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Date of Issue:	10-JUL-2022	Approved by:	Dr. Iman Kamranfar
Review Date:	10-JAN-2024	Signature:	
Title:	<b>TECHNICAL DATA SHEET</b>		

<b>Product Name</b>	Williams Medium E
<b>Filtration/Treatment</b>	without L-Glutamine, Sodium bicarbonate, and Phenol Red
<b>Product Codes</b>	MCP-071-50L
<b>Shelf Life</b>	4 years
<b>Storage Temperature</b>	2 to 8 °C
<b>Shipping Temperature</b>	ambient
<b>Substance</b>	<b>Concentration (mg/L)</b>
<b>Amino Acids</b>	
L-Alanine	90.00
L-Arginine HCL	60.50
L-Asparagine H <sub>2</sub> O	20.00
L-Aspartic Acid	30.00
L-Cysteine HCL H <sub>2</sub> O	58.00
L-Cystine 2HCL	26.09
L-Glutamic Acid	50.00
L-Histidine HCL H <sub>2</sub> O	20.30
L-Isoleucine	50.00
L-Leucine	75.00
L-Lysine HCL	87.50
L-Methionine	15.00
L-Phenylalanine	25.00
L-Proline	30.00
L-serine	10.00
L-Threonine	40.00
L-Tryptophan	10.00
L-Tyrosine	35.00
L-Valine	50.00
<b>Vitamins</b>	
Biotin	0.50
Calciferol	1.00
Choline Chloride	1.50
D-Calcium Pantothenate	1.00
DL-a-Tocopherol PO <sub>4</sub> Na <sub>2</sub>	0.01
Folic Acid	1.00
L-Ascorbic Acid	2.00
Menadione Sodium Bisulfite 3H <sub>2</sub> O	0.01
Myo-Inositol	2.00
Niacinamide	1.00
Pyridoxal HCL	1.00
Riboflavin	0.10
Thiamine, HCL	1.00
Vitamin A Acetate	0.10
Vitamin B12	0.20
<b>Other Components</b>	
Dextrose (D-Glucose)	2000.00
Reduced Glutathione	0.05

**SPECIMEN**

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Methyl Linoleate	0.03
Sodium Pyruvate	25.00
<b>Inorganic Salts</b>	
Calcium Chloride 2H <sub>2</sub> O	264.90
Cupric Sulfate	0.00006
Ferric Nitrate Nonahydrate [Fe(NO <sub>3</sub> ) <sub>3</sub> 9H <sub>2</sub> O]	0.0001
Magnesium Sulfate, Anhydrous	97.70
Potassium Chloride	400.00
Sodium Chloride	6800.00
Sodium Phosphate Monobasic Monohydrate (NaH <sub>2</sub> PO <sub>4</sub> H <sub>2</sub> O)	140.00
Zinc Sulfate Heptahydrate ( ZnSO <sub>4</sub> 7H <sub>2</sub> O)	0.0002
<b>Gram of Powder required for 1 L Medium</b>	<b>10.522</b>

<b>Specifications</b>	
Appearance	Off-white powder
Solubility	10.522 g/L in ≤ 30 minutes
Moisture Content	≤ 2.0 %
pH without NaHCO <sub>3</sub>	Test and report
pH with NaHCO <sub>3</sub>	6.8 - 7.8
Osmolality without NaHCO <sub>3</sub>	240-280 mM/kg
Osmolality with NaHCO <sub>3</sub> (2.2 g/L)	280-340 mM/kg
Endotoxin	≤ 1.0 EU/ml
Mycoplasma	Not detected

**Note:-** Sodium Bicarbonate is not included in the powdered medium ( add 2200.00 mg/L).

- L -Glutamine is not in the powdered medium ( add 292.00 mg/L).

### Product description

Williams et al., (1971)<sup>1</sup> introduced a new method based on sequential plating technique to more efficiently isolate and culture new born epithelial liver cells. They used a modified version of MEM medium called Williams' Medium D which was enriched in amino acids and double glucose content. Williams and Gunn (1974)<sup>2</sup> conducted further studies led to release of Williams' Medium E to be used for the effective long-term culture of adult liver cells. During last decades Williams' Medium E has been widely used for the culture of liver epithelial cells, as well as primary hepatocytes from different species (e.g., human HepaRG cells).

William's Medium E contains unique ingredients such as zinc, iron, manganese, non-essential amino acids, the reducing agent glutathione and the lipid methyl linoleate. William's E Medium can be supplemented, usually with 5-10% fetal bovine serum may be required. William's E Medium uses a sodium bicarbonate (2.2 g/l) buffer system and therefore requires a 5-10% CO<sub>2</sub> environment to maintain physiological pH.

### References

- Williams, G.M., and Gunn, J.M., Long-Term Cell Culture of Adult Rat Liver Epithelial Cells. Exp. Cell Research, 89, 139-142 (1974).
- Williams, G.M. et al., Isolation and Long-Term Cell Culture of Epithelial-Like Cells From Rat Liver. Exp. Cell Research, 69, 106-112 (1971).

**THIS PRODUCT IS FOR LABORATORY USE ONLY.**



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