

# **CHEMICAL & ALLIED PRODUCTS IN CROATIA**



**Report prepared  
for the Embassy of India in Zagreb  
by Rahela Jurković, PhD**

**Zagreb, September 2018**

## TABLE OF CONTENTS

Executive summary.....	3
1. Introduction .....	4
2. Basic information and data regarding the sector .....	10
3. Main national strategies concerning the sector .....	15
3.1. Industrial Strategy of the Republic of Croatia .....	15
3.2. Smart Specialisation Strategy .....	17
4. Associations and research institutions supporting the sector .....	20
5. Business opportunities for Indian companies .....	24
6. List of useful contacts .....	37
Literature.....	38

## Executive summary

The sector of chemical and allied products has a long tradition in Croatia, started at the turn of 19<sup>th</sup> and 20<sup>th</sup> centuries. Two Nobel laureates in chemistry were of Croatian origin: Lavoslav Ružička (1887 – 1976) and Vladimir Prelog (1906 – 1998). The chemical and allied products' Croatian industry today is concentrated around larger towns, especially Zagreb, the capital city. Besides long history and tradition, the sector is characterised by highly skilled workforce, high-quality and price-competitive products, excellent geostrategic location within Europe, and rising domestic demand. The last statistical figures demonstrate that the annual revenues generated in the sector is around 780 million EUR, meaning that this industry has a share of 3.9% in the total manufacturing industry of Croatia. There are more than 340 companies active in the sector, employing around 5,700 people. Most of these companies, especially small and medium ones, serve the domestic market. The current concerns of the companies operating in the sector are: to restructure and modernise production processes in order to meet European standards, to reduce operating costs and to achieve international quality certification. Many companies, especially larger ones, are export-oriented. As main weaknesses of the sector, uncertainty over fuel supplies, high energy and logistic costs, lack of investment in new and innovative products, insufficient investment in marketing, are recognised, followed by inadequate links between companies and research institutions to develop new products and improve technology, high cost of taxes, levies and utility charges, and heavy administrative and regulatory burden. Some of these weaknesses are subject of the current strategies of the Republic of Croatia: Industrial Strategy and Smart Specialisation Strategy, and their proposals for action. Also, some of these issues are tackled at the level of the European Union (EU). As an EU Member State and participant at the common European market, Croatia is influenced by the policies and legislation decided at the level of all 28 EU countries. Some of the common issues important for European businesses (including Croatian ones) operating in the sector of chemical and allied products are the following: an urgent need for a long-term EU industrial strategy, as other world regions (including India) are implementing ambitious plans to promote local world-leading industrial activity; building-up production facilities and attracting investments by putting industry at the very top of the EU political agendas; recognising that the European chemical industry is of genuine importance for economic development and wealth, providing modern products and materials and enabling technical solutions in virtually all sectors and value chains of the manufacturing economy.

## 1. Introduction

The sector of chemical and allied products is classified according to the Statistical Classification of Economic Activities in the European Community, abbreviated as NACE<sup>1</sup>, which is the classification of economic activities in the European Union (EU), as the sector 20: Manufacture of chemicals and chemical products. It is further divided into the following segments: 20.1. Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms; 20.2. Manufacture of pesticides and other agrochemical products; 20.3. Manufacture of paints, varnishes and similar coatings, printing ink and mastics; 20.4. Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations; 20.5. Manufacture of other chemical products; and 20.6. Manufacture of man-made fibres.

The manufacture of chemicals and chemical products on the territory of today's Croatia started at the end of 19<sup>th</sup> and beginning of 20<sup>th</sup> century, when several factories were built, following trends and technologies developed in Europe. Between 1900 and 1918, a sulfuric acid and mineral fertiliser factory in the town of Koprivnica and a factory for the production of calcium carbide and cyanamide in Dugi Rat were built. During the period between the two World Wars, the chemical processing industry had further developed, based on imported raw materials and semi-finished products. After the II World War, destroyed and damaged factory facilities were reconstructed, capacity increased, and new productions plants emerged too. For instance, a poly (vinyl chloride) plant was built in Kaštel Sućurac and in Zagreb a factory for photographic material and a factory for production of organic colours. Since then and until the 1980s, the chemical industry in Croatia was steady growing, and new capacities have been built for the production of technical chemicals, coatings, plant protection products, essential oils, auxiliary materials for textile industry, leather and rubber industries, etc. In the second half. Production plants for petrochemicals (polyethylene, polystyrene and others), natural gas fertilisers and aromatic hydrocarbons were also built in the period after the WWII. In comparison to 1939, the production of Croatian chemistry industry in the 1970s noticed a 20-fold increase. The growth was however stopped by the war for Croatian independency (1991-95), causing reduction of overall industrial capacities, including the chemical and allied products industry. Current situation of the

---

<sup>1</sup> The term NACE is derived from French: *Nomenclature statistique des activités économiques dans la Communauté européenne*.

sector and the latest statistical figures will be presented in the subsequent chapters of the report.

However, before presenting the contemporary Croatian chemical industry, we should not forget to mention two Nobel prize winners in chemistry of Croatian origin, although both made their successes abroad, and became Swiss citizens: Lavoslav Ružička and Vladimir Prelog.

Lavoslav (or Leopold) Ružička (1887 – 1976) was born in Vukovar, in eastern part of Croatia. He attended the primary school and the classical gymnasium in the nearby town of Osijek, but he then went to Germany, to study chemistry. While working as an assistant to the German chemist Hermann Staudinger, Ružička investigated the composition of the insecticides in pyrethrum. Accompanying Staudinger to the Federal Institute of Technology in Zürich, he became a Swiss citizen and lectured at the institute. In 1926 he became professor of organic chemistry at the University of Utrecht in the Netherlands, and three years later he returned to Switzerland, where he became professor of chemistry at the Federal Institute of Technology.



Ružička's investigations of natural odoriferous compounds begun in 1916, culminated in the discovery that the molecules of muskone and civetone, important to the perfume industry, contain rings of 15 and 17 carbon atoms, respectively. Before this discovery, rings with more than eight atoms had been unknown and had been believed to be too unstable to exist. Ružička's discovery greatly expanded research on these compounds. He also showed that the carbon skeletons of terpenes and many other large organic molecules are constructed from multiple units of isoprene. Terpenes are a large and varied group of substances that range from rubber and the solvent turpentine to the cholesterol in our blood. Ružička studied fragrances in perfumes and became interested in how they were related to other substances. In the mid-1920s he concluded that the substances were composed of the same building block, terpene isoprene. By manipulating cholesterol molecules, in the mid-1930s Ružička discovered the molecular structure of several male sex hormones, notably testosterone and androsterone and subsequently synthesised them. He later demonstrated that testosterone also could be produced from cholesterol. In 1939 Ružička won the Nobel Prize „for his work on polymethylenes and higher terpenes". He continued

his scientific career in Switzerland, and during his lifetime acquired eight honorary doctorates (4 Science, 2 Medicine, 1 Natural Sciences, 1 Law), 7 prizes and medals, 24 honorary memberships of chemical, biochemical and other scientific societies, 18 honorary, ordinary and foreign memberships of scientific academies.

Vladimir Prelog (1906 – 1998) was born of Croatian parents in Sarajevo (Bosnia and Herzegovina). He was educated at the Technical School of Chemistry in Prague, receiving his doctorate in 1929. After several years in a commercial laboratory, he began teaching at the University of Zagreb in 1935, first as a lecturer and later as professor of organic chemistry. With a support of Lavoslav Ružička, in 1942 Prelog joined the Faculty of the Federal Institute of Technology in Zürich, where he served as head of the Organic Chemistry Laboratory, from 1957 to 1965. He became a Swiss citizen in 1959. At the end of the 1940s, Vladimir Prelog began researching the connection between the structures of organic molecules and how they react. His studies included ring-shaped molecules of medium size and how reactions can arise when different parts of the molecule come into contact with one another. He also studied substances that occur in two different reversed forms and how they react. Prelog performed wide-ranging research on the stereochemistry of alkaloids, antibiotics, enzymes, and other natural compounds. In particular, he contributed to the understanding of stereoisomerism, in which two compounds of identical chemical composition have different, mirror-image configurations. With Robert Cahn and Sir Christopher Ingold, he developed a nomenclature for describing complex organic compounds. This system, known as CIP, provided a standard and international language for precisely specifying a compound's structure. Vladimir Prelog won the Nobel Prize in Chemistry in 1975 "for his research into the stereochemistry of organic molecules and reactions". He shared the prize with the Australian/British research chemist John Cornfor, who was also awarded with Nobel prize for his work on the stereochemistry.

At the end of this chapter, as Croatia is a Member State of the European Union (EU) and the EU Single Market, where the national industries are regulated at the EU level, we will shortly present the most recent Manifesto of the European Chemical Industry Association - Cefic<sup>2</sup>. Emphasising the chemical industry's role in Europe of an enabler of all other manufacturing sectors and notwithstanding overall good growth results of the chemical industry in the EU in 2017, Cefic pointed out to an urgent need for a long-term EU industry strategy, as other

---

<sup>2</sup> See chapter 4 for more information on Cefic.

world regions implement ambitious plans to promote local world-leading industrial activity. Recognising the chemical industry’s strategic importance for a successful industrial strategy, China, the Middle East and India, quotes Cefic, have all made successful efforts to build up large and increasingly sophisticated production facilities and attract high investments by putting industry at the very top of their political agendas. The same applies to the United States of America where the recent shift towards “America First” will inevitably have further strong impacts on their industrial policy. Therefore, Cefec urged the European Commission to recognise in its further strategies that the European chemical industry is of genuine importance for economic development and wealth, providing modern products and materials and enabling technical solutions in virtually all sectors and value chains of the manufacturing economy. The industry is also an essential solution provider for the achievement of a competitive, low carbon economy and the circular economy, as well as all other major societal challenges. As such, the chemical industry will be a key contributor to the achievement of the United Nations’ Sustainable Development Agenda 2030.



Figure 1: Geographical breakdown of the world chemical sales (in billion EUR)  
 Source: Cefic Manifesto, 2018

The chemical industry plays a pivotal role in providing the solutions needed to enable the transition to a low-carbon and circular economy, which are stated

policy objectives of the EU. According to Cefic, it is crucial that the future EU Industrial Policy Strategy is mainstreamed across all EU policies in a masterplan enabling the industry to transform, by creating a favourable business environment that stimulates innovation.

Cefic's recommendations for the EU policy in the sector of chemical and allied products are hence the following:

### **1. Drive energy and climate policies to be cost-competitive**

Competitive energy pricing should be defined explicitly as a policy objective. EU policies should not add further to the existing disadvantage against other regions the chemical industry is already facing. The EU should vigorously continue its raw materials strategy with regard to discriminatory practices of third countries (export restrictions, export duties, etc.) for the various organic and inorganic feedstock used by the chemical industry. The EU should also remove its own import tariffs (e.g. 60% on bioethanol) or market distorting policies regarding chemical feedstock.

### **2. Complete the Single Market in networks** (Single Electricity Market, rail infrastructure, digital)

A cost-effective lower carbon electrical economy depends on progressively greater availability of significant additional quantities of lower carbon electricity within a functioning Single Electricity Market. A functioning Single European Electricity Market is a priority action in ongoing efforts to shape a new common energy policy. Considerable gains in efficiency of the single market can be made through greater coordination and inter-operability of crucial infrastructure including the rail network. Completion of the single market is equally important for digitalisation (Digital Single Market). This starts with public investment in improved digital connectivity (e.g. 5G networks).

### **3. Ensure that industry continues to play a central role in future EU R&D policy and priority-setting**

Increased research and innovation investments are important drivers of Europe's competitiveness. Industrial success depends ever more on the speedy conversion of knowledge into innovation. The chemical industry has a strong and enabling position in multiple value chains and holds a pivotal position in research and development (R&D) and the market introduction of innovative solutions. A thriving, innovative chemical industry is at the root of a dynamic and creative



European society that keeps a leading role on the global scene. Therefore, European chemical industry needs a competitive innovation ecosystem, aimed at all technology readiness levels to prepare for large-scale investment decisions, and focusing on Key Enabling Technologies (KETs), including advanced process technologies and advanced materials. Furthermore, alignment and complementarity of research and innovation policies and funding instruments at the EU, Member States and regional levels, should be improved.

#### **4. Ensure integration into the global trading system**

Open markets for EU chemical exports are a key priority for European industry. Improved market access to growth markets in the world should be obtained by means of ambitious EU Free Trade Agreements (FTAs) with third countries. They should include simple and flexible rules of origin, provisions governing undistorted access to energy and renewable raw materials and mechanisms for regulatory dialogues on chemicals.

## 2. Basic information and data regarding the sector

The chemical industry in Croatia is concentrated around larger towns, especially Zagreb, the capital city. The last statistical figures demonstrate that the annual revenues generated in the sector is around 780 million EUR, meaning that this industry has a share of 3.9% in the total manufacturing industry of Croatia. There are more than 340 companies active in the sector, employing around 5,700 people. Most of these companies, especially small and medium ones, serve the domestic market. The current concerns of the companies operating in the sector are: to restructure and modernise production processes in order to meet European standards, to reduce operating costs and to achieve international quality certification. Many companies, especially larger ones, are export-oriented. Chemicals' share in total Croatian exports is 5.2%.

The share of the chemical industry sector in the gross domestic product (GDP) of Croatia is around 1%. At the same time, the share of chemical, chemical and man-made fibres production in the total gross value added (BDV) of the manufacturing industry is 3.2%. In the total employment of the manufacturing industry in 2017, the sector of the chemical and allied products participated with a share of 2.7%.

The chemical and chemical industries have not yet reached the level of production and employment from the pre-recession level in 2008. Despite that, an encouraging sign is that in 2017 exports of chemicals and chemical products increased by 9% compared to 2008, while imports increased by 16.5%.

After the chemical and chemical industries recorded positive growth rates for three consecutive years (2.7% in 2014, 11.7% in 2015 and 12.9% in 2016), in 2017 an annual decline of 14.2% was recorded. The decline in production was negatively impacted by employment, which declined by 1.5%. Compared to 2016, average monthly gross salaries of employees in this industry increased by 2.8% in 2017. The average gross earning paid in December 2017 in the chemicals and chemical products industry was 7,835 HRK (ca 1,060 EUR), which was 2.7% below the average of the economy and 10.2% above the average of the entire manufacturing industry. If we look at the trends of employees in the chemical and chemical industry and the entire manufacturing industry from January 2008 to January 2018, we can observe two periods: the first period from January 2008 to December 2014, and the second period, from January 2015 to January 2018.

The first period was marked by a sharp drop in the number of employees at the level of the manufacturing sector (down 20.4%) and even more at the level of the chemical industry (a drop of 35%). The second period is marked by oscillatory trends in the number of employees, both at the level of the manufacturing industry as a whole, and at the level of chemical and chemical industry. The analysis of gross wage developments from 2008 to 2017 in the industry also points to two periods. In the period from 2008 to 2010, the gross wages of the industry were falling; while after 2011 there was a slight growth period. It is worth to note that the average monthly gross salary paid in the chemical and chemical industry over the entire period from 2008 to 2017 was above the average of the manufacturing industry, but below the national average. However, salaries paid in the chemical and chemical industry in 2016 almost reached the state average (99.9% percent), and in 2017 they were only slightly below it (by 1.2% the national average).

After a short-term drop in labour productivity of 2.5% in 2012 compared to 2010, industry of chemicals and allied products marked a period of productivity growth over the next four years. Thus, the productivity of the chemical and chemical industry in 2016 was 69.4% higher than in 2010. However, in 2017 the industry recorded a year-on-year drop in manufacturing productivity of 14.9%. The decline in the manufacturing performance of the chemical and chemical industry is attributable to a stronger decline in production activity than the decline in employment over the same period. Despite that, recent data indicates a recovery in the production activity of the sector: in the fourth quarter of 2017 the production increased by 10% compared to the third quarter of the same year.

In the total export of the manufacturing industry from January to December 2017, the chemical and allied products accounted for 5.8%. At the same time, the sector accounted for 8.7% in the total processing industry's imports. In 2017, the export of the chemical sector was growing faster than imports: exports in 2017 increased by 11.7% compared to 2016 and imports by 7.3%. However, because of the high dependence on imported raw materials, the industry is constantly experiencing foreign trade deficit. In 2017 the deficit amounted to 900 million EUR.

Main strengths and weakness of the sector of chemical and allied products in Croatia are presented in the Table 1.

**Table 1: Strengths and weakness of the chemical industry in Croatia**

<b>Strengths</b>	<b>Weaknesses</b>
<p>Long history and tradition</p> <p>Highly skilled work-force</p> <p>Advanced technology</p> <p>High-quality and price-competitive products</p> <p>Excellent geostrategic location within Europe with access to Central Europe, the Mediterranean and three Pan-European corridors</p> <p>Seaports and most modern transport infrastructure in the region</p> <p>Rising domestic demand</p>	<p>Dependence on imported raw materials</p> <p>Uncertainty over fuel supplies</p> <p>High energy and logistic costs</p> <p>Lack of investment in new and innovative products</p> <p>Insufficient investment in marketing</p> <p>Inadequate links between companies and research institutions to develop new products and improve technology</p> <p>High cost of taxes, levies and utility charges</p> <p>Heavy administrative and regulatory burden</p>

*Source: Cefic, 2018*

Some of the weaknesses mentioned in the Table 1 that need to be further clarified are related to high taxes and administrative burden. Namely, high energy prices, high taxes and parafiscal charges, and demanding legislation that request from manufacturers to meet high standards of environmental protection and human health in production processes, represent an additional pressure on the profitability of the industry. Since it is an energy-intensive sector, it is important to mention the Government's decision of September 2017 to increase the renewable energy (OIE) premium from 3.5 lb per kilowatt (kWh) to 10.5 lb per kWh, which has had significant consequences for the businesses. The

companies active in the sector expressed their disagreement with the increase in the level of compensation for renewable energy sources, arguing that it was a burden on the economy, with a negative impact on operating costs and competitiveness. There are now agreements underway trying to establish compensatory measures to mitigate the effects of increased OIE compensation in energy-intensive production. As Croatia is an EU member state, the measures should be in line with existing practices in other EU countries.

Besides above-mentioned strengths and weaknesses, there are many opportunities for growth of the chemical industry in Croatia, such as the following. Consumption of most chemical products per capita in Croatia has not yet reached EU levels. The production structure of the chemical industry should be changed to boost the competitiveness of the Croatian chemical industry, and to move toward the production of high value-added products. Croatia's assets in this sector are a highly skilled labour force, supported by good scientists and an excellent geostrategic location.

When concerns the ten largest companies operating in the sector (presented in the Table 2), main feature of great majority of them is doing profitable business. If property ownership is observed, it is noticed that many of them are foreign owned. Only three of them (Labud, Chromos-Svjetlost and Agrochem-Maks) are domestically owned, while Petrokemija is in domestic ownership with 79.85% ownership of the State. The remaining companies are either fully or partly foreign owned, while the share of foreign ownership in the company Saponia d.d. is 87%. Each of the ten largest companies is presented in more details in the chapter 5 of this report.

**Table 2: Leading companies in the sector**

<b>Leading Croatian companies in the sector of chemical and allied products</b>					
<b>No</b>	<b>Name of the company</b>	<b>Revenue in 2017 (in '000 EUR)</b>	<b>Revenue Change 2017/2016</b>	<b>Profit before taxation (in '000 EUR)</b>	<b>No. of employees</b>
<b>1</b>	PETROKEMIJA d.d.	269,752	3.32%	-32.786	1,612
<b>2</b>	SAPONIJA d.d.	95,070	-5.41%	3,679	840
<b>3</b>	HEMPEL d.o.o.	33,299	4.77%	5,520	91
<b>4</b>	SCOTT BADER d.o.o.	26,353	13.47%	401	61

<b>5</b>	ADRIATICA DUNAV d.o.o.	25,010	-3.58%	112	55
<b>6</b>	CHROMOS SVJETLOST d.o.o.	22,689	5.87%	2,627	166
<b>7</b>	LUSH MANUFAKTURA d.o.o.	21,543	50.69%	2,361	247
<b>8</b>	LABUD d.o.o.	16,738	-16.57%	105	94
<b>9</b>	AGROCHEM-MAKS d.o.o.	16,621	-0,12%	683	17
<b>10</b>	CHROMOS AGRO d.d.	14,691	2.79%	121	80

*Source: magazine Lider, 2018*

### **3. Main national strategies concerning the sector**

The sector of chemical and allied products in Croatia is a subject of two core documents of the Government of the Republic of Croatia, with an aim to include the sector in the overall goals important for the growth of Croatian economy. These two documents, the topic of this chapter, are: The Industrial Strategy of the Republic of Croatia and The Smart Specialisation Strategy.

#### ***3.1. Industrial Strategy of the Republic of Croatia***

The Industrial Strategy of the Republic of Croatia for the period 2014-2020, as overall issues of Croatian industry in general, recognises the following: unfavourable institutional environment (non-efficient public administration), legal insecurity, corruption, high and complex tax burden, administrative procedures and incomprehensible regulations, low foreign direct investment (FDI) in the industry, low share of highly educated labour force in total labour force, insufficient investment in research and development (low level of innovative capacity) and low level of labour productivity. In order to tackle these issues, Croatian Government has been implementing measure that should lead, by 2020, to the realisation of the following goals set up in the Strategy:

- growth of the industrial production volume at the average annual rate of 2.85%,
- growth of the number of new employees by 85.619 (in all industry sectors) by the end of 2020, out of which minimum 30% with higher education;
- growth of the labour productivity by 68.9% in the period from 2014-2020,
- in the same period, growth of the export by 30% and change in the export structure in favour of goods with higher added value.

The Strategy recognises the sector of chemical and allied products as an important one, since the manufactured goods generated in the sector are indispensable ingredients for many other economic sectors and are also parts of general consumption. Hence, the sector is evaluated as a very important for the overall economy in Croatia. The Strategy also recognises the sector's importance for the foreign trade and export of the Republic Croatia, and, according to

technology intensity and following the OECD<sup>3</sup> qualification, it has qualified it as a medium high technology sector.

The global market of chemical and allied products has been characterised by structural changes, as well as by a geographical redistribution of both production and consumption. A move towards replacement of the world manufacture of chemicals to the countries of south-east Asia and China are clearly noticeable. That move was also triggered by a stricter legislation in the EU, which influences Croatian manufacturers as well and questions its prospects for further profitability of their businesses. Despite a continuous increase of the production in the sector, Europe has lost its leading position in this industry, which also influences Croatian manufacturers, which main exporting markets are traditionally countries of the European Union and Europe in its broader sense.

As regards the Croatian market, the Strategy acknowledges the fact that the majority of total revenues in the sector is generated by a small number of companies, that are also active exporters. The problems these companies are facing are high costs of imported raw material and high transport costs (to the end users). When compared to their competitors from other European countries, Croatian companies are characterised by outdated technology. Also, they have been burdened by the costs of harmonisation with the EU regulations, related to the environment protection. Despite these drawbacks, the Strategy recognises that the sector has a significant potential for export and further growth. Hence, strategic goals for improvements in this sector are in the document oriented toward the following areas: 1) volume of the industrial production; 2) employment; 3) productivity; and 4) export. Improvements in these areas are envisaged to be realised by implementing four main priorities of the Industrial Strategy: I) creation of a stable investment environment; II) promotion of a strategic cooperation between the industry, on the one hand, and the educational, research and technological sector, on the other hand; III) restructuring of the public administration; and IV) development of the capital market (alternative sources of financing).

The goals of the Strategy are also supported through the European Structural and Investment Funds targeted to Croatia, in which the sector of chemical and allied products (especially small and medium companies) can actively participate and be funded for the purpose of its modernisation or cooperation with the research institutions.

---

<sup>3</sup> OECD = Organisation for Economic Cooperation and Development



### **3.2. Smart Specialisation Strategy**

Smart Specialisation Strategy 2016 – 2020 (S3) of the Republic of Croatia, developed in line with the guidelines and principles of the European Union, is considered to be a guiding principle that brings together the business community, knowledge institutions, citizens and authorities with the primary aim of developing and using innovation to foster economic growth and competitiveness. Croatia's S3 brings together existing knowledge, human potential and natural geographical advantages to help the country taking control of its economic and social cohesion. An overall strategic objective of the S3 is to use research and development potential of Croatia in order to achieve innovative products, processes and services to bring innovation to the market and achieve more knowledge intensive, innovative and creative economy.

Chemical and allied products are part of the S3's thematic priority area (TPA) called "Agro-food and bio-economy". This TPA contains several sub-thematic areas: food and beverage production, agriculture, fishery, aquaculture, forest/wood industry, manufacture of rubber and plastic and chemicals and chemical products. It is linked with other TPAs such as health and energy efficiency and sustainable sources of energy, which gives space for cross-sectoral cooperation and development of new emerging niches in research and product development.

The importance of the chemical industry in S3 is also emphasised in relation to the following areas. Advanced materials, as an interdisciplinary field applying to various areas of science and engineering, present one of the thematic strengths that Croatia possess in key technologies, and shows the potential for economic growth. The selection of advanced materials in the hotspots of the key technologies in Croatia is significantly supported by the scientific output by Croatian scientists in materials science and other related fields, including chemistry, engineering and chemical engineering. The impacts of advanced materials and nanotechnology are expected to increase in the foreseeable future and are likely to deliver substantial growth opportunities, especially for environment-friendly technologies and equipment. An opportunity related to the challenge of decreasing emission of carbon dioxide relates to potentials in exploring possibilities in using animal and vegetable waste in production of bio-fuels. Biomass and bio-based products are related to the applications of life sciences and biotechnology in a broad variety of sectors as the main innovation drivers of the knowledge-based bio-economy, leading to new growth and competitiveness in traditional chemical sector, and the creation of emerging sectors based on renewable raw materials, such as bio-based products and bio-

fuels. The area of biomass provides opportunities to certain industry sectors that will need to orient towards different niches and new technological directions. For example, to the chemical industry, as it provides excellent basis for implementation of bioprocesses. In connection to biotechnology, this field is throughout the whole S3 document presented as one of the most perspective areas. Also, agricultural and biological sciences are closely related to the chemical industry and there is strong research capacity devoted to problems of environmental pollution. Numerous national and international projects have been performed by the various research organisations in the field of agriculture, to monitor and analyse effects of fertilisation and other chemical treatments in agriculture to pollution of soils and waters (salinization, nitrates, heavy metals, etc.). Furthermore, Key Enabling Technologies (KETs), as the technologies of the future, will provide the technological building blocks and key source of innovation in Croatia that will enable a wide range of product applications in the industry, including those required for developing low carbon energy technologies, improving energy and resource efficiency, boosting the fight against climate change, etc. They will create added value along different industrial chains and sectors - from materials through equipment and devices, to products and services. Due to their cross-cutting nature and systemic relevance, KETs will be instrumental for modernising Croatia's industrial base as well as driving the development of entirely new industries.

The scientific base is apparent from the increasingly successful track record in KET-related international research projects, particularly in biotechnology and in advanced materials. The main research institutions responsible for these achievements are, among others: the Ruđer Bošković Institute and the Faculty of Chemical Engineering and Technology. Because of their spill-over effects on industry users from various industrial value chains, including suppliers and downstream sectors, KETs can spur innovation, increase productivity, give rise to new applications and help tackle societal challenges. In order to enhance the potential to deploy KETs, it is therefore essential to enhance the critical mass in KETs in Croatia and to make specific choices on research themes. Smart choices and a focus on particular KET will well align the concept of smart specialisation. Biotechnology is one of the most important and most widespread KETs in public research organisations, as well as in business sector, and containing several categories: Blue, White, Green, Grey and Red Biotech. White biotechnology (industrial biotech) is particularly important in the processes for the cost-efficient conversion of various biomass to biofuels and to basic chemicals and intermediates, due to the prominence of biomass in Croatia.

Finally, S3 recognises the importance of cluster development in Croatia, and among needed clusters envisages the establishment of the Chemical, Agro-food and Wood Processing Competitiveness Cluster. Though the Cluster is supposed to be functional, at the moment of finalising this report no activities, published publicly, have been developed by it yet, that would include or be related to the chemical and allied products' sector in Croatia.

## 4. Associations and research institutions supporting the sector

This chapter presents the companies' associations and research institutions active in the sector. These are: the Croatian Chamber of Economy and its associations related to the industry, the Faculty of Chemical Engineering and Technology and the Faculty of Pharmacy and Biochemistry of the University of Zagreb, the Division of Physical Chemistry and the Division of Organic Chemistry and Biochemistry of the Ruđer Bošković Institute in Zagreb.

Under the umbrella of the **Croatian Chamber of Economy**, there is a professional Association for the Chemical Industry in Croatia. This branch represents the interests of its members (companies that opt for becoming a member of the Association, but are otherwise obligatory members of the Chamber). The Association has three sub-groups: Group of Producers of Cleaning Products and Cosmetics; Group of Producers of Paints, Varnishes and Similar Coatings, Printing Ink and Mastics; and Group of Producers of Agrochemicals and Fertilisers. Since October 2005, the Chemical Industry Association of the Chamber of Economy has been a member of the European Chemical Industry Association - Cefic. Cefic is recognised as the voice of the chemical industry in Europe, a committed partner to EU policymakers, facilitating dialogue with industry and sharing its broad-based expertise with their members. This organisation represents large, medium and small chemical companies across Europe, which directly provide 1.2 million jobs and account for 14.7% of world chemical production. Based in Brussels, Cefic interacts on behalf of its members with international and EU institutions, non-governmental organisations, the international media, and other stakeholders.

The **Faculty of Chemical Engineering and Technology** of the University of Zagreb has a long tradition in science and education, which dates back to 1919. Hence, this Faculty has influenced greatly the very emergence and development of modern chemical industry in Croatia and neighbouring countries. Its predecessor, Technical Institute Zagreb was founded in 1918. Among its six departments was the Chemical-Technical Department, soon to be renamed into Chemical-Engineering Department. Among the first teachers were Ivan Marek, an inventor of the furnace for elemental analysis of organic chemicals, Ivan Plotnikov, a world-renowned photo-chemist, Franjo Hanaman, a co-inventor of the tungsten filament for electric bulbs. Later on, Vladimir Prelog, mentioned in

the first chapter of the report, joined the staff of the Faculty as well. In 1926 the Technical Institute Zagreb joined the University of Zagreb to become the Technical Faculty. This merger opened the possibility for a more intense scientific research. In this period, besides Vladimir Prelog who first introduced organic synthesis to Croatia, many other young researches paved their way into the world of science and technology (such as Vjera Marjanović, Rikard Podhorsky, Karlo Weber, Matija Krajčinović, and Miroslav Karšulin). All of them went abroad to visit top scientific institutions of the time and returned to bring fresh ideas, increase the knowledge level and promote the development of chemical engineer profession in Croatia. As early as 1935, Rikard Podhorsky promoted the American view on chemical engineering as the distinct scientific discipline that is "equally important to a chemical engineer as pure disciplines of chemistry and physics". Following the growth of technical disciplines, Technical Faculty soon began to restructure and split into various institutions. Thus, within the University of Zagreb, chemical engineering was taught at the Faculty of Chemical, Food and Mining Technology in 1956 and Faculty of Technology in 1957. Later on, Faculty of Metallurgy in 1978 and Faculty of Food Technology and Biotechnology in 1980 grew apart, and in 1991, two independent institutions: Faculty of Textile Technology and Faculty of Chemical Engineering and Technology were founded. The core activities of the Faculty of Chemical Engineering and Technology are research, investigation and high-level education in the fields of chemical engineering and chemistry. In particular, the Faculty: organises and performs undergraduate, graduate and postgraduate scientific and professional courses; organises and performs scientific work in connection with the educational process and through the postgraduate scientific courses; organises, completes and revises research projects, studies and consulting for the industry and governmental institutions; organises colloquia, seminars, symposia and other scientific and professional meetings and events; attests materials, procedures and processes and issues quality certificates; disseminates important scientific and professional achievements; collaborates with other scientific, professional, educational and other institutions within the chemical engineering, chemistry, environmental engineering and related fields in Croatia and abroad.

The **Faculty of Pharmacy and Biochemistry** of the University of Zagreb is the only faculty and the leading scientific institution in the Republic of Croatia dedicated entirely to teaching and research in pharmacy and medical biochemistry experts. Pharmacy studies were started at the University of Zagreb in 1882. The name Faculty of Pharmacy and Biochemistry was adopted in 1963,

and since 1986 the Faculty organises two study programmes, one in pharmacy and the other in medical biochemistry. Today, the Faculty offers graduate programme in Pharmacy and in Medical biochemistry, postgraduate (PhD) programme in "Pharmaceutical-Biochemical Sciences" and postgraduate specialist programmes. In addition, The Faculty offers continuing education for masters of pharmacy and medical biochemistry. Teaching activities are conducted in 15 departments and two centres. Through its scientific and research projects the Faculty collaborates at the national and international level with other faculties, research institutes, pharmaceutical industry, hospitals, public health institutions and pharmaceutical and medical biochemistry professional organisations. The main aim of the Faculty is to promote science, to provide students with first-class education in the field of pharmacy and medical biochemistry, and to improve the health through education of contemporary health professionals working in the healthcare system, public health sector and research institutions. The mission of the Faculty of Pharmacy and Biochemistry of the University of Zagreb is to implement scientific research, graduate and postgraduate education and professional activities in the field of biomedicine and health, and thereby to contribute to the general progress of communities and knowledge-based development of economy. By ensuring the rational use of available human and material resources, the Faculty encourages development of the multidisciplinary scientific and educational programmes, international competitiveness of teaching, scientific and professional work, rise in society's innovation level, rapid transfer of knowledge, and bridges education and research with entrepreneurship.

The **Ruđer Bošković Institute** is regarded as Croatia's leading scientific institute in the natural and biomedical sciences, as well as marine and environmental research, owing to its size, scientific productivity, international reputation in research, and the quality of its scientific personnel and research facilities. The Institute is the leading and internationally most competitive Croatian institute by virtue of its participation in international research projects, such as the programmes funded by the European Commission, NATO, NSF, SNSF, DAAD and other international scientific foundations. Today, the Ruđer Bošković Institute has over 550 scientists and researchers in more than 80 laboratories, pursuing research in theoretical and experimental physics, physics and materials chemistry, electronics, physical chemistry, organic chemistry and biochemistry, molecular biology and medicine, the sea and the environment, informational and computer sciences, laser and nuclear research and development.

The **Division of Physical Chemistry** is one of the oldest units of the Ruđer Bošković Institute. The mission of the Division of Physical Chemistry is discovery, exploitation, and dissemination of fundamental knowledge in the fields of protein science, coordination chemistry, spectroscopy, and computational and theoretical chemistry, in order to emerge as an internationally recognised Centre of Excellence in selected areas of molecular scientific research. Division's research teams have expertise and exceptional research productivity in atmospheric chemistry, chemical kinetics, structural chemistry, spectroscopy, theoretical chemistry, modelling of substance properties, as well as physical and chemical processes, risk assessment, and structural and chemical analyses. Several research teams have applied their expertise and extended research activities into various areas of the biosciences. In addition to exceptional research productivity, Division members have contributed extensively to undergraduate and graduate education in Croatia. The Division of Physical Chemistry also has a rich tradition in organising well-known international scientific conferences, workshops and summer schools.

Another Ruđer Bošković Institute's Division in this area is the **Division of Organic Chemistry and Biochemistry** (DOCB). Its mission is to sustain excellence in fundamental scientific research covering selected experimental and theoretical topics of organic chemistry and biochemistry, to promote and intensify international collaboration in these fields and actively participate at the undergraduate and postgraduate levels of education in organic chemistry and biochemistry at Croatian universities by providing specific expertise and facilities. Research in the DOCB covers broad topics in modern experimental and theoretical organic chemistry and biochemistry: the development of new synthetic methods and their application in the preparation of new organic molecules and materials, experimental and theoretical studies of molecular properties and reaction mechanisms, as well as research in the field of medicinal chemistry. In the last few years, Division researchers have considerably increased their contribution to higher education in Croatia. DOCB scientists are members of many scientific EU committees, as well as members of national committees, boards and councils.

## 5. Business opportunities for Indian companies

This chapter gives an overview of Croatian leading and successful companies active in the sector of chemical and allied products. As such, they can be potential business partners to Indian companies and entrepreneurs interested in this sector. The following companies are presented in this chapter (according to their alphabetic order): Adriatica Dunav, Agrochem-Maks, Chromos Agro, Chromos Svjetlost, Fidelta, Hempel, Labud, LUSH manufaktura, Petrokemija, Saponia, Scott Bader.

### Adriatica Dunav

Adriatica Dunav, company based in the town of Vukovar, is a part of K-Adriatica Group, Italian corporation engaged in the production of fertilisers. The company was established in 2010, as a greenfield investment worth 18 million EUR: a modern plant producing Complex Mineral Fertilisers. The majority of the production is dedicated for the export to European countries and the neighbouring region. K-Adriatica was the first Italian fertiliser manufacturer to give up traditional production through chemical reactions and start to make Compacted Complex Fertilisers. The company was the first to switch from 50 kg to 25 kg fertiliser packages, choosing original sacks with a single strap suitable for outdoor storage. And it was Italy's first privately owned agricultural company to invest energy and resources in a production plant in Croatia to meet demand on Eastern European markets. These strategies and innovations concretely demonstrate the company's constant orientation toward development and research for complete customer satisfaction. At a highly problematic time for the global economy, K-Adriatica took another step forward: aware of the importance of agriculture as a key sector of the world economy, the group established Adriatica Dunav to produce Complex Granular Fertilisers.





The company's headquarters in the town of Vukovar permitted distribution all over Eastern Europe, an area with a strong vocation for agriculture. The company's line of N-GOOO Inhibitors, Grostart and Microphos Microgranules, the return to use of Sulphur, the line of Green Fertilisers, K Sol Hydrosoluble Fertilisers, defence stimulators and Bio-products for organic agriculture represent the most recent new additions to its production range. A vast, highly diversified product range is a result of a dynamic attitude oriented toward the needs of customers and the market, as well as a result of research capacities developed in a Group's daughter company located in Italy. Researchers and laboratories included in a global company's quality system are capable of coming up with sustainable projects for genetic improvement of plant species ranging from cereals to straw, maize, rice and oil seeds. Advanced high-tech production systems and research and development conducted in collaboration with universities and research institutes in Italy and abroad allow Adriatica to supply products for treatment of nutritional physiopathies. That is recognised as a real innovation on the fertiliser market, offering farmers a valuable opportunity for improved, more profitable crop management with a view to sustainable farming.

Contact details: Adriatica Dunav d.o.o., address: Vinkovačka 56, 32000 Vukovar, Croatia, tel: +385 32 432 826, email: [logistic.dunav@k-adriatica.hr](mailto:logistic.dunav@k-adriatica.hr), web-site: [www.k-adriatica.it](http://www.k-adriatica.it).

### **Agrochem Maks**



Agrochem Maks is a leading distributor of plant protection and related products in Croatia. Through strong agricultural background and market experience, the company's team of proven and experienced professionals offers full technical, commercial, registration and marketing support to its international partners. Agrochem Maks is distributing in Croatia the products of Dow AgroSciences, Isagro, UPL, FMC, DuPont, Cheminova, Afrasa, Nisso, Arista. The company is importing from the United States of America, Belgium, Italy, France, China, and India, providing a variety of products that meet the needs of Croatian customers. The products they are distributors of are: herbicides, fungicides, insecticides, special fertilisers and other crop protection chemicals. Agrochem Maks can be a possible partner for Indian companies engaged in the production and business of fertilisers and crop protection chemicals.

Contact details: Agrochem Maks d.o.o., address: Trg žrtava fašizma 6, 10000 Zagreb, Croatia, tel: +385 1 6608 633, email: [info@agrochem-maks.com](mailto:info@agrochem-maks.com), web-site: [www.agrochem-maks.com](http://www.agrochem-maks.com).

## Chromos Agro

Chromos Agro, the company founded in 1941, engages in the production and distribution of pesticides. In 1993 the company was transformed into a joint stock company and changed its name from Chromos-Zaštita bilja to Chromos



**Chromos Agro** d.d.  
VAŠ NAJSIGURNIJI IZBOR

Agro. In 2012, the company signed a long-term agreement on business cooperation with the local drug producer Genera. Chromos Agro is among the largest Croatian producers and a leading company in production and distribution of the plant protection chemicals. The company manufactures various plant protection products and biocides, such as pesticides, insecticides, fungicides, rodenticides, slimicides, limacides, acaricides, repellents and herbicides. They produce pesticides which protect from almost all known pests, weeds and diseases for many plant varieties. Chromos Agro manufactures approximately 100 different products and its production capacity exceeds 25,000 tons per year. Among its production line there are: 25 types of herbicides, 32 fungicides, and 20 insecticides. Chromos Agro also exports its products abroad and is cooperating with the largest global chemical industries, such as: BASF, Sygenta, Dow AgroSciences, Cinkarna, Govan. The company has four subsidiaries - companies in its ownership: Chromos coex (production of packaging), Banovci (agricultural production), Agri vrt (distribution of plant protection products) and Biotron (production of bio-fuel).

Contact details: Chromos Agro d.o.o., address: Radnička cesta 173n, 10002 Zagreb, Croatia, tel: +385 1 2404 188, email: [chromos-agro@chromos-agro.hr](mailto:chromos-agro@chromos-agro.hr), web-site: [www.chromos-agro.hr](http://www.chromos-agro.hr).

## Chromos Svjetlost

The company Chromos Svjetlost is located in Lužani, a village near the town of Slavonski Brod. The company has a 100-year old tradition of producing paints and varnishes. Its location, close to Bosnia and Herzegovina and the river of Sava, and in vicinity to a well-developed road and rail infrastructure, makes an excellent basis for business operating and development. Chromos Svjetlost has continuously recorded significant business growth since the mid-1990s. High quality of the company's products and good sales network have made them the leaders in the production of paints and varnishes in Croatia. Systematic work on the maintenance and improvement of these two business segments, large investments in new and improved existing products, have resulted in a number of new products which successfully compete with the largest foreign producers of paints and varnishes in Croatian market. The company's machine tinting system guarantees quality competitive both in domestic and the international markets. The quality of Chromos Svjetlost products has been recognised on demanding foreign markets, and the company has been recording significant results in the field of exports. Their product line involves products for: metal protection (anti-corrosion protection, metal coatings), wood protection (wood basecoats, primers, wood stains, transparent topcoats), special use products, facade systems, decorative plasters for treatment of external and internal wall surfaces, products for protection facade surfaces, paints for interior walls and protections of interior walls, road markings, thinners, etc. In the last two years the company has been using the EU funds to increase production and storage capacities of its factory, introduce latest technology in their business systems and hence increase its turnover and hire new employees.



Contact details: Chromos Svjetlost d.o.o., address: M. Stojanovića 12, 35257 Lužani, Croatia, tel: +385 35 213 800, email: [info@chromos-svjetlost.hr](mailto:info@chromos-svjetlost.hr), web-site: [www.chromos-svjetlost.eu](http://www.chromos-svjetlost.eu).

## Fidelta

Fidelta is a daughter company of the Galapagos Group, with a long history in pharmaceutical research, dating back to 1952. Fidelta originates from the Research institute PLIVA, where the antibiotic azithromycin was discovered (later



on licensed to Pfizer). The research focus of the PLIVA Research institute was on therapeutic areas of infection and inflammation, and the Institute was well recognised within the scientific community for its leading role in macrolide chemistry. The Institute's expertise in macrolide research was one of the key drivers behind its acquisition

by GlaxoSmithKline (GSK) in 2006. Within GSK, the Zagreb Institute was set up as the Centre of Excellence in Macrolide Drug Discovery, and was later reorganised into the Macrolide Discovery Performance Unit (DPU) and the Integrated Research Unit (IRU). In 2010 the GSK research and development (R&D) site in Croatia was taken over by the Galapagos group. Within Galapagos, the company initially operated as an internal R&D service unit, providing support to a number of discovery and development projects, in addition to being fully responsible for the progression of an internal drug discovery project portfolio. The company has later become oriented towards external clients, offering drug discovery services to the pharmaceutical and related industries. To mark this change in the operating model, the company name was changed to Fidelta. In the field of chemistry, the company is offering the following services: all-inclusive integrated drug discovery package, stand-alone chemistry services (complementing client's own research), medicinal chemistry, custom synthesis, scale-up, computer-aided drug design, discovery analytical services, structural analysis and interactions. All chemists, the majority with PhD's and fluent in English, the company's employees have access to relevant scientific journals and other data visualisation tools to stay ahead with integrated medicinal chemistry services.

Contact details: Fidelta d.o.o., address: Prilaz baruna Filipovića 29, 10000 Zagreb, Croatia, tel: +385 1 8886 300, email: [fidelta@glpg.com](mailto:fidelta@glpg.com), web-site: <http://www.glpg.com/fidelta>.

## Hempel

Hempel Croatia is a part of the global Hempel company, a world-leading coatings supplier to the decorative, protective, marine, container and yacht markets. From windmills and bridges to hospitals, ships and homes, Hempel coatings protect man-made structures from the corrosive forces of nature. They help prolong a structure's service life and reduce maintenance costs. The company is constantly focused on innovative solutions and advanced production techniques. They invest in advanced waterborne products and innovative ideas to help customers cut fuel consumption, reduce emissions and hit their environmental targets. They offer a full range of coatings and technical service to customers in the protective, marine and



container industries, but they also supply low-solvent paints to homeowners and provide a full range of products for yacht owners. Hempel's expertise covers many industries: conventional power generation, including coal and gas; renewable energy, including hydro power, and offshore and onshore wind power; upstream and downstream oil & gas; civil structures, sports stadia and commercial buildings; general construction; transport centres and bridges; cranes and port machinery; rail cars; heavy-duty equipment. In Croatia, Hempel bought a factory of coatings for shipyard industry, located in the maritime town of Umag and having a tradition of ship coatings' production since 1954. Cooperation with that Croatian company and the company Hempel's Marine Paints started already in 1970. From that time onwards, the Croatian company has been achieving great results. The annual production of Hempel Croatia is approximately 8.5 million litres of paints, that are used by 80% of newly built boats and ships in Croatia and on 50% of existing boats and ships, that are on maintenance in Croatia. Hempel is hence the leading Croatian producer of marine paints and coatings. Besides that, the company is distributing on Croatian market special coatings for protection of pipelines, towing vehicles and containers, as well as paints for horizontal road signalisation. Branch offices and warehouses of the company in Croatia are located in Pula, Rijeka, Split and Zagreb.

Contact details: Hempel d.o.o., address: Novigradska 32, 52470 Umag, Croatia, tel: +385 52 741 777, email: [umag@hempel.com](mailto:umag@hempel.com), web-site: [www.hempel.hr](http://www.hempel.hr).

## Labud

Labud was founded in 1947 and in the beginning its business was focused on the production of soaps, cosmetic and chemical products. Soon after its establishment, the company started its expansion, implementing new advanced technologies. In the 1960s and 1970s the company decided to specialise in the production of detergents and cleaning agents, and soon became a pioneer in releasing new, innovative products to the market. For instance, Labud was the first producer in Croatia that launched a bioactive handwash and washing machine powder for colours and whites, followed by the first abrasive cleaner, and the first handwash and washing machine detergent for delicate fabrics. In the same period the company launched its most valuable trademarks, Sanitar and Čarli, with the last one becoming the product that generations of Croatian consumers have grown up with, a generic name for washing up liquid. Today, Labud is one of Croatia's leading producers of detergents and cleaning agents. In addition to the domestic market, its products are successfully sold in the region as well. The company's product line involves: laundry care products, dishwashing products, household cleaning products, products for personal care and a range of cleaning products for professional use. As part of its professional services, the company offers complete hygiene solutions for the following types of customers: hotels, bars and restaurants, public and medical institutions, laundries, food industry. Labud's team of experts identify and satisfy the clients' cleaning and disinfection needs, helping them manage the business in a better and cost-effective way. In Labud's Research and Development Lab the employees continuously create new products and solutions, while constantly improving the existing ones. Labud's mission is to satisfy the daily needs of its customers and



consumers while managing a sustainable, healthy business, ensuring a rational use of raw materials and energy consumption is implemented, together with an efficient waste management system. When sourcing raw materials, a special attention is given to those components that are less harmful to the environment and do not present adverse effects on human health. All activities are in line with the existing regulations and in full compliance with the environmental standards regarding the procurement of raw materials, manufacturing process and storage of goods. Also, the company is emphasising the fact that it does not conduct animal testing on its products. Since 2007 Labud has implemented the ISO operation monitoring system and is certified in accordance with ISO 9001:2008 and ISO 14001:2004.

Contact details: Labud d.o.o., address: Radnička cesta 173, 10000 Zagreb, Croatia, tel: +385 1 2404 618, email: [labud@labud.hr](mailto:labud@labud.hr), web-site: [www.labud.hr](http://www.labud.hr).

## LUSH manufaktura

LUSH manufaktura is a part of the successful global team of LUSH Fresh Handmade Cosmetics - a handmade fresh and natural cosmetics with more than 20 years of successful business. LUSH Cosmetics was founded in 1995, Poole (United Kingdom) by trichologist Mark Constantine and beauty therapist Liz Weir. The company's business is based on a belief in finding new ways to reduce the



ecological footprint, in creating effective products using fresh fruits and vegetables, and exclusively safe synthetic ingredients, with none of the ingredients and finished products being tested on animals. LUSH is inventing its own products and fragrances, making them fresh by hand, using

little or no preservative or packaging, using only vegetarian ingredients, and informing the customers when the products were made. LUSH is buying ingredients only from companies that do not commission tests on animals. This innovative, independently-owned retailer has made a success out of "fresh handmade cosmetics" (which is also their slogan) on a global scale. The ambition

of the company is ethical, environmentally-friendly, and fair business. LUSH products are 100% vegetarian, 85% vegan, against animal testing and completely handmade. The company has 900 stores worldwide. The store is famed for its "deli" approach to selling soaps and products: a client can sample and try before he or she buys, and can purchase the soap by weight. The stores do not typically sell products older than four or five months. Most products have a shelf life of approximately 14 months, depending on the particular item. LUSH is investing in its specific marketing and brand building, which resulted by the company's dedicated fans known as "Lushies". LUSH has built a brand around its playful products – bubble bars, body scrubs, shower jellies, toothy tabs, dusting powders and most popular – its bath bombs which create online hype around each release. LUSH arrived to Croatia in 1996, when two Croatians, mother and son, noticed a Lush shop in London. Few years ago, LUSH manufaktura started to work on exports and today the 90% of its production is exported to the shops in Italy, Austria, the Czech Republic, Bulgaria, Slovenia, Bosnia and Herzegovina, etc. In their shops in Croatia, LUSH manufaktura has 385 products during the whole year, and some of them are seasonal products.

Contact details: LUSH manufaktura d.o.o., address: Augusta Šenoje 5, 10434 Strmec Samoborski, Croatia, tel: +385 1 4810 657, email: [uprava@lush.hr](mailto:uprava@lush.hr), website: [www.lush.hr](http://www.lush.hr).

## **Petrokemija**

The company Petrokemija is the largest Croatian fertiliser producer, present with its products in Croatia, broader region and on the world market. Thanks to the proven quality of the company's products and services and the annual capacity of 1.35 million tonnes, Petrokemija is a significant factor in the development of the Croatian economy and is also a company in majority owned by the Croatian State. Petrokemija produces mineral fertilisers using natural mineral raw materials, natural gas, atmospheric nitrogen and oxygen. Based on these technological processes, basic chemicals and then mineral fertilisers are produced from the raw materials. According to their composition, fertilisers are defined as unitary and complex, or complex and mixed, and according to the aggregate state as solid (granulated and adapted) and liquid. Petrokemija in its product range offers several types of products and services. Along with the granular and prilled mineral fertilisers, which are in the main field of production offerings, there are also liquid mineral fertilisers Fertine, mineral fertilisers in a



small package Florini, casting and construction products, animal feed supplements and hygienic litter for cats and other pets. Something that all Petrokemija fertilisers have in common is a large share of nutrients and high solubility, while each granule contains the nutrition in exactly the same proportion as is written on the packaging of the product. The company holds facilities for quality testing of mineral fertilisers and soil and chemical analysis of soil, plant material, water and air. They are also carrying out engineering, construction, electrical, measuring, technical regulation services and engineering services. In the structure of Petrokemija's income, exports accounts for more than 60% of total sales. According to financial results in 2017, Petrokemija realised a loss, caused by increased natural gas prices and exceptionally high gas transport costs in Croatia. The main constraints to achieving positive business results of the company are



the increase in natural gas prices, lower average selling prices, increased interests and environmental constraints. In the first half of 2017, the company adopted a restructuring programme, involving the recapitalisation with a private investor and the implementation of the operational and financial restructuring plan. The restructuring process would include modernisation of production facilities with the aim of raising the level of energy and technological efficiency, as well as meeting environmental requirements in line with EU regulations; providing sources of financing of fixed working capital; more active appearance and strategic positioning on the market of Croatia and the region; raising the level of maintenance efficiency, logistics and other service processes that will ensure a positive financial result, stability and business development. In 2017 a call for recapitalisation and invitation to restructuring and privatisation process was published, followed by the offers of several interested investors. Although this process was planned to be completed by the end of 2017, in the moment of this report's finalisation, it is still ongoing.

Contact details: Petrokemija d.d., address: Aleja Vukovar 4, 44320 Kutina, Croatia, tel: +385 44 647 269, email: [uprava@petrokemija.hr](mailto:uprava@petrokemija.hr), web-site: [www.petrokemija.hr](http://www.petrokemija.hr).

## Saponia

The company Saponia was founded in 1894 in the town of Osijek, where Samuel Reinitz started the production of soaps. From that time on, the company raised into a modern detergent and toilet industry. Saponia's brands on Croatian and the market of the broader region - neighbouring (former Yugoslavia) countries - have become synonymous for quality and present in many households: Faks helizim, Nila, Rubel, Bioaktiv, Plavi Radion, Ornel, Likvi, Tipso, Arf, Vim, Bis, Lahor, Frutella, Kalodont, Di, Brinell, Skit. These products are the result of the work of the company's experts who have mission to provide superior cleanliness and health to their customers. Vision of the company is to be the leading detergent and personal hygiene products manufacturer in the region. Saponia offers to the market more than 500 different products separated in three basic product groups: detergents for mass consumption (laundry detergents, fabric softeners, dish detergents, cleaning agents); personal hygiene programme (toothpastes, toothbrushes, soaps, shampoos, baby care products, sun tanning products); and agents for industrial and institution use (products for cleaning and disinfection in various institutions and industrial corporations). Thanks to the high quality and innovative technology, Saponia's cleaning and laundry care products are positioned among the leading brands in the region. With the most advanced formulations they provide effective cleaning results at low temperatures, which contributes to energy conservation. The company claims to be responsible towards the environment, as its detergents do not contain phosphates. Their industrial market segment is made of cleaning and disinfecting



products intended for professional hygiene maintenance use. Efficiency, efficacy, cost-effectiveness and ecological acceptability are basic guidelines of how the company develops its projects and implement them in the production.

Contact details: Saponia d.d., address: Matije Gupca 2, 31000 Osijek, Croatia, tel: +385 31 513 513, email: [saponia@saponia.hr](mailto:saponia@saponia.hr), web-site: [www.saponia.hr](http://www.saponia.hr).

## **Scott Bader**

The company Scott Bader was established in the early 1960s (at the time it was called Chromos tvornica smola d.d.), and in 1999 the company joined the Scott Bader Group and became the base of that international company in Croatia. Scott Bader is an established €230 million global chemical company employing almost 700 people across 6 manufacturing sites and 11 offices. Using combined global resource and expertise, Scott Bader is a leader in the manufacturing of products for the composites, advanced composites, adhesives and speciality polymers markets, offering a full range of technologies and manufacturing capabilities for many market sectors. Scott Bader in Croatia is a manufacturer of polyester, vinyl ester, alkyd and acrylic resins. The company is committed to providing quality and innovation through an ongoing investment in R&D, ensuring that new and existing products meet their customers' specific needs. Prior to becoming the owner of Chromos tvornica smola d.d., Scott Bader had worked on improving the company's processes, products, organisation and financial stability, while it also provided access to all of its resources and expertise. After recognising the possibility of a complete and successful integration with the Croatian company, the Scott Bader Group went on to acquire full ownership in 2006 and in spring 2007 the company changed its name to Scott Bader d.o.o. The company sells its products mostly in Central and Eastern Europe, but also in several countries outside these regions, through direct sales and a developed distribution network. Sales are based on the years of experience in the following markets: Germany, Austria, Italy, Poland, Czech Republic, Slovakia, Slovenia, Bosnia-Herzegovina, Serbia, Macedonia, Romania, Bulgaria, Russia, Ukraine, UK, France and Portugal. Today Scott Bader operates its own



property in the Zagreb industrial zone. The company's strategic goal is to be a sustainable best class company and to pioneer the future of chemistry by making a positive difference to all businesses they serve. Scott Bader has always been committed to protecting the environment. The company uses electrical energy from renewable sources, thus reducing CO2 emissions.

Contact details: Scott Bader d.o.o., address: Radnička cesta 173, 10000 Zagreb, Croatia, tel: +385 1 2406 440, email: [info@scottbader.hr](mailto:info@scottbader.hr), web-site: [www.scottbader.hr](http://www.scottbader.hr).

## 6. List of useful contacts

Herewith we present contacts of institutions and organisations that are mentioned in the report or are relevant for the sector of chemical and allied products in Croatia, with their contact details.

- Ministry of Economy, Entrepreneurship and Crafts: [www.mingo.hr](http://www.mingo.hr)
- Agency for Investments and Competitiveness of Croatia: [www.aik-invest.hr](http://www.aik-invest.hr)
- Croatian Chamber of Economy: [www.hgk.hr](http://www.hgk.hr)
- Croatian Chamber of Economy, Association for the Chemical Industry: Mrs. Renata Florjanić, tel: +385 1 460 6759, email: [rflorjanic@hgk.hr](mailto:rflorjanic@hgk.hr)
- Faculty of Chemical Engineering and Technology of the University of Zagreb: [www.fkit.unizg.hr/en](http://www.fkit.unizg.hr/en)
- Faculty of Pharmacy and Biochemistry of the University of Zagreb: <http://www.pharma.unizg.hr/en/>
- Ruđer Bošković Institute, Zagreb, [www.irb.hr](http://www.irb.hr)
- Division of Physical Chemistry of the Ruđer Bošković Institute in Zagreb: <https://www.irb.hr/eng/Research/Divisions/Division-of-Physical-Chemistry>
- Division of Organic Chemistry and Biochemistry of the Ruđer Bošković Institute in Zagreb: <https://www.irb.hr/eng/Research/Divisions/Division-of-Organic-Chemistry-and-Biochemistry>
- European Chemical Industry Association – Cefic: [www.cefic.org](http://www.cefic.org)
- Government of the Republic of Croatia: [www.vlada.hr](http://www.vlada.hr)
- Office of the President of the Republic of Croatia: [www.predsjednica.hr](http://www.predsjednica.hr)

## Literature

- The Industrial Strategy of the Republic of Croatia, Official Gazette 126/2014
- Smart Specialisation Strategy of the Republic of Croatia 2016-2020, source: [http://s3platform.jrc.ec.europa.eu/documents/20182/222782/strategy\\_EN.pdf/e0e7a3d7-a3b9-4240-a651-a3f6bfaaf10e](http://s3platform.jrc.ec.europa.eu/documents/20182/222782/strategy_EN.pdf/e0e7a3d7-a3b9-4240-a651-a3f6bfaaf10e)
- Landscape of the European Chemistry Industry 2018, Cefic
- Cefic Manifesto for a Competitive Europe, September 2018
- Sectoral Analyses: Chemistry Industry (author: Ivana Rašić Bakarić), Ekonomski institute Zagreb, March 2018
- Croatian Bureau of Statistics, [www.dzs.hr](http://www.dzs.hr)
- Eurostat: <http://ec.europa.eu/eurostat>

### Internet sources:

- <http://www.enciklopedija.hr/natuknica.aspx?id=31154>
- <https://www.britannica.com/biography/Leopold-Ruzicka>
- <https://www.nobelprize.org/prizes/chemistry/1975/prelog/facts/>
- <https://www.nobelprize.org/prizes/chemistry/1939/ruzicka/facts/>
- <https://www.britannica.com/biography/Vladimir-Prelog>
- <https://www.hgk.hr/s-industriju-i-it/kontakti-grupa#udruzenje-kemijske-industrije>
- <https://www.chemlandscape.cefic.org/country/croatia/>
- <http://www.poslovni.hr/hrvatska/kemijska-industrija-u-tri-godine-porasla-194-posto-326194>