

“AVITECH” Antigen Production Unit



Fig 1 - Centre of Biotechnology

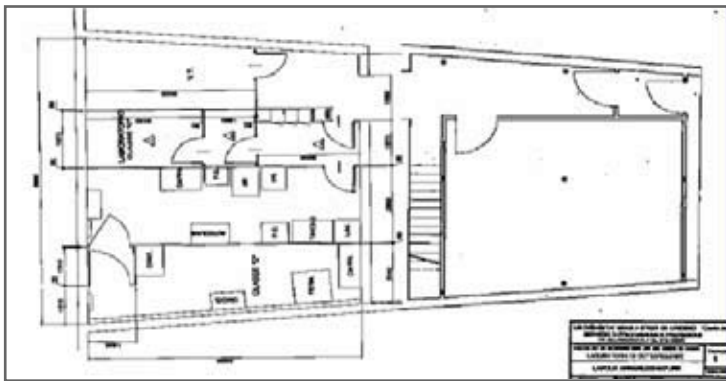


Fig 2 - Lay out of the “AVITECH” Antigen Production Facility



Fig 3 - Outside and inside view of production facility.

The “AVITECH” Antigen Production Unit consists of a dedicated facility located adjacent to the main Centre of Biotechnology building (Fig 1) (a detached centre of the University of Urbino) within the industrial area of the city of Fano. The Industrial area is located in a green belt site, which is approximately two kilometres from the Centre of Fano.

The “AVITECH” Antigen Production Unit is adjacent to the main building of the Centre of Biotechnology to which it is connected by a minor road. The site is of about 250 square meters and it is separated in two floors (Fig 2). Within the first floor we have the following: the Quality Control room (Fig 3), of about 30 square meters, the Service Room, of about 15 square meters, the Production lab of about 22 square meters, the Fermentation Room of about 20 square meters and the Clean Room, complete of pre-changing, changing and air lock rooms, of about 25 square meters; within the upper floor it is situated the Store of about 55 square meters.

The “AVITECH” Antigen Production Unit is committed to a system of quality management that will ensure our products and services exactly meet the requirements of our customers. This is achieved by embracing the requirements of EN ISO 9001 Quality Management System (certification obtained on June, 1st, 2005) and the principles of Good Pharmaceutical Manufacturing Practice (authorization obtained in July 2006 from the AIFA for the production of APIs for clinical studies in GMP condition).

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Fig 4
From left to right:
ISO 9001:2000
Certification and
AIFA Authorization
for the
production of APIs





Media preparation room

The AVITECH personnel is qualified by appropriate education, training and/or experience to perform and supervise the manufacture of intermediates and APIs. Media preparation equipment include: Vertical Laminar Flow Cabinet BIO 48-M, Precision Balance (B303 S), Viper BC-15 Balance, Ultra Low Temperature Freezer (-80), Freezer +4/-20°C, Digital Incubator Shaker (Innova 4000) for inoculum preparation, Fedegari Autoclave, Stirrer Base Units, Benchtop Centrifuge and Horizontal Rotor, Vortex Falc Mix 20, Peristaltic Pump Watson Marlow, Computerized Systems (Fig 5).



Fig 5
Media preparation equipment from left to right: Laminar Flow cabinet, Autoclave and Digital incubator Shaker

Fermentation

Avitech fermentation room is equipped with Biostat B Fermenter 5000 ml (Fig 6), Biostat C Fermenter 20000 ml (Fig 7), PANDA Homogenizer for cell disruption, 2 Horizontal Laminar Flow Cabinet KBM-4 and Beckman Refrigerate Centrifuge (6x1L).

BIOSTAT B: compact, autoclavable fermentor system of high quality which is especially designed to meet the requirements of small scale fermentation applications. **Working volumes from 1 to 5 Liters.**

BIOSTAT C: compact, scale fermentor system that can be sterilized in situ (CIP). The main components are: supply unit in an open stainless steel frame to support the piping and the vessel. Can be used for batch and continuous processes and is completely equipped with the measurements and control system for temperature, agitation, pH, pO₂, airflow, antifoam, level. **Working volumes from 5 to 20 Liters.**

PURIFICATION

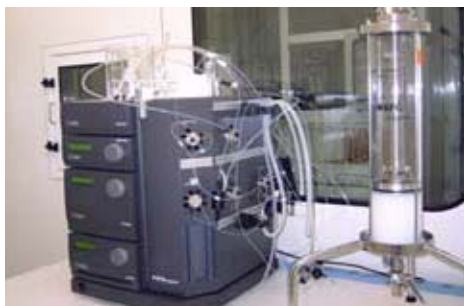
The purification of a biological product, a recombinant protein, from fermentation broth or cell culture supernatant is an important part of biotechnological manufacturing. Downstream recovery represents a large part of the product cost and therefore efficient and robust separation techniques are essential for the production of biological products. Recovering a biological product from the contaminants and impurities requires a series of purification steps, each removing some of the impurities and bringing the product closer to the final specifications. AVITECH has large experience in protein purification techniques and has developed a wide range of robust protocols to purify large quantity of final target protein.



Fig 6 - BIOSTAT B



Fig 7 - (From left to right): BIOSTAT C and set-up for fermentation run.



*Fig 8
(Above and below)
AKTA Explorer 100air
connected to BPG
column;
KTA system in
operational.*



*Fig 9
(Above and below)
Quality Control room;
Microbial analysis.*



PURIFICATION

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Quality Control is concerned with sampling, specifications and testing, and with the organization, documentation and release procedures which ensure that the necessary and relevant tests are carried out and that materials are not released for use, until their quality has been judged satisfactory. QC will document the AVITECH Antigen Production Unit facility conditions during the manufacturing process by verifying operation and comparing with specifications.

The QC department will be responsible for the following:

- Sampling and testing of components
- Ensuring provision of suitable product containers
- Microbiological testing of in-process and finished product (bulk) sample and air testing as necessary.



*Fig 10 - (From left to right)
Particle counter for air MET-ONE 227B
and SAS Super 100 used for microbial count of air.*



Fig 11 - QA department

The role of the Quality Assurance Department is to co-ordinate the development and maintenance of the "AVITECH" Antigen Production Unit's quality system.

This is achieved by a combination of testing, validating, monitoring and auditing the materials, facilities, systems and procedures, which can influence product quality. The quality system is based on an integrated documentation framework of specifications, standard operating procedures and batch records supported by validated equipment, processes and trained operators. The Quality Assurance function covers all APU areas and an important element to this is the internal audit system. Audits are carried out by trained personnel and the areas audited include the "AVITECH" Antigen Production Unit and the QC section.

› **AVITECH**

Antigen Production Unit

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