Recombinant Human Insulin

Application Note

RECOMBINANT INSULIN FOR CELL CULTURE

Expressed in *E.coli*

Introduction

Biopharmaceutical Industry extensively uses mammalian cell culture for production of several therapeutic proteins such as antibodies, growth factors, hormones etc. Most of them require growth medium for mammalian cells, most of which are based on serum derived from animal origin. This results in exposure to animal derived viruses and adventitious agents linked to bovine spongiform encephalopathy (BSE) and the threat of transmission of Creutzfeldt-Jakob disease. There are growing needs and trends in the industry to move toward the use of serum-free, chemically defined, formulations for use in mammalian cell culture. Regulatory authorities such as FDA, EMEA, CBER recommend the use of animal origin free components in the manufacturing (1-3). Serum free media comprising of Recombinant Proteins offer solutions to such problems. It is recognized that the addition of key serum proteins such as bovine serum albumin, transferrin, and insulin (4,5) (which are naturally found in serum) can enhance cell viability and productivity. These ingredients, together with supplements, are added to promote cell growth, survival, and optimized productivity (6).

Studies with recombinant ingredients have shown equivalent or improved performance in a wide range of cell types up to commercial scale. Recombinant alternatives to three critical components of serum (insulin, transferrin, and albumin) have led to a range of animal-free recombinant protein ingredients that are designed and manufactured specifically to optimize mammalian cell growth and productivity at the industrial scale.

Key advantages are as follows:

1. Reduces the risk of introducing adventitious agents,
2. Assists both upstream and downstream process purification optimizations.
3. Completely avoids the batch-to-batch variations in serum and thus, maintains consistency of production batches.

Insulin is a widely used growth factor to delay apoptosis in mammalian cell culture, which leads to increased productivity. Insulin suppresses cell death in serum-free culture by means of lowering intracellular reactive oxygen species levels *via* an increase in the specific glucose consumption rate.

BioGenomics Recombinant Insulin is Animal Origin Free-Level 2 (AOF- Level 2) quality

BioGenomics' Recombinant Insulin, European Pharmacopoeia (Ph Eur) grade, is manufactured at its state-of-the-art facility. It is an "Animal Origin Free" product compared to other insulins currently available due to the following reason. **BioGenomics Recombinant Human Insulin** is manufactured initially as "Recombinant Proinsulin" using *Escherichia coli*, and further, the conversion of "Proinsulin to Insulin" is also carried out using Recombinant enzymes such as **Recombinant Trypsin and Recombinant Carboxypeptidase B,** thus completely eliminating the risk of BSE (Bovine Spongiform Encephalopathy) contamination. In addition, all the media used in the fermentation process is also animal origin free. This recombinant insulin can be classified as Animal Origin Free-Level 2 (AOF- Level 2) (Refer Figure 1).

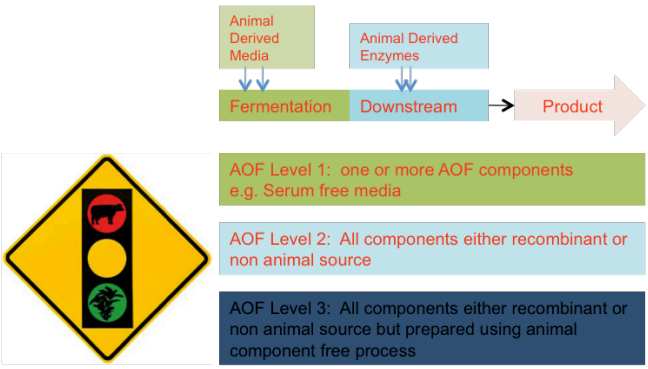

Figure 1: Levels of Animal Origin Free (AOF) Products

BioGenomics' Recombinant Insulin can be used to improve productivity of manufacturing biological therapeutics from cell culture. Manufactured to recognized quality standards and offering continuity of supply, BioGenomics' Recombinant Insulin provides the confidence in critical raw material quality that is required of products used in long-term biopharmaceutical manufacturing.

BioGenomics is shortly launching its two new products for cell culture users, viz. Recombinant Holo-Transferrin and Recombinant Human Serum Albumin.

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