

Figure. Laboratory facility of I.P.A.S. SA

Analytical studies in pharmacokinetics are carried out with chromatographic apparatuses, namely HPLC (high-performance liquid chromatography) and GC (gas chromatography) using several appropriate selective detectors.

Concentrations in biological fluids are then processed according to the accepted statistical criteria to investigate pharma-

cokinetics, bioavailability, bioequivalence, tolerability. Data obtained are comprehensively presented and discussed in a Research Report issued according to the up-to-date criteria suggested by European and USA FDA (Food and Drug Administration) Agencies.

The site of I.P.A.S., in the centre of Europe, and the international vocation of

Switzerland, facilitate contracts with Sponsors from all the Europe and USA. Activity of I.P.A.S., in fact, despite its recent foundation, is in continuous increasing rate, mainly in the generic applications, which require a bioequivalence study comparing the new vs. the original formulation marketed by the innovator company.

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Laboratorio Analisi Speciali Chimico-cliniche SA*

The *Laboratorio Analisi Speciali (LA)* is a 20-years-old facility, originally located in Mendrisio, in the southern of Canton Ticino.

Since 1990 it moved to Ligornetto, a small village near to Mendrisio, in a mark-

edly bigger facility. Until now its evolution was rapid and new fields of activity were implemented.

At the present the LA is able to perform biomedical, chemical and microbiological analysis.

The main area, that of biomedical analysis, is divided into four sections:

- clinical chemistry
- haematology
- serology and immunology
- microbiology

providing complete tools for physicians and hospitals.

In addition to instruments for routine analysis the LA have instruments for special analysis like:

- atomic absorption spectrometer for detection of metals in body fluids
- HPLC and GC for monitoring drugs, hormones, haemoglobin and its fractions or vitamins in body fluids
- laser-flow cytometer for immuno phenotyping of leucocytes
- thermal cycler for PCR (polymerase chain reaction) for research of infective agents.

Other customers are industries, hotels, pubs, and refectories mainly for sanitary controls of the workers and the working areas.

The analytical chemistry section was set up to meet requests from the Chemical Industries for analysis at different stage of the production, e.g., controls of raw mate-

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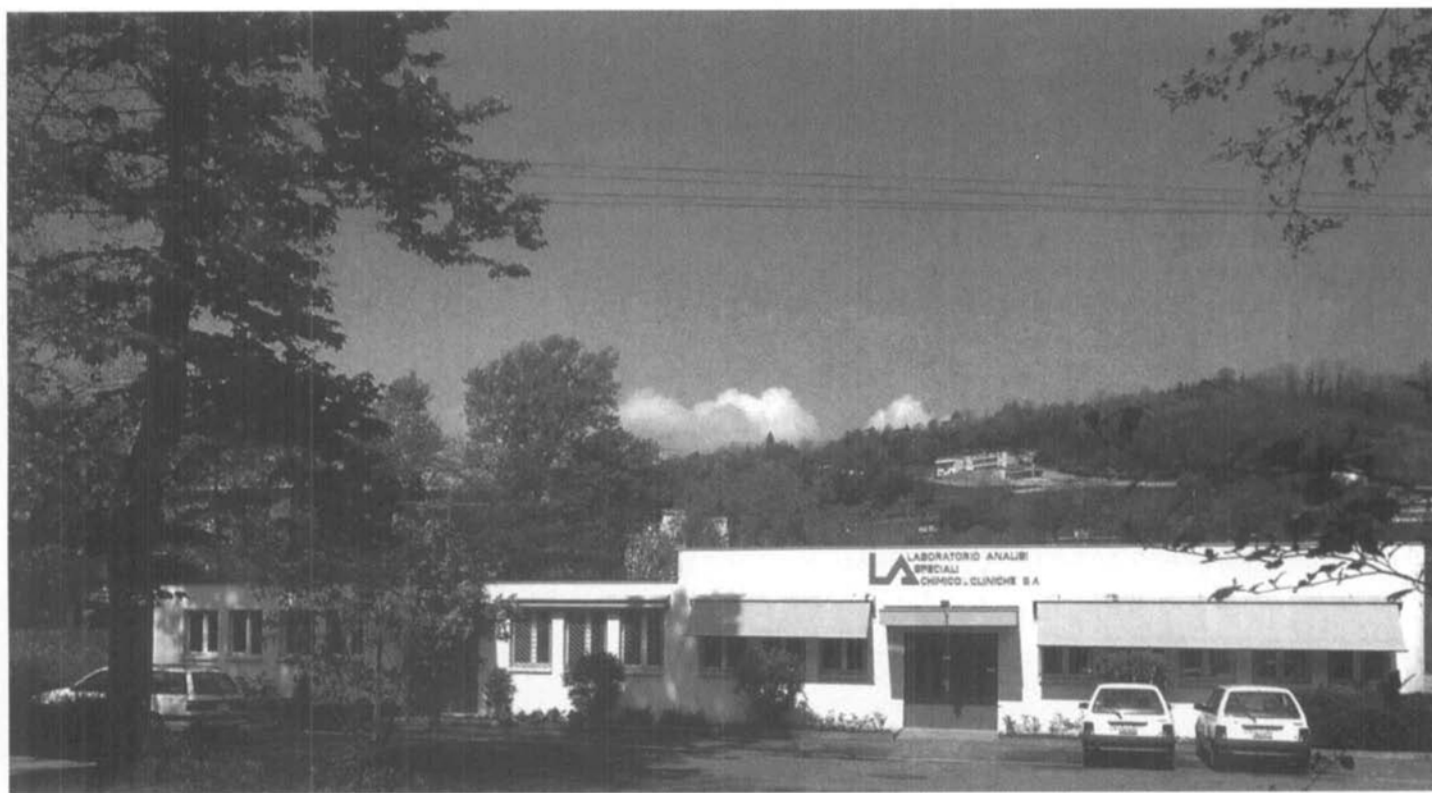


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rials or for quality controls of the end products. The activity of the section was extended to meet requests about environmental controls and special analysis.

Instrumentation used is as follows:

- UV/VIS spectrophotometers
- IR and fluorescence spectrophotometers
- Karl-Fischer titrator
- Kjeldahl digestors
- HPLC with UV/VIS and diode-array detectors
- GC with FID, NPD, FPD, and ECD detectors
- AAS with burner, graphite furnace or mercury/hydride system.

Microbiology applied to pharmaceutical products, alimentary products, water for domestic or industrial uses, waste water or bathing water completes the analytical service that LA provides to industries and more in general to customers.

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Lonza G+T*

Synthetic Graphite Powder, a Product from Tessin

1. Introduction

Officine del Gottardo founded in 1908 and located in Bodio (Tessin) began in 1916 the production of Silicon Carbide and later synthetic graphite powder by means of large quantities of electricity consuming *Acheson* furnaces. *Officine del Gottardo* used to be a wholly owned company of *Lonza AG*. In 1989 the plant was merged with the *Lonza Graphite Centre* in Sins (Argovia) to establish the new firm *Lonza G+T*. Since 1994 it belongs to the French group *Imetal*. As a consequence the company will change the name again in the near future. The former *Officine del Gottardo* is one of the biggest plants in the world for the manufacturing of synthetic graphite powder. Thousands of tons of graphite find their way to North and South America, Japan, China, Australia, South Africa, even India and Pakistan to serve a purpose in the daily life. In 1993 *Lonza G+T* was certified to comply with the ISO 9001 standards.

The following article is not only dealing with some aspects of the manufacturing of synthetic graphite powder but it will describe also some applications and a short description of the most important characteristics. It will, however, not focus on the

fundamental physical and chemical properties of graphite since they can be gathered from a variety of literature [1-3].

2. The Various Forms of Graphite

Graphite occurs in many different forms:

- as powder of flake mined from the earth and purified, referred to as natural graphite
- as powder synthesized in high temperature furnaces, referred to as synthetic graphite
- as graphite parts such as graphite electrodes, moderator blocs, seals and bearings crucibles or refractory plates.

Synthetic graphite consists of polycrystalline polygranular graphitic carbon. An extended heat treatment combined with carefully selected raw materials results in a graphite of not only purity and almost perfect crystalline structure but also very high consistency and predictability; in the market referred as *Lonza Graphite*. The unique combination of various properties makes this 'black material' very useful for a variety of applications.

3. The Use of Synthetic Graphite in the Daily Life

Synthetic graphite powder is not only environmentally harmless and nontoxic but it has exciting characteristics such as self lubrication, electrical and thermal con-

ductivity, chemical inertness, (with some exceptions) up to several hundred degrees, and serves as a host for intercalation reactions. The following few examples demonstrate the very useful behaviour of graphite. Very often not only one but several properties are required so as to meet a certain performance.

3.1. Lubrication Properties

Synthetic graphite powder found its place as a *friction modifier* so as to prevent blockaging, to reduce wear and to enable a smooth breaking. In addition graphite reduces the noise of breaking remarkable.

Engineering parts containing synthetic graphite as an additive provide excellent *self lubricating properties*. Water meters for example determining the water consumption of a household include such products.

3.2. Electrically Conductive Properties

Synthetic graphite powder serves in primary alkaline batteries as an *electronic conductor* and compaction additive in the positive electrode. The requirements regarding purity of the graphite became even more stringent when the battery industry successfully developed the mercury free alkaline cell.

An equipment very often used in a household is the dust cleaner. The specifications for the electric motor of the air ventilator and the carbon brushes accordingly are stringent so as to meet the users demand. Synthetic graphite provides the *electric conductivity, the lubrication properties, the hardness, and others* to the carbon brush.

In total more than twenty different applications of the synthetic graphite powder could be discussed. However, a brief description of the manufacturing process might be of interest as well.

4. The Manufacturing Process

The manufacturing of *Lonza Graphite* consists basically of *Acheson* furnaces and

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