

## 14. The development of chemical technologies in Ukraine and abroad

**Alla Rybnikovich**

**Kristina Zaets**

**Juliya Lapta**

*National University of Food Technology*

**Introduction.** Throughout its development, from ancient times to the present days, chemistry has always served and continues to serve the individual and its practice. Chemistry is the scientific study of the structure of substances, how they react when combined or in contact with one another and how they behave under different conditions, it is the study of the materials and substances of the world in which we live. The materials, which make up the earth, sea and air, are called raw materials. These include many important natural resources like ores, rocks, coal and gas. The modern science of chemical process includes many branches of science, scientists demonstrate the need to use different interrelated nature of knowledge in scientific field. Chemical engineers are comfortable with chemistry, but they do much more with this knowledge than just make chemicals. In fact, the term "chemical engineer" is not even intended to describe the type of work a chemical engineer performs. Instead it means to reveal what makes the field different from the other branches of engineering. Chemical engineer alone that draws upon the vast and powerful science of chemistry to solve a wide range of problems. The strong technical and social ties that bind chemistry and chemical engineering are unique in the fields of science and technology. The future of the chemical industry is the development of the new technologies.

The modern human experience places a large emphasis upon the material world. From the day of our birth to the day we die, we are frequently preoccupied with the world around us. Whether struggling to feed ourselves, occupying ourselves with modern inventions, interacting with other people or animals, or simply meditating on the air we breathe, our attention is focused on different aspects of the material world. Understanding chemistry is the key to understanding the world. Over the years, development of organic chemistry in Ukraine has been connected with its geographical position and natural resources. Being separated into two parts during the 17th-early 20th centuries, Ukraine was greatly influenced in its Western part by German and Polish culture. Eastern regions, geographically closer to Russia and extremely rich in coal and other raw materials, were strongly connected with the development of Russian, and later Soviet science and industry. The Western and Eastern parts of Ukraine were united under Soviet power in 1939. Since then, and through the 1990's, when Ukraine gained

independence, organic chemistry, as one of the leading disciplines of science, developed along the same lines in a united Ukraine. Pharmacists are believed to be one of the first groups of people to deal with organic substances, their simple transformations, and laboratory techniques. The industrial revolution of the 19th century had a great impact on the development of organic chemistry and its applications in Ukraine. By the mid 19th century Eastern and Central Ukraine became a largest producer of sugar in Europe. In 1869, John Hughes, a British engineer and entrepreneur, started the first metallurgical plant in Donetsk region and began the industrial production of coal. This burst in industrial development was a basis for further progress in organic chemistry and chemical technology. Despite dramatic social changes at the beginning and at the end of the 20th century and the impact of two World Wars, organic chemistry in Ukraine continued to develop. Nowadays, multiple theoretical and practical aspects of organic chemistry are studied in scientific institutions and universities throughout the country. Leading technical schools conduct research in the areas of general organic, heterocyclic and polymer-supported synthesis and their technical applications. Chemical industry is one of the principal sectors of Ukraine economy. It numbers some 200 enterprises and associations, where over 35 thou people are engaged in. According to the data of the Ministry of Industrial Policy, they manufacture up to 20 thou names of production to the sum of UAH 40-45 bn. 2,7% - in the structure of GDP. One of the principal lines of development of the Ukrainian chemical sector is the adoption of energy-saving technologies. Food processing has an annual turnover of USD 19.496 million (in 2011), making up 15% of total industrial output. It generates direct employment for 13% of working population. Food processing has been less affected by the economic crisis than other manufacturing sectors in Ukraine even registering, on average, positive growth of 5% during 2008-2011. Pharmaceutical industry is traditionally one of the main industry sectors in the economy of Ukraine. It covers production of pharmaceuticals and medical purpose articles, wholesale and retail trade, specialized storage and distribution through developed sales network. It is one of the most dynamic and profitable industries. During 2009-2011 Ukrainian pharmaceutical market showed strong growth reaching pre-crisis level in volume terms. Total Ukrainian market was estimated to be USD 3 bn in 2011 and is the second biggest market in the CIS. In 2011 pharmaceutical market of Ukraine has fulfilled optimistic expectations of the operators as it grew by 15% in USD equivalent. In volume terms the market barely reached pre-crisis level.

The chemicals industry is one of the United States largest manufacturing industries, serving both a sizable domestic market and an expanding global market. It is also one of the top exporting sectors of U.S. manufacturing. Accounting for 15 percent of global chemical shipments, the United States is a world leader in chemicals production and exports. The

industry's more than 8,000 firms produce more than 70,000 products. In 2011, the U.S. chemicals industry had sales of \$763 billion and directly employed more than 788,000 workers. Germany's chemical sectors play a keystone role. Supported by world-renowned research and development institutes and dependable supply-chains, Germany offer investors fertile ground for their product development and market integration within Europe's largest economy. From 2008-2010 turnover in chemicals in the UK fell by 14%, according to figures from the country's Office of National Statistics. The decrease was particularly steep in commodities, which accounts for around 40% of the UK chemical industry's turnover. The UK still has a highly developed industrial infrastructure, especially in and around its main chemicals clusters in the northwest and northeast of England. These are becoming centers of innovation based on newly forged links between academia and industry. New technological platforms are being built with the help of some of the world's leading universities. The country has highly qualified personnel in the upper tiers of chemistry and chemical engineering. Today there are around 70,000 practicing chemical engineers in the United States. During the entire history of the profession there have been only about 135,000 American chemical engineers. Chemical engineers concern themselves with the chemical processes that turn raw materials into valuable products. The necessary skills encompass all aspects of design, testing, scale-up, operation, control, and optimization, and require a detailed understanding of the various unit operations, such as distillation, mixing, and biological processes.

**Conclusions.** The importance of chemistry in our lives is immense. Once knowledge of chemistry was used in primitive way but now incredible stuff can be created. Chemistry has the power to explain everything in this world, from the ordinary to the bizarre. Thanks to alchemical knowledge now scientists have learned to create drugs and save lives, materials that provide comfort. The ties between chemists and chemical engineers has been beneficial to both sides. Advanced scientific development opens up new prospects for the chemical industry. Composite materials, coating ceramic, polycrystalline silicon, nano-membranes and many others new items will allow the chemical industry to start producing a fundamentally different products with previously unimaginable properties. Due to chemistry our country and world in general will find solutions to many problems that are currently considered to be global. In the future, the chemical industry will be transformed into safe multifunctional facilities that produce products demanded in various industries.

#### **References**

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**Scientific supervisor: Natalia Nesterenko**