

# Institute of Organic Chemistry with Centre of Phytochemistry



Sofia 2007

The Institute of Organic Chemistry with Centre of Phytochemistry (IOCCP) at the Bulgarian Academy of Sciences was founded in 1960. Since its foundation the Institute has been playing an important role in Bulgaria as a leading scientific institution in the field of organic chemistry. The international recognition gained by the Institute was acknowledged by the foundation of the Centre of Phytochemistry for scientific and applied research and training of scientists in 1977 within a joint project of the Bulgarian Government, UNDP and UNESCO.



*Synthetic laboratory in IOCCP*

The main fundamental and applied investigations in IOCCP include: clarifying the relationship between the synthesis, the structure and the reactivity of organic compounds; isolation, determination of the structure and practical application of natural compounds; determination of the structure and the function of proteins, enzymes and peptides; study of the thermal and catalytic transformations of hydrocarbons.

Noteworthy among the greatest accomplishments of the scientists, employed in IOCCP are:

→ Creation of new methods for synthesis of organic compounds as well as development of the enantioselective catalyst applying organometallic compounds;

→ Development of new anticorrosion and decorative Galvan plating (copper, zinc and other metals and alloys) based on new organic additives, synthesized and implemented industrially in Bulgaria and used for more than two decades in the automobile industry of Eastern Europe;



*Spectrophotometer Lambda 25 and Spectrofluorimeter LS 50 (Perkin Elmer)*

→ Investigation on the basis of spectral (NMR, IR and UV-VIS absorption and fluorescence spectroscopy) as well as computing methods of the relationship structure – spectral properties and structure – reactivity of organic compounds for the purpose of design and synthesis of new materials for nanotechnology and optoelectronics, photo protectors, fluorescence labels with application in biology and medicine, etc;

→ isolation of natural compounds originating from Bulgarian and foreign medical and aromatic plants, propolis, non-poisonous mushrooms, insects and nautical

organisms in order to characterize their chemical constitution and to find new biologically active substances for medicine and pharmacy;

→ Investigation of the mechanism of nutritiousness fats and oils in order to improve their quality and prolong the terms of their preservation;



*Apparatus for gas - chromatography analysis Shimadzu GC-17A*

→ Development of new analytical methods for investigation and standardization of food products aiming to prove their quality and authenticity;

→ Studies of the chemical mechanism of action of the membrane during protein biosynthesis using a combination of theoretical and physical-organic chemistry approaches;

→ Production of “Neprolizine” used for enzyme cleaning of healing wounds has been patented;

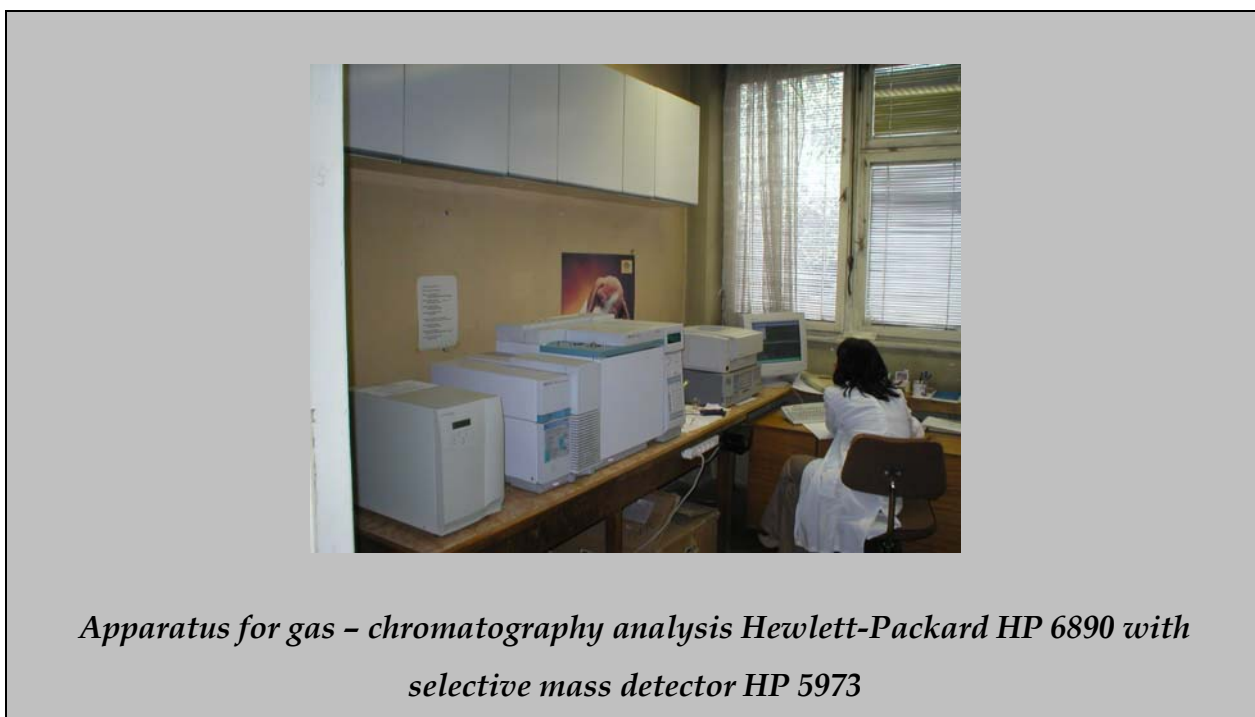
→ Creation of new biotechnological methods for preparation of enzymic protein hydrolyzates with application in restoratives for medicine and sports;

→ Isolation of pectin polysaccharides from leeks acting as immunomodulators; determination of their carbohydrate and amino acid contents;

→ Agricultural wastes utilization for active carbon production, applied for potable and waste waters cleaning;

→ Development of a method for production of highly effective carbon adsorbents with possible application as a drug, for cleaning of wasted waters and gases, as an adsorbent in food industry, etc.;

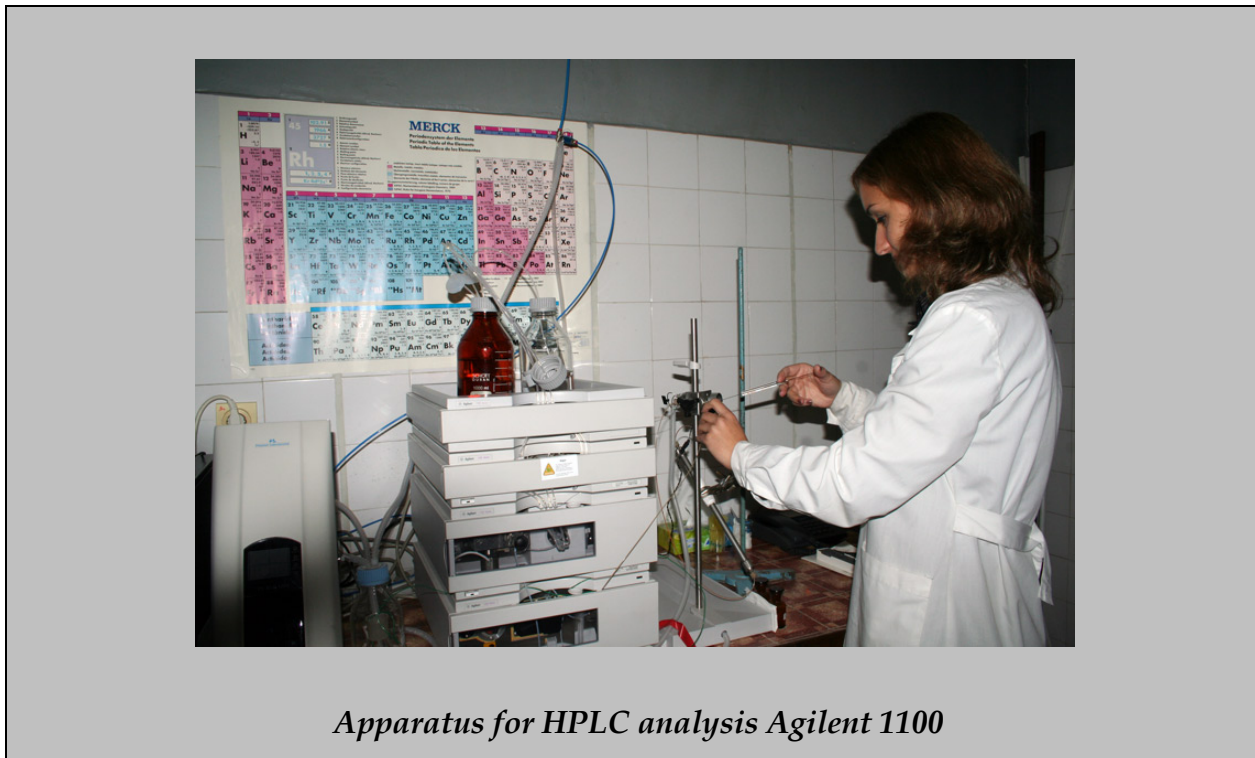
→ Preparation and characterization of nanocomposite materials on the basis of ultra dispersed diamond powders used as catalysts supports;



→ Development of a method for production of highly effective carbon adsorbents with possible application as a drug, for cleaning of wasted waters and gases, as an adsorbent in food industry, etc.;

→ Development of new heterogeneous catalysts for processing of hydrocarbon raw materials and obtaining of ecologic and alternative fuels;

→ Study of the possibilities to respect the legislation norms for lignite combustion



The total number of scientists employed in IOCCP is 104 (30% of which are below 35 years old), including 49 professors and associated professors. The IOCCP is engaged in the education of PhD students, as well as Bachelor and Master Degree students. IOCCP is the only center in Bulgaria for teaching students in the field of NMR spectroscopy.



*NMR spectrometer Bruker Avance DRX-250 (250 MHz)*

During the last years IOCCP is organizing a number of schools and workshops for young scientists with international participation, as well as the XVIIth EuCheMS Conference on Organometallic Chemistry which will be held in Sofia in September 2007.



*NMR spectrometer Bruker Avance II + 600 MHz*

The administrative structure of IOCCP includes 11 departments namely:

- **Organic syntheses and stereochemistry**
- **Structural organic analysis**
- **Nuclear magnetic resonance**
- **Chemistry of natural products**
- **Chemistry of lipids**
- **Chemistry and biophysics of proteins and enzymes**
- **Biocatalysts**
- **Chemistry of solid fuel**
- **Organic reactions on micro porous materials**
- **Physical organic and computational chemistry**
- **Biologically active compounds**



Since its foundation the Institute of Organic Chemistry with Centre of Phytochemistry is a preferable partner for joint scientific projects of institutes and universities from most of the European countries, as well as of a number of European scientific foundations, e.g. DAAD, Alexander von Humboldt and National Science fund of Swiss. At present the scientists from IOCCP participate in 34 scientific projects financed by the National Science Fund of Bulgaria, as well as in 13 projects supported financially by EU, NATO and other international organizations. During the last years the contacts of IOCCP with many of the leading European and Bulgarian companies, like Johnson & Johnson Pharmaceutical Research and Development, Janssen Pharmaceutica N.V. (Belgium), Shering AG (Germany), Rhône Poulenc (France), Actavis (Bulgaria), Sopharma (Bulgaria) etc. have been successfully developed. In Bulgaria IOCCP has a very close cooperation with other chemical and biological institutes of the Bulgarian Academy of Sciences, as well as with the leading universities.

In order to improve the level of scientific investigations in IOCCP as well as to enlarge the contacts with leading European and Bulgarian companies the available spectral apparatus of the institute was entirely renovated. New UV-VIS Spectrofluorimeter and Spectrofluorimeter (Perkin Elmer), two HPLC devices (Agilent) as well as FTIR spectrometer (Bruker) have been bought.

In the beginning of 2007 the installation of a new modern NMR spectrometer (600 MHz) with possibilities for registration spectra both in liquid and in rigid medium had been conducted and the beginning of a **National NMR laboratory** was established.

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