

MAM-PF[®]

CHO PRODUCTION MEDIA

Benefits at a glance:

- ACF (Animal Component Free)
- Chemically defined
- High cell densities
- Pharmaceutical application
- High product yield



Distributed by:

Lab Unlimited
CARL STUART GROUP

Tallaght Business Park
Whitestown, Dublin 24,
Ireland
D24 RFK3

Tel: (01) 4523432
Fax: (01) 4523967
E-mail: info@labunlimited.com
Web: www.labunlimited.com

Quatro House, Frimley Road,
Camberley,
United Kingdom
GU16 7ER

Tel: 08452 30 40 30
Fax: 08452 30 50 30
E-mail: info@labunlimited.co.uk
Web: www.labunlimited.co.uk

History

Forty years of experience serving the Swiss biological community.

2015 the brand new liquid media production plant was opened.

1993 BioConcept added the Amimed® brand to its portfolio.

BioConcept has developed a strong international presence with its Amimed® brand.

BioConcept has a positive reputation because the company is constantly updating its practices in order to keep up with the advancing field of cell biology.

Flexibility

BioConcept is a privately held company.

BioConcept listens to the customers' needs and does its utmost to meet them.

Powder and liquid media plants.

Batch sizes from 5 up to 5,000 Litres. 1 kg powder up to 800 kg.

Production with WFI (Water For Injection).

Media can be delivered within a few weeks if needed.

Facilities

In 2015 BioConcept opened its brand new liquid media plant. The plant was designed to uphold a maximum degree of sterility through its state of the art air processing system and advanced machinery.

More information:

www.bioconcept.ch/de/Downloads

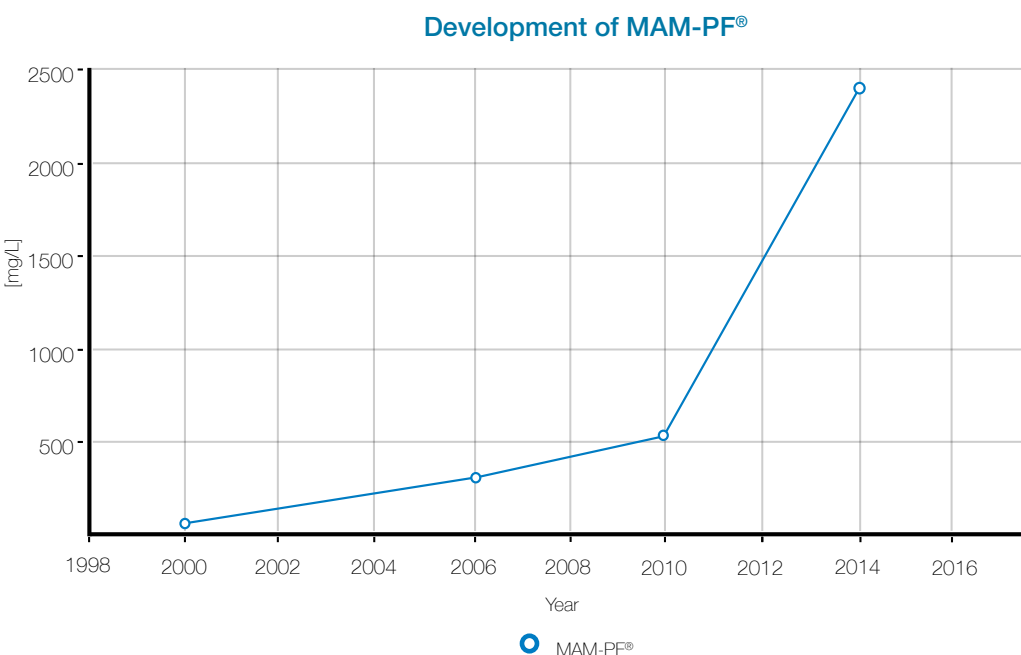




Highlights

of the MAM-PF® series

- Animal Component Free**
MAM-PF® media do not contain proteins or undefined hydrolysates.
- Liquid batch capacity**
Batch sizes ranging from 5-5000 litre, water for injection (WFI) is the highest quality available.
- Chemically defined**
BioConcept holds TSE certificates for each component to ensure EMA/410/01 conformity.
- Powder batch capacity**
Batch sizes ranging from 1 - 800 kg, our milling process results in particle sizes of around 20 µm (d50). This leads to a quick dissolution of the powder medium.
- Easy adaptation**
In many cases it is possible to switch directly from your current medium to MAM-PF®.
- Feed mixes**
Various feed mixes are available for high density cell culture and high productivity.
- High cell density combined with high product yield**
 - Antibody production of up to 5.5 g/L.
 - EPO of up to 2.5 g/L (see graph below).
 - Cell density up to 3.7×10^7 cells/ml.
- Glycosylation**
Best glycosylation pattern observed.



Increase of Erythropoietin (EPO) yields during the system development. Within the last 4 years the product yield could be quadrupled up to 2.3 g/L using the MAM-PF77® medium and FMS3 in a fed-batch.

MAM-PF® series

MAM-PF® (Mammalian Artificial Medium - Protein Free) media are Animal Component Free (ACF) and in accordance with the strict quality guidelines EMA/410/01. MAM-PF® is a production media. It is protein-free and protein hydrolysates free, chemically defined and for high cell density cultivation of a variety of cell lines such as CHO (Chinese Hamster Ovary) cells or BHK (Baby Hamster Kidney) cells and the high level expression of recombinant proteins. BioConcept holds a certificate for every single component used in the MAM-PF® media series to guarantee an untainted and exceptional final product.

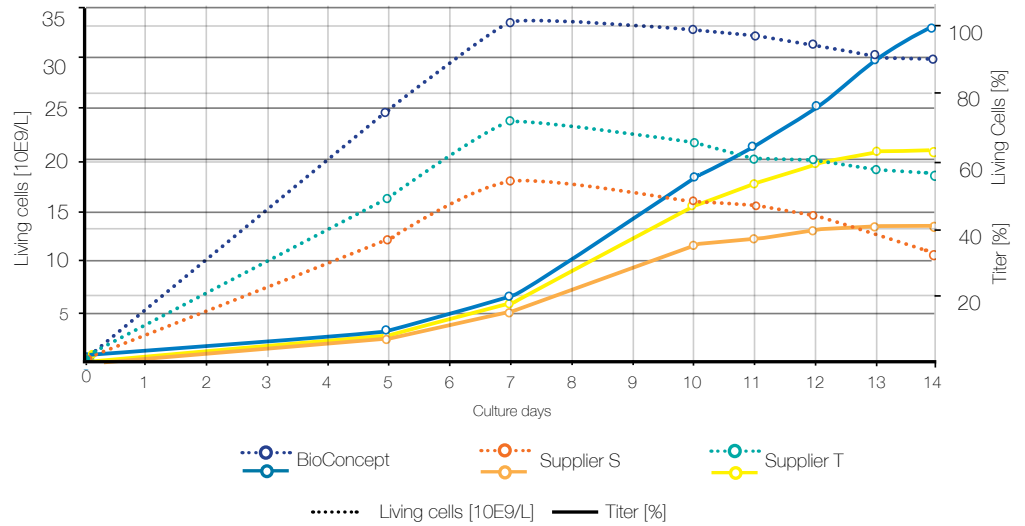
Performance

Cell Density

CHOSI cells cultured in MAM-PF77[®] have shown the fastest growth and a ~100% and ~40% higher cell density compared to media by Suppliers S and T. This corresponds with the final product titers at the end of the fed-batch, respectively (All cultures were fed with FMS3 in the same feed regime).

The higher viability in the stationary phase shows that the glycosylation in MAM-PF77[®] was superior.

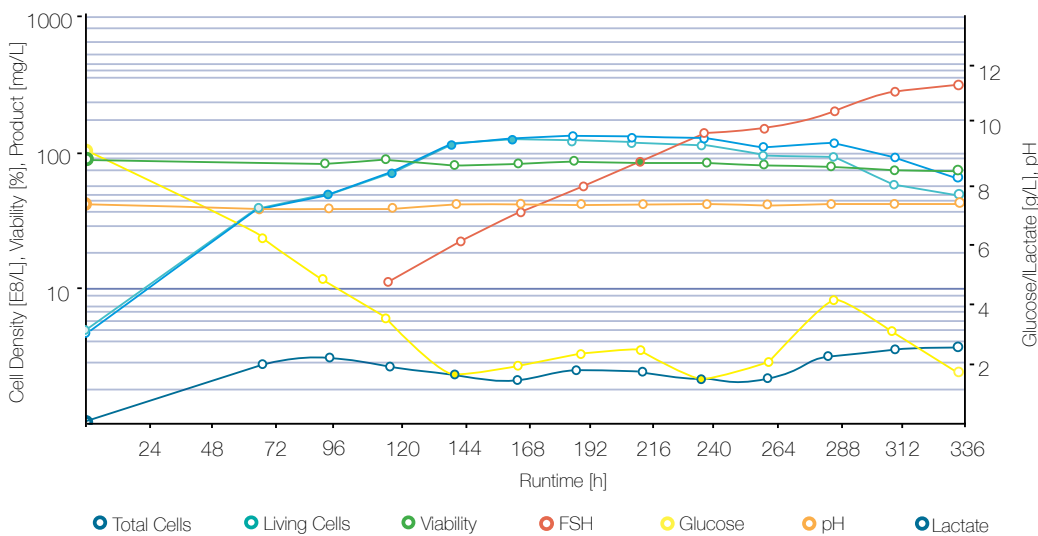
MAM-PF[®] and Other Suppliers



Performance of MAM-PF77[®] and two different CHO media suppliers in a 14-day fed-batch mAb production.



FSH produced with MAM-PF[®] and FMS3



FSH

A cell density of over 100 mio. cells per liter can be reached through mixing the CHO feed mix FMS3 to MAM-PF77[®]. It is possible to achieve a titer of over 350 mg/L of the highly glycosylated follicle-stimulating hormone (FSH) within 14 days in a stirring bioreactor tank, making it a very high quality product. As determined during the purification process, 45% of the product showed an isoform-pattern, low aggregates, and low oxidized forms. MAM-PF77[®] can be used to produce quality FSH that fulfills its Ph.Eur. requirements.

14-day bioreactor production scheme of the high glycosylated follicle-stimulating hormone (FSH) using MAM-PF77[®] and the FMS3 feed mix.

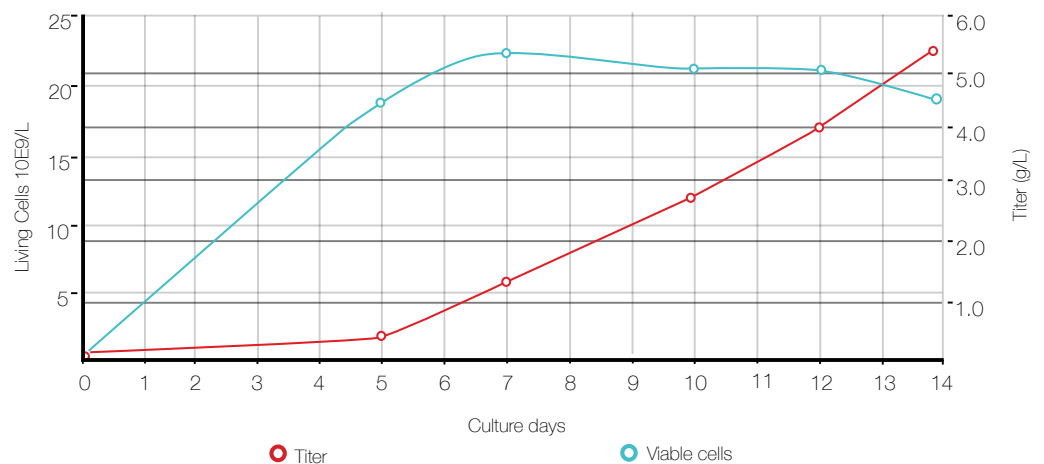
Application Data Antibody



Ipilimumab

The continuous innovation and development of the MAM-PF[®] media series has led to the brand new MAM-PF77[®] cell culture medium and CHO Feed Mixes FMS3 and FMU. MAM-PF[®] media now increase productivity of Ipilimumab (monoclonal antibody) by up to 5g/L. The new expression system is also viable in fed-batch and perfusion systems.

Ipilimumab produced with MAM-PF[®] and FSU



High yields of mAbs, e.g. > 5g/L Ipilimumab can be reached in a 14-day fed-batch system using MAM-PF77[®] plus the novel CHO feed mix FMU.



Selection of pre-developed biosimilars produced with MAM-PF® media series.

API (Indication)	Available (EUGENEX Biotechnologies)	Brand Name (Originator)	Global Sales 2012 Estimates [Mio \$]
EPO , Epoetin alpha (Anemia)	Cell-Line & USP & DSP	Epogen (Amgen) Eprex (Johnson)	~5.000
DPO , Darbepoetin alpha (Anemia)	Cell-Line & USP & DSP	Aranesp (Amgen)	~2.500
INFb , Interferon beta 1a (MS)	Cell-Line & USP & DSP	Avonex (Biogen) Rebif (Serono)	~1.200
FSH , follicle stimulating hormon (Infertility); also hCG & LH	Cell-Line & USP & DSP	Gonal-F (Serono) Puregon (Organon)	~500 ~300
Etanercept , TNFa receptor IgG (chronical arthritis, psoriasis)	Cell Line USP & DSP	Enbrel (Amgen, Pfizer, Takeda)	~8.400
Adalimumab , TNFa Mab (rheumatoid arthritis, Crohn's)	Cell Line USP & DSP	Humira (Abbott)	~9.300
Rituximab , CD20 Mab (rheumatoid arthritis, lymphoma)	Cell Line USP & DSP	Rituxan (Roche)	~6.900
Trastuzumab , HER2 Mab (mammarcarinom)	Cell Line USP & DSP	Herceptin (Roche)	~6.100
Bevacizumab , VEGF Mab (colorectal cancer)	Cell Line USP & DSP	Avastin (Roche)	~6.300
Cetuximab , EGF receptor Mab (colorectal cancer)	Cell Line USP	Erbix (BMS, Imclone)	~1.000
Omalizumab , IgE Mab (persistent allergic asthma)	Cell Line USP	Xolair (Genentech/Novartis)	~1.000
Denosumab , RANKL IgG (osteoporosis, colorectal cancer)	Cell Line USP	Prolia (Amgen)	~500
Eculizumab , Complement C5 Mab (hemoglobinuria (PNH))	Cell Line USP	Soliris (Alexion)	~1.100
Ipilimumab , CTLA-4 IgG1 (metastatic melanoma)	Cell Line USP	Yervoy (BMS)	~1.000
Tocilizumab , IL-6R IgG1 (Castelman, rheumatoid arthritis)	Cell Line	Actemra (Roche, Chugai)	~1.000
Abatacept , CTLA-4-IgG1 fusion (rheumatoid arthritis)	Cell Line	Orencia (BMS)	~1.000
Pertuzumab , Her2 dimer inhibitor (metastatic breast cancer)	Cell Line USP	Omnitarg (Roche)	~1.000
Panitumumab , EGF-R Mab (colorectal cancer)	Cell Line	Vectibix (Genentech/Novartis)	~400
Ofatumumab , CD20 IgG1 2 nd Gen. (leukemia and others)	Cell Line	Arzerra (Genmab/GSK)	~100

Biosimilars and MAM-PF®

Biosimilars are highly diverse and complex. The medicines are a large group that include growth factors, cytokines, hormones, monoclonal antibodies (mAb) and, potentially, vaccines (Huzair and Kale, 2015). Due to their complexity and post-translational modifications (e.g. glycosylation of mAbs), many biosimilars are produced using the CHO (Chinese Hamster Ovary) expression system. Finding a medium that meets the strict regulations set for biosimilar production and creates a highly superior product can be challenging. Nevertheless, you must look no further: At BioConcept we offer high quality products that are both fully chemically defined and animal component free. This is the ground-breaking MAM-PF® media series. In the adjoining table you will find a selection of successfully produced biosimilars that are cultured with MAM-PF® media in the designed expression CHO host cell line (propriety of EUGENEX Biotechnologies).

Selection of references for the MAM-PF media series:

Harald Zähringer (2009). Product survey: Protein expression systems :New Protein Factories. Lab Times (6) 58-63.

Stefan Nahrgang (2002). Influence of cell-line and process conditions on the glycosylation of recombinant proteins. Dissertation EPFL, Lausanne.

Ravish Patel, Rustom Mody (2013). Development of In-Vitro cell based assay for the determination of biological activity of FSH using a CHO based recombinant cell line. Research in Biotechnology 4(1) 12-20.

Ravish Patel, Susobhan Das, Rustom Mody, Jayesh Maradiya (2012). A Novel Cell Based Approach for Potency Determination of Recombinant Human Follicle Stimulating Hormone. Advances in Biological Research 6 (6) 210-220.

Alexander Hähnel, Benjamin Pütz, Kai Iding, Tabea Niediek, Frank Gudermann, Dirk Lütkemeyer (2011). Evaluation of a disposable stirred tank bioreactor for cultivation of mammalian cells. BMC Proceedings 5 (Suppl 8):P54.

Link, J, Rattenholl, A., Lütkemeyer, D., and Gudermann, F.Characterisation of gas transfer properties in shake flasks using disposable pH and dissolved oxygen sensors and their application in mammalian high cell density cultures (Poster). URL: http://microsite.sartorius.com/fileadmin/Image_Archive/microsite/sensolux/pdf/11_05_12_Poster_Sensolux.pdf

Schumann et. al. (2009). Method for purifying erythropoietin. United States Patent No: US 7,619,073 B2.

BioConcept is serving you:

Swiss Cell Culture Media

CHO cell culture media (ACF)
Insect cell culture media
Hybridoma cell culture media
Classical cell culture media
Sterile salt solutions
And more

Discover more on:
www.bioconcept.ch

Contact Me Today



Kieran Byrne

086 414 9753 | 01 452 3432
kieran.byrne@carlstuart.com

Your local distributor:

Distributed by:

Lab Unlimited
CARL STUART GROUP

Tallaght Business Park
Whitestown, Dublin 24,
Ireland
D24 RFK3

Tel: (01) 4523432
Fax: (01) 4523967

E-mail: info@labunlimited.com
Web: www.labunlimited.com

Quatro House, Frimley Road,
Camberley,
United Kingdom
GU16 7ER

Tel: 08452 30 40 30
Fax: 08452 30 50 30

E-mail: info@labunlimited.co.uk
Web: www.labunlimited.co.uk

