follow the same principle: combining living matter (whole organisms or enzymes) with nutrients under the conditions necessary to make the desired end product.

One of the fields of Bioprocessing is the research, development and manufacture of biopharmaceutical products.

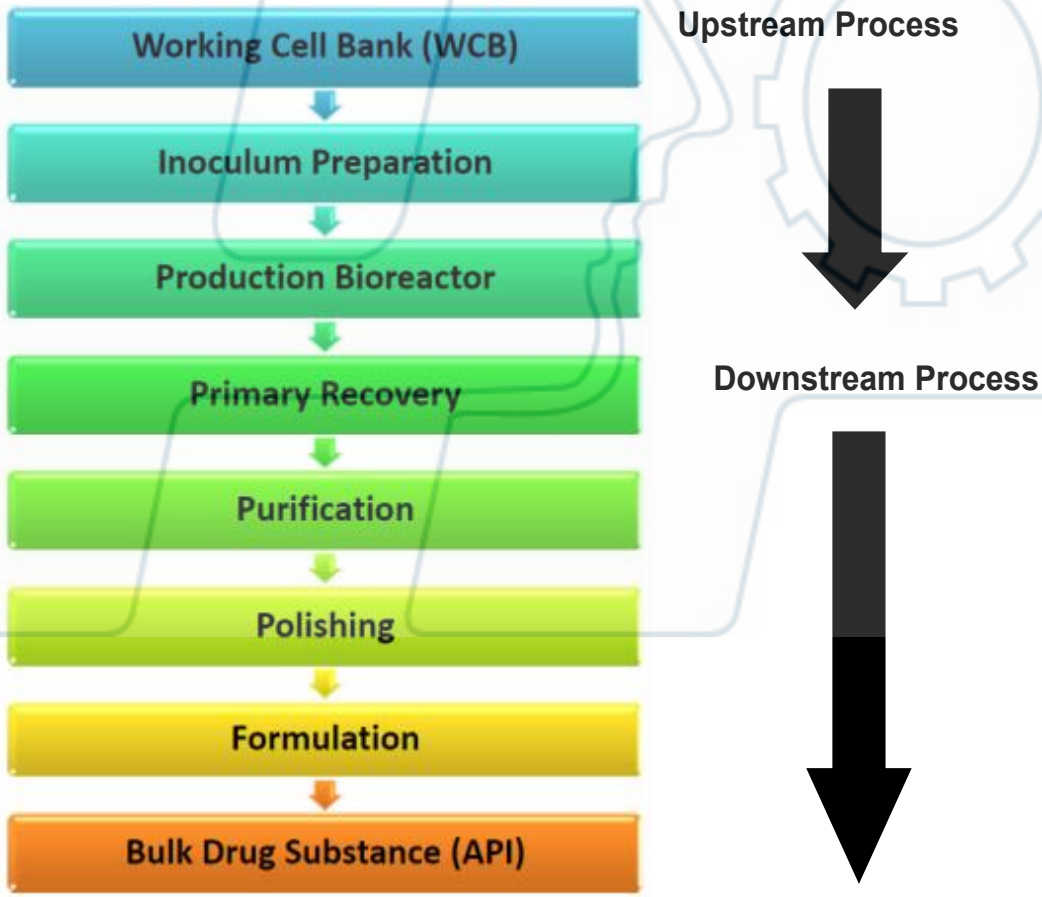
Biopharmaceuticals are those drug products produced, extracted from, or semi-synthesized from biological sources.

Manufacture of biopharmaceutical products takes place in a secure and controlled environment with a process that has been validated to ensure that the quality of the product is to the highest standards.

Manufacturing for biopharmaceuticals can be divided into upstream and downstream processes.

Upstream Bioprocessing is defined as the stages of microorganism growth required to produce biopharmaceuticals.

Downstream Bioprocessing is defined as the various stages of processing that occur after the completion of the fermentation or bioconversion stage. These stages include including separation and recovery, purification, polishing formulation and packaging of the product.



In this course we will examine Upstream Bioprocessing.

We will examine how Cell Banks are developed and maintained. We will look at how inoculum cultures are prepared. We will examine the make-up and design of Bioreactors and finally we will examine the production operation of a Bioreactor.

This course is separated into a number of different lessons

Lesson1: Cell Banks and Inoculum

Lesson 2: Bioreactor Design

Lesson 3: Bioreactor Operation

If this is your first course with People & Process Academy, be sure to look at “Studying with People & Process” before you begin. This short video shows you how to find your way around the lessons.

Lessons are all presented in video format, and there's a transcript you can follow as you watch. If you like, you can download the video transcript to revise later on.

In ***Upstream Bioprocessing*** each new lesson builds on previous information, so it’s best to follow the lessons in order. All registered users have unlimited access to video lessons and transcripts, and you can repeat each video as often as you like.

If you have any difficulties navigating the course, see the support section for help.

There's a quiz at the end of each lesson to test your understanding of the material.

To successfully complete this course, you must pass the quiz for each lesson. Once all the lessons have been completed, you can then download and print the People & Process completion certificate.

So let’s get started! In the next video, we’ll look at ‘Cell Banks and Inoculum’