D (+)-Glucose, anhydrous
Cell Culture Tested

Product Code: TC130

Product Description:
Molecular Weight: 180.16
Molecular Formula: C₆H₁₂O₆
CAS No.: 50-99-7
Synonym: Dextrose

Glucose is a carbohydrate compound consisting of six carbon atoms and an aldehyde group and they are referred to as aldohexose. The glucose structure can exist in an open-chain (acyclic) and ring (cyclic) form. It occurs in many fruits, animal tissues and fluids, etc. Glucose has several optically different forms. The common form is dextrorotatory glucose because of which it is also known as dextrose. All forms of glucose are colourless and soluble in water.

Glucose is used an energy source in most of the organisms from bacteria to human beings. In plants and some prokaryotes, glucose is the produced as result of photosynthesis. In animals and fungi, glucose is obtained from the breakdown of glycogen by a process known as glycogenolysis. In animals, it is also synthesized in the liver and kidney by a process known as gluconeogenesis from pyruvate and glycerol.

Glucose is used as a major component in wide range of cell culture media including classical and serum-free media. It plays many important roles in cell culture.

In vitro functions of glucose:
• Energy source:
   Glucose is utilized as a major source of energy by cultured cells. Several transporter proteins are involved in transport of glucose molecules in and out of the cells via cell membrane. Glucose cannot enter or exit the cells without these proteins. Once inside the cells, it serves as a major substrate in following cell metabolic pathways:
   1) Glycolysis
   2) Glycogenesis
   3) Pentose-phosphate pathway
   4) Citric acid cycle

• Cell defense:
   In addition to its role in cell proliferation and cell metabolism, glucose is also involved in maintaining reduced environment inside the cells. Metabolism of glucose via the oxidative branch of the pentose phosphate pathway provides the reducing power needed to maintain the pool of NADPH. Cells in vitro are subjected to oxidative stress and their ability to survive and grow is likely to be significantly affected by their capacity to generate NADPH through the PPP.

Applications:
• In bio-manufacturing:
   Glucose is one of the major components of nutritional supplement solutions used in fed-batch bio-manufacturing of recombinant proteins, monoclonal antibodies, viral vectors for gene therapy and viral vaccines from mammalian and insect cell cultures. Addition of such glucose containing supplements in mid-run results in improvement in the quantity of the harvested product.

• In vitro diabetes research:
   Glucose is a potent regulator of pancreatic beta cell activity. It stimulates beta-cell proliferation and destruction. Addition of tritiated glucose to the culture medium and studying extent of glucose uptake in in vitro diabetes model is a very widely used system for evaluation of potency of anti-diabetic drug.

Directions:
Preparation instructions:
For cell culture applications, glucose is generally used at a concentration of 1-10g/L depending on type of the medium and cells.
Glucose is soluble in water (100mg/ml). Glucose solutions can be sterilized by autoclaving or by filtering through a sterile membrane filter of porosity 0.22 microns or less.
Quality Control:

Appearance
White powder.

Solubility
Clear, colorless solution at 10gm in 100ml of water.

pH
5.00 - 6.50

Specific rotation \( \alpha_{20} \)
+52.5° to +53.0°

Assay
NLT 99.00%

Cell Culture Test
Passes

Insect Cell Culture Test
Passes

Storage and Shelf Life:
Store below 15-30°C away from bright light.
Shelf life is 48 months.
Use before expiry date given on the product label.

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