

## Ham's F-12 liquid medium

Developed by Ham, nutrient mixture Ham's F-12 has higher levels of amino acids, vitamins, and trace elements. Putrescine and linoleic acid were added to the formulation. The medium was originally designed for the serum-free growth of Chinese hamster ovary and lung cells. When used with whole or dialyzed serum or in combination with hormones and transferrin, Ham's F-12 is widely used to grow a broad spectrum of mammalian and

hybridoma cells. Ham's F-12 today is the medium of choice for clonal toxicity-assays using CHO-cells (CHD-3 and CHL-1). For optimum buffering, use in a 5 % CO<sub>2</sub> atmosphere.

This medium is also available as a standard in powder with a minimum order of 500 litres; pack sizes are 10 or 50 litres.

Product	Cat. No.	Unit
<b>Ham's F-12 liquid medium without L-glutamine</b> with 1.176 g/l NaHCO <sub>3</sub> , with 10 mg/l phenol red Storage temperature: +2 – +8 °C	F 0815	500 ml
<b>Ham's F-12 liquid medium with stable glutamine</b> with 1.176 g/l NaHCO <sub>3</sub> , with 10 mg/l phenol red Storage temperature: +2 – +8 °C	FG 0815	500 ml

### Formulation

Tab. 19: Composition of the Ham's F-12 medium

Substance	Concentration (mg/l)	Substance	Concentration (mg/l)
NaCl	7599	L-methionine	4.47
KCl	223.6	L-phenylalanine	5
Na <sub>2</sub> HPO <sub>4</sub>	142	L-proline	34.5
CaCl <sub>2</sub> ·2H <sub>2</sub> O	44	L-serine	10.5
MgCl <sub>2</sub> ·6H <sub>2</sub> O	122	L-threonine	12
FeSO <sub>4</sub> ·7H <sub>2</sub> O	0.834	L-tryptophane	2
CuSO <sub>4</sub> ·5H <sub>2</sub> O	0.00249	L-tyrosine	5.4
ZnSO <sub>4</sub> ·7H <sub>2</sub> O	0.863	L-valine	11.7
D-glucose	1802	Biotin	0.0073
Na-pyruvate	110	D-Ca-pantothenate	0.48
Phenol red	1.2*	Choline chloride	14
NaHCO <sub>3</sub>	1176	Folic acid	1.3
L-alanine	9	Myo-inositol	18
L-arginine-HCl	211	Nicotinic acid amid	0.037
L-asparagine	13.2	Pyridoxin-HCl	0.062
L-aspartic acid	13.3	Riboflavin	0.038
L-cysteine-HCl	31.5	Thiamine-HCl	0.34
L-glutamine	146	Vitamin B <sub>12</sub>	1.36
L-glutamic acid	14.7	Hypoxanthine	4.1
Glycine	7.5	Thymidine	0.73
L-histidine-HCl·H <sub>2</sub> O	21	Lipoic acid	0.21
L-isoleucine	4	Linoleic acid	0.084
L-leucine	13	Putrescine-2HCl	0.161
L-lysine-HCl	36.5		

\* liquid media contain 10 mg/l of phenol red

#### Reference:

Ham. R.G.; *Proc. Nat. Acad. Sci* **53**, 288 [1965]