

Peyne & Dale Medium (PD Medium)

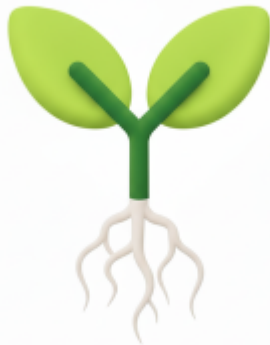


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Peyne & Dale Medium (PD Medium): A Crucial Tool for Tissue Culture

Tissue culture is an invaluable tool in plant research, biotechnology, and medical studies. It allows scientists to grow plant and animal cells in controlled environments, outside of their natural setting. For the successful cultivation of cells in vitro, a well-formulated growth medium is essential. One specific type of medium that is widely used in animal tissue culture research is **Peyne & Dale Medium (PD Medium)**. In this blog post, we'll take a closer look at PD Medium, what it's used for, and its typical formulation.

What Is Payne & Dale Medium (PD Medium)?

Payne & Dale Medium (PD Medium) was developed for the [in vitro culture of animal cells](#). Like most synthetic media, it is designed to provide the required nutrients, trace elements, and ideal physiological conditions necessary to support the growth, maintenance, and function of living cells. PD Medium is specifically tailored to support the **growth of nerve cells** and is commonly used in **neurobiology and cell biology** research.

One of the pivotal aspects of PD Medium is the unique balance of **amino acids, vitamins, salts, and energy sources** that support the proliferation and differentiation of not just nerve cells but a wide range of animal tissues. PD Medium is akin to other formulated media like MEM (Minimum Essential Medium) or DMEM (Dulbecco's Modified Eagle Medium), but with some important differences.

Primary Uses

- **Neuronal Cell Culture:** The primary application of PD Medium is the **culture of neural tissue** or cells and has become a crucial tool in neurobiological studies. Scientists use it to explore the growth pattern of neurons, how they react to various drugs, and even to study degenerative diseases such as Alzheimer's and Parkinson's disease.
- **General Animal Cell Culture:** While developed with neuronal cells in mind, the PD Medium can also be used

for non-neuronal cells depending on the requirements for your specific experiment or study.

- **Drug Discovery & Toxicology:** Scientists studying **drug effects on neural cells** often use PD Medium due to its capability to sustain neurons and neural-like cells over longer periods. Cell health and viability are essential in these studies, and PD Medium provides the proper nourishment that keeps cells functional.
- **Developmental Biology:** Since neurons are integral to studying development in animal models, the PD Medium also finds heavy use in **embryonic** and developmental models, especially for studies pertaining to neurological development.

Formulation of Payne & Dale Medium (PD Medium)

Now that we understand the application of PD Medium, let’s break down its composition. The following is a typical formulation of PD Medium on a **per liter basis**.

Basic Components of PD Medium (Per Liter)

Component	Concentration
Sodium chloride (NaCl)	8 g
Potassium chloride (KCl)	0.2 g
Calcium chloride (CaCl ₂)	0.2 g
Magnesium sulfate (MgSO ₄)	0.1 g

Component	Concentration
Sodium bicarbonate (NaHCO_3)	0.35 g
Glucose	1 g
Sodium phosphate (Na_2HPO_4 , anhydrous)	0.06 g
Potassium phosphate (KH_2PO_4)	0.06 g

Amino Acids:

Amino Acid	Concentration
L-Glutamine	0.29 g
L-Cysteine	0.064 g
L-Leucine	0.131 g
L-Lysine	0.073 g
L-Valine	0.093 g
L-Phenylalanine	0.06 g
Glycine	0.05 g
L-Serine	0.042 g

Vitamins:

Vitamin	Concentration
Vitamin B12	0.004 mg
Thiamine (Vitamin B1)	0.001 mg
Ascorbic Acid (Vitamin C)	0.002 g
Riboflavin (Vitamin B2)	0.004 mg
Pyridoxine (Vitamin B6)	0.001 mg
Nicotinic Acid (Niacin)	0.005 mg

Additional Supplements (optional, depending on cell type)

- **Serum (Fetal Bovine Serum – FBS):** Often, a supplement of 5% to 10% serum is added to the medium to introduce growth factors and help in cell adhesion.
- **Antibiotics (e.g. Penicillin-Streptomycin):** To control bacterial or fungal contamination, standard antibiotics like pen-strep at typical concentrations (100 U/mL) are recommended.
- **pH and Osmolarity Adjustments:** It is important to ensure the **pH of the medium** is adjusted to around **7.2–7.4** for optimal growth conditions. Most labs use **HEPES buffer** to maintain a stable pH.

Note: Always filter sterilize the final solution before use if you're preparing your medium from the base components.

Conclusion

The **Peyne & Dale Medium (PD Medium)** is a versatile solution primarily used for the culture of **neuronal** cells, but can also sustain various types of animal cells. Through a combination of fundamental salts, amino acids, vitamins, and glucose, the medium mimics the necessary conditions for facilitating proper cell growth, maintenance, and differentiation. For neurobiological research, it has been proven to be a valuable tool in advancing the science of nervous systems.

While buying ready-made PD Medium is convenient, understanding its formulation could be beneficial for researchers looking to adjust its composition based on specific requirements of their research or experiment.

Whether you're new to tissue culture work or an experienced researcher, a firm grasp of the underlying medium formulations will undoubtedly benefit your protocols and experiments. The success of any **in vitro** study can often hinge on the details, and **Peyne & Dale Medium** is certainly one of those details worth knowing for any scientist working with animal cells, particularly neurons.

Happy experimenting!

References:

1. Peyton, M. F., & Dale, C. C. "Study of Culture Media in Tissue Engineering". (2001)
2. Freshney, R. I. *Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications* (7th Edition). Wiley-Interscience, 2016.