STATE GENERAL LABORATORY

REPUBLIC OF CYPRUS

STATE GENERAL LABORATORY

Annual Report 2016

Abridged version

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Excellence. The foundation to a better quality of life.

INTRODUCTORY NOTE

by the Director of the State General Laboratory

Dear readers,

The assessment of the State General Laboratory's (SGL) work for 2016 demonstrates a steady and continuous effort to implement national strategic goals to protect public health, the environment, citizens' safety and consumer interests. Without any compromise, the SGL managed to set its strategic objectives and priorities while implementing national control plans, in close collaboration with various competent Authorities.

For the SGL, 2016 was another year with many challenges, where reduction of available financial resources led to a more targeted design and hierarchy of control plans. Priority was given to cases of higher risk and support for new legislative requirements while responding effectively to the requests of the competent Authorities, absorbing at the same time national and EU funds for the implementation of applied research.

The most important events that highlighted the work of the SGL during 2016 were:

(a) the successful organisation of the "European Pesticide Residue Workshop (EPRW)" in Lemesos with 450 participants from 48 countries, and

(b) the preparation of the "Programme Concept Note (PCN)", in collaboration with the Department of Public Works, and its subsequent approval by the Directorate-General for European Programmes, Coordination and Development (DG EPCD) as a prerequisite for the long awaited construction of the new building of the SGL.

The SGL is now a scientifically mature, accredited organisation that should and can contribute to further promoting the role of Cyprus in the "scientific arena" of the EU, while contributing to socioeconomic development and upgrading the quality of life.

With the continued support of our associates, the Director-General of the Ministry of Health and the Minister of Health, to whom I express our deep appreciation, and the other collaborating agencies, whom we thank, we are convinced that, not in the distant future, SGL will be recognised as a Centre of Excellence. The staff of the SGL and myself believe that such a vision is not difficult to achieve.

Finally, I am very happy to record without hesitation, my heartfelt thanks to the staff of the SGL for their support, good will, professionalism and dedication, and for doing more with less.

I hope that this publication will be useful to all stakeholders, so as to continue to build a relationship of mutual trust and loyal cooperation based on scientific objectivity and transparency.

Dr Popi Nicolaidou-Kanari
Director of SGL

Excellence. The foundation to a better quality of life.

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ABOUT THE SGL

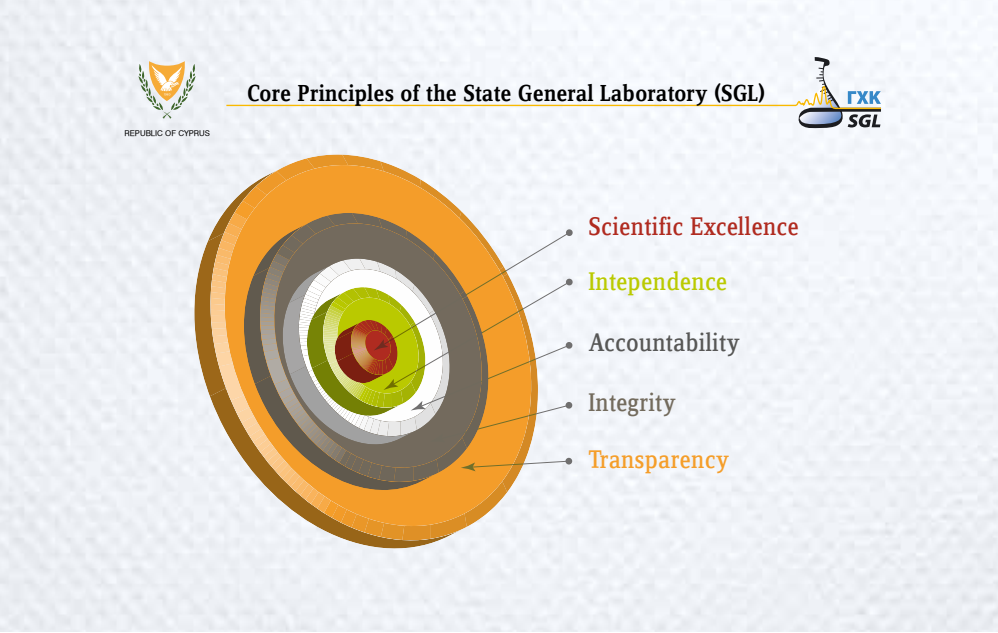
GENERAL SCOPE AND RESPONSIBILITIES

The State General Laboratory of Cyprus (SGL) is one of the five independent Departments of the Ministry of Health. It is the main official laboratory for the chemical / biological / microbiological / toxicological and radiological control and the official **National Control Centre** for foodstuffs, water, environment, pharmaceuticals, cosmetics, various consumer goods, controlled drugs and other police exhibits. This wide scope of responsibilities is covered under 21 specialised laboratories and five Units.

All laboratories under the SGL are accredited according to the European Standard EN ISO/IEC 17025:2005 in the areas of its competence.

It is also the National Reference Laboratory for several food safety sectors.

The activities of the SGL, a non-conflict of interest organisation, governed by the principles of scientific excellence, independence, integrity, accountability and transparency, ensure compliance with the Public Service Law, as well as the fulfillment of citizens' expectations.



Under the support and configuration of National Policy, within the framework of its responsibilities, the SGL's staff serves on many National Council Boards (Food, Pharmaceuticals, Cosmetics, Plant Protection Products and Biocides, Veterinary Medicines, Chemicals, and Food Safety) and also in National Committees (e.g. Environment and Children's Health, School canteens, Natural Mineral Water, Environmental Impact, Reduction of Drugs Supply, Drugs Legislation, National Centre of Information on Narcotics, Veterinary Drugs Register).

It is also the National Representative in the Advisory Forum of the European Food Safety Authority (EFSA) and the National Focal Point of EFSA, and the World Health Organization (WHO) on Environment and Health.

Through this active involvement, the SGL contributes to the revision, modernisation and harmonisation of legislation, and the formulation of policies / strategies related to its competences, not only at a national but also at European level. Its constant contribution to the revision of food legislation and the legislation on Drugs and Psychotropic Substances for the integration of new synthetic drugs has been significant.

VISION AND MISSION

The **vision** of the SGL is to substantially contribute to the improvement of quality of life by providing reliable and high quality services through the organisation's continuous development and excellence.

Based on this vision, the SGL has been continuously widening its **mission** to include:
The provision to the Authorities and the citizens of high quality services and independent opinions, through innovative administration procedures and technology.

"Excellence. The foundation to a better quality of life" has served as the SGL's motto and has been guiding the organisation, based on its vision and mission, towards the following strategic objectives**:**

1. To safeguard public health and the environment, citizen's safety and consumers' rights mainly through prevention.
2. To facilitate fair trade and competitiveness.
3. To respond promptly and reliably to new obligations, emerging problems and crisis incidents.
4. To promote applied research to prevent or solve emerging / existing problems.
5. To contribute to the legislative process and policy making.
6. To strengthen networking and enhance expertise.
7. To scientifically support the judicial and police authorities.

To fulfill its mission, the SGL operates at many levels:

- It ensures quality, reliability and accountability through its accreditation by EN ISO / IEC 17025:2005 and by embedding the value of quality at all levels of the organisation, while implementing the model of the Common Assessment Framework Programme (CAF) with benchmarking towards excellence.

- It promotes new approaches at the managerial and technical levels and elaboration of its services, while keeping abreast of European and international developments and requirements.

- It collaborates with all public sectors and respective EU Organisations and Committees,

- It continuously develops and implements:
  - new preventive and targeted national control programmes,
  - a holistic and interdisciplinary approach, which reflects upon the design of monitoring, surveillance, control and research programmes with added-value and synergistic efficacy, and
  - risk assessment for food and water safety (chemical, microbiological, biological).
- It enhances productivity by implementing modern technologies and multivariate control methods by fully utilising the manpower, equipment and available financial resources.
- It attracts young scientists with high academic qualifications through the implementation of applied research projects while utilising local and EU funds to solve existing problems and prevent emerging risks.
- It strengthens international networking and collaboration with universities, European research centers and relevant bodies to promote the exchange of scientists, joint research projects, technology transfer and other common actions towards development.
- It contributes to academic activities by investing in capacity building of post-graduate students who undertake research projects at the SGL in collaboration with European and Cyprus universities.
- It invests on staff training and expertise.
- It disseminates information and knowledge through educational programmes to the relevant stakeholders and to the public at large.
- It provides expertise and advice and works as a technical consultant/advisor for public authorities or as third member.
- It facilitates the execution of a wide range of laboratory tests as well as the solution of complex scientific and technical issues, through its modern laboratory equipment and its well trained staff.

THE SGL IN NUMBERS IN 2016

26,331	Analysed Samples
544,495	Analysed Parametres
325	Interlaboratory Skills Testing
737	Parametres Checked in Interlaboratory Skills Testing
60	National Control - Monitoring - Surveillance Programmes
22	Applied Research Programmes
3	Scientific Publications
8	Posters & Oral Presentations in international conferences
2	European and international conferences in Cyprus
59	Presentations in national, European, international conferences/workshops/seminars
1	European recognition
21	Specialised Laboratories
€7,232,383	Budget implemented (95%)
*	Further development of the National Guard Laboratory for the ammunition control

ORGANISATIONAL STRUCTURE

The SGL has its own organisational structure, the Director and the Heads of Sectors comprising the management team, as shown in the 2016 Organisational Chart below. The SGL's wide range of analytical work is covered by 21 Laboratories that fall under eight sections which are being supported by the following five Units:

a. Cooperation with EFSA and Risk Assessment Unit

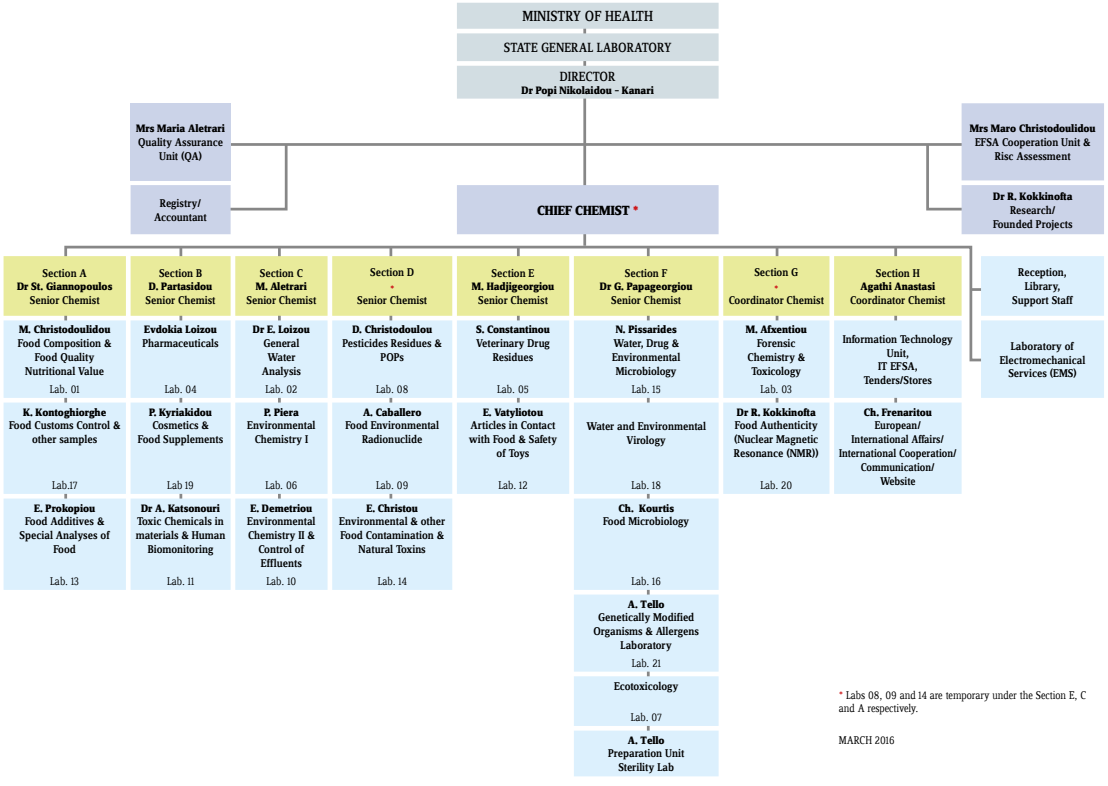
b. Quality Assurance Unit

c. Research and Funded Projects Unit

d. IT Unit

e. European / International Issues, International Cooperation & Communication Unit.

The following services assist the SGL in its day-to-day operation and implementation of its work: Registry, Stores, Library, Secretariat, Accounts and Electromechanical Services.

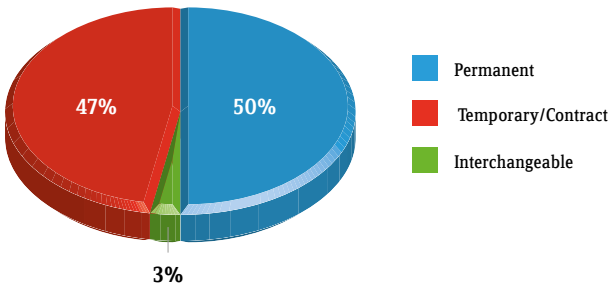


HUMAN RESOURCES

During 2016, the staff comprised 180 persons in total:

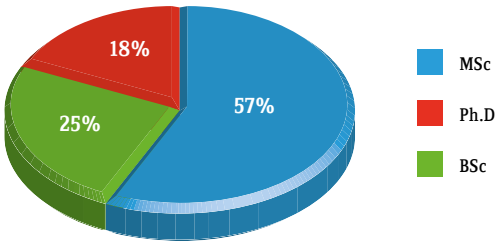
- 65 Chemists, Microbiologists / Biologists, six clerks and five persons from other departments as well as 21 support staff, in permanent positions.
- 50 laboratory technicians with high academic qualifications (such as Chemists and Microbiologists / Biologists) as well seven clerks were employed on contract.
- 26 Chemists / Microbiologists / Biologists, including a Data Base expert and an Executive Assistant for managing research programmes were employed on contract for the completion of the research projects.

SGL's staff at all levels - 2016



It is also worth noting that out of the 115 scientists, 86 (75%) held at least one postgraduate degree and several of them had a PhD.

SGL's Scientific Staff - 2016



RESEARCH

APPLIED RESEARCH

Applied research is an important pillar of the continuous scientific and technological development of the SGL. Research carried out contributes towards problem solving and prevention as well as supporting policy decisions and legislation, while boosting socioeconomic growth. The main areas of research cover especially food safety and quality, food authenticity and geographical origin, water, environment and health, as well as narcotics.

Research is carried out primarily with EU funds but also with national funds by the Research Promotion Foundation and the Ministry of Health. During 2016, the SGL utilised €410,000 from national and EU funds for research programmes.

The results of these research activities have been presented in international conferences and published in international, well established, scientific journals and magazines, as well as on the SGL's website and in the local mass media for keeping updated both the scientific community and the public at large.

In 2016, the SGL started or continued the following **22 research projects** / studies:

a) EU Research Programmes funded by the European Food Safety Authority (7)

1. "**Support to national dietary surveys** in compliance with the EFSA Guidance on General principles for the collection of national food consumption data in the view of a pan-European dietary survey"- third support / **LOT1 (children)** (2013 - 2018)

2. "**Support to national dietary surveys** in compliance with the EFSA Guidance on General principles for the collection of national food consumption data in the view of a pan-European dietary survey"- third support / **LOT2 (adults)** (2013 - 2018)

3. **Pilot project on the implementation of the SSD2 Food Classification System**, in the frame of the electronic transmission of harmonised data collection of analytical results (additives, contaminants and pesticides residues) to EFSA (2014-2016)

4. **Pilot project on the implementation of the SSD2 Food Classification System**, in the frame of the electronic transmission of harmonised data collection of analytical results (veterinary residues) to EFSA (2015-2017)

5. **EFSA Multi-Annual Focal Point Grant Agreement** (2015-2018)

6. **Workshop / Training on exposure assessment and "ImproRisk" model**- GA/EFSA/AFSCO/2016/01 (2016)

7. "**Risk characterisation of Ciguatera food poisoning in Europe**" signed under Framework Partnership Agreement GP/EFSA/AFSCO/2015/03 for the "Evaluation of ciguatoxins (ctxs) in seafood and the environment for the risk assessment of ciguatera fish poisoning (cfp), with the consequent obtainment of reference material" (2016-2020)

b) EU Research Programmes funded by the Research Promotion Foundation, FP7, Horizon2020 (5)

1. "**Total Diet Study Exposure**" for the estimation of the exposure / intake of the population to chemicals and nutrients (FP7) (2012-2016)

2. "**RoCyWines**: Scientific factors related to consumers' health as new tools for the confirmation of authenticity of Cypriot / Romanian wines" (2014-2016)

3. "**METAWATER**: New metagenomics and molecular based tools for European scale identification and control of emergent microbial contaminants in irrigation water" (2014 - 2017)

4. "**New psychoactive substances (NPS)**: Building knowledge and evidence-based training through research" (2014 - 2016)

5. "**EuroMix: Horizon 2020 EU project**: Assessing the health risks of combined human exposure to multiple food-related toxic substances" (2015 - 2019)

c) Pilot Research Programmes funded by the Ministry of Health (9)

1. Foodstuffs analysis (bread, milk and milk products and ready to eat meals) for parameters related to health such as salt and conjugated linoleic acid (CLA).

2. Determination of tropanoid alkaloids in cereals (sorghum, buckwheat, millet, etc.) and baby foods based on the above cereals using LC-MS/MS technique.

3. Surveillance and monitoring of the presence of trace elements (heavy metals) in food.

4. Detection of animal DNA in meat products for food fraud investigation.

5. Investigation of drinking water quality produced by domestic water filtration systems.

6. Analysis of controlled substances.

7. Investigation of the levels of uranium radioisotopes (U-238, U-235 and U-234) in drinking waters of Cyprus, using alpha spectrometry.

8. Pharmaceuticals in wastes with focus on Diclofenac

9. Investigation of the risk of legionnaire's disease in military camps of the National Guard.

In addition, the SGL continued its participation in the ongoing project "Monitoring of the enrichment of Ezousa ground water".

DEVELOPMENT POLICY AND STRATEGY

In the context of the Administrative Reform of the Public Sector, the SGL has modified its strategic plan and connected it with its activities for implementation. At the same time, it has revised its performance indicators which have now been linked to the more effective monitoring of budget implementation, in connection with its strategic planning.

The development policy and strategy of the SGL is based on its vision and mission and it sets the organisation's priorities which aim towards:

- its development as a Centre of Excellence and Regional Reference Centre in the areas of its competence (food quality and safety, pharmaceuticals, consumer products, environmental protection and crime investigation),

- its significant contribution, as a counsellor of the State, in responding promptly and in a reliable manner to crises and problems that cover areas under its remit, having an active, scientifically robust and meaningful role in the implementation of the National Strategy,

- its contribution, through its scientific work, to the economic and social development of the country, and

- its sustainability, as a high quality and state-of-the-art centre of integrated services, expertise and applied research whose scientific contribution can be classified among the best in Europe.

COOPERATION

NATIONAL COOPERATION

In order to achieve its objectives, the SGL co-operates at **national level** with almost all Ministries and competent Authorities, municipalities, governmental and other organisations, universities and institutions.

EUROPEAN / INTERNATIONAL COOPERATION

The SGL also expands its **European and international cooperation** so as to improve even further its scientific progress, to enhance capacity building and exploit sources of external funding. Through this cooperation, there is an exchange of knowledge and experience with other member states. At the same time, the SGL has the opportunity to demonstrate the activities and skills of a small member state and its adaptability to cope with new requirements and challenges.

In 2016, the SGL actively participated in the following **European** meetings/Bodies / networks/programmes/ studies:

- European Food Safety Authority (EFSA)
  - Advisory Forum (AF)
  - Focal Point (FP)
  - AF - Communication WG
  - Expert group on Food Consumption and Exposure Data
  - Networking groups for Pesticide Residues Monitoring, Emerging Risks Exchange Network (EMRISK)

- Scientific Networks: Chemical Occurrence Data, Nanotechnologies in Food & Feed, Food Contact Materials, Veterinary Medicine Products Residues, Microbiological Risk Assessment, Risk Assessment of GMO's (Food & Feed), etc.

- European Reference Laboratories (EURL-NRL).
- Collaborative studies on standardisation of methods (ISO) under the coordination of the competent EURLs.
- EU Comitology expert groups and Standing Committees.
- Programme "Customs 2020" (European Network of Customs Laboratories (CLEN) for harmonisation and joint actions) - Working Groups of the Programme (Actions 1 to 6).
- Customs Laboratories Working Groups dealing with new psychoactive substances.
- European Network of Forensic Science Institutes (ENFSI) for drugs, arson, gunshot residues and explosives.
- Network of Official Medicines Control Laboratories of the Council of Europe (EDQM-OMCL) in cooperation with the European Medicines Agency (EMA), and other subcommittees of the Network.
- Expert Working Group on Analytical Methods of the European Chemicals Agency (ECHA).

Furthermore, in 2016, the SGL:

- **Continued participation** in the following:
  - The evaluation of EU research proposals for funding and in the Programming Committee of the "Horizon2020" (Food Security, Sustainable Agriculture, Marine, Maritime and Inland water research and Bio-monitoring) for Research, etc.
  - The Scientific Committee of the Ministry of Health for the development of a strategy for research, and the approval of applications for applied research within the various departments of the Ministry.
  - The creation of the "European Wine Bank" (as scientific coordinator of Cyprus and Greece), coordinated by the EU's Joint Research Centre (JRC)-in implementation of the Regulation (EC) 2729/2000.
  - The Working Groups of the Council of the EU for the formation / modification of the European legislation.

- **Coorganised in Cyprus** the following workshops:
  - **"Training workshop on the dietary risk assessment model "IMPRORISK"**, with EFSA, to acquire/increase knowledge of the scientific principles and methodology of exposure assessment and to provide training on the deterministic exposure assessment model developed by the SGL, the IMPRORISK model, with regards to its applicability in chemical risk assessment (May, 2016).

  - **"11th European Pesticide Residue Workshop (EPRW)"**, with the European Scientific Committee of the EPRW, to present and discuss the latest concepts and developments in the field of pesticide residues in food and drink and share the state-of-the-art techniques, knowledge, legislative requirements, etc. The EPRW is a well-established and internationally recognised format which also provides a platform for the exchange of information and experience in the field, bringing together people from each of the relevant sectors (May 2016).

In terms of **international cooperation**, the SGL continued participation in the following:

- The Codex Alimentarius, the FAO and the WHO discussions in areas of its competence.
- WHO's "Environment and Health" Committee, as the Contact Point of the Ministry of Health.
- The International Association of Forensic Toxicologists (TIAFT) working groups.
- The International Network of Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA).
- International conferences with presentations of scientific papers.
- The evaluation of research papers (reviews) for their approval for publication in international reputable journals or books.

FINANCIAL RESOURCES AND BUDGET

Expenditures incurred by the SGL in 2016 amounted to €7,232,383 (95% implementation) (94% of the Ordinary Budget and 84% of the Development Budget).

RELIABILITY AND EFFICIENCY

The efficiency and reliability of a dynamically evolving Institution are fundamental conditions for its stability and growth. As a result of long lasting efforts, the SGL has been able to simultaneously apply two quality management systems in order to guarantee a more integrated approach:

a) **International standard EN ISO / IEC 17025:2005**: Since 2002 the SGL has been accredited with this standard by the Greek Accrediting Body (ESYD), and since 2015 it has been accredited by the National Accreditation Body ("The Cyprus Organization for the Promotion of Quality (CYS-CYSAB)") - within the context of Regulation (EC) No. 765/2008,

and

b) **Common Assessment Framework (CAF)**: It is also one of the first services in Cyprus and the rest of Europe that started in 2005 the implementation of CAF, a system through which an organisation carries out self-evaluation and sets benchmark for its performance.

To achieve the efficiency and reliability objectives it has set, the SGL has focused on the following:

- **Quality Assurance-Accreditation System**
- **Implementation of Quality Management System**
- **Implementation of the Common Assessment Framework (CAF)**
- **Development of the Eco-Management and Audit Scheme (EMAS) which covers environmental factors**

OBJECTIVES FULFILLED IN 2016

- **Expansion of the control, monitoring and surveillance plans**:

  Full implementation of the monitoring/surveillance/control programmes (in all **60**) covering a total of **26,331** samples with **544,495** parameters in 2016 (compared to 2015 where 30,449 samples were analysed with 492,556 parameters tested). The fact that the number of analysed samples in 2016 is lower and the respective number of parameters is higher than in 2015, is due to:

  a) the use of multi-residual methods that analyse more parameters with fewer samples while giving a more representative picture of the sample's situation and more effective control at a reduced cost,

  b) the coverage of new parameters on a prioritisation basis, and

  c) the reduction of crises (nutritional, environmental, etc.) as a result of more targeted controls by the SGL, in cooperation with the competent Authorities.

- **Human resources development** through trainings and educational programmes **(21)**
- **Infrastructure development and advancement of laboratory equipment** (a total of **€425,000** was spent in purchasing state-of-the art equipment or renewal of old equipment).
- **Enhancement of dietary risk assessment capacity** with the use of its own deterministic model, "ImproRisk", to assess the risk from several substances (such as Lead, Cadmium, Mercury, Nitrates and Aflatoxin B1), and through the participation in EFSA's project "EU Menu", the "Horizon2020" research programme "EuroMix", Better Training for Safer Food (BTSF).
- Further **development of the Information Technology (IT) Unit's capacity and ability to respond to EFSA's programmes** and requirements, e.g. two programs for the implementation of the Food Classification System (SSD2), a programme for "Support to National Dietary Surveys", an electronic management of SGL's Quality System documentation, as well as its contribution to update the "OPEN DATA" platform.
- **Effective contribution and support for the national policy / strategy** in areas of its competence, among others, through its participation in relevant national Councils (9), national Committees (10) and Technical & Working Groups (5).
- **Communication / Dissemination of knowledge and information** via specific publications (leaflets (4) and press releases) / website / interviews to mass media (6) / lectures and presentations (59).

ACHIEVEMENTS - RECOGNITIONS

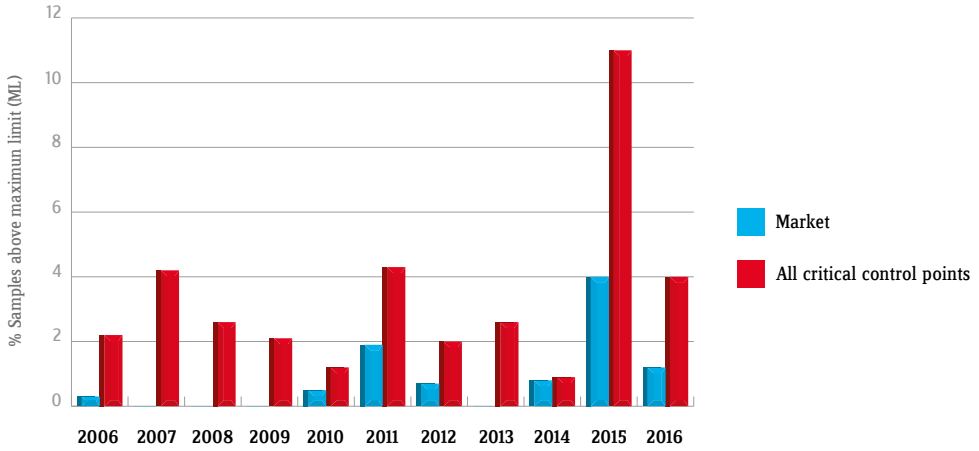
ACHIEVEMENTS-IMPLEMENTATION OF ACTIVITIES AND PROGRAMMES

During 2016 the SGL achieved the following:

A. Great effectiveness in detecting non-compliant:

- **foods**, preventing their entry from third countries and EU member states into the Cyprus and EU market (e.g. nuts, vegetables, fish), by using appropriate preventive and effective control programmes at critical control points (e.g. imports check points), and

Aflatoxin control of nuts (2006-2016)



- other **consumer products**, identifying and withdrawing inappropriate consumer products from the Cyprus market (e.g. glues, toys, cosmetics) and communicating them to the European Rapid Alert System RAPEX.

B. Extension of the scope of its accreditation as regards international standard EN ISO / IEC 17025: 2005 to new methods and new parameters.

C. Expansion of the official controls to cover new parameters or categories, despite budget constraints on consumables, such as:

Foodstuffs area:

- Synthetic antioxidants (BHA, BHT and tBHQ) in oils and fats
- Milk powder in haloumi (Cyprus cheese)
- Conjugated linoleic acid (CLA) in milk products (CLA is reported to affect positively the human body (improve the immune system, have antioxidant and anticancer effect etc.)
- New imported foodstuffs such as drinks, food supplements, flavoured milk, drinks etc. for customs classification (Meursing code)
- Tropane Alkaloids in breakfast cereals and/or milling products, baby foods (cereal-based: buckwheat, millet and sorghum)
- Ergot alkaloids in cereals (wheat, rice, barley, oats, rye and millet)
- Enniatins and Beauvericin in cereals (corn, wheat, barley oats, rice, rye and vegetables such as tomatoes and potatoes)
- Acrylamide in starchy foods (potatoes/chips, potatoes, nuts, bakery products, etc.)
- Chemical Elements [Al, Cr, Mn, Fe, Co, Ni, Cu, Zn, Se, Sn, As, Cd, Pb, Hg] in various foods (milk, honey, legumes, herbs etc.)
- Pesticides residues in the wine for 79 pesticides with gas chromatography / mass spectrometry GC-MS/MS
- Stilbene, beta agonists, anabolic steroids and zeranol in imported meat
- New Genetically Modified Organisms (15% increase over 2015)
- Testing for the presence of genetically modified organisms (GMOs) in packaged animal feed
- 2,4-dinitrophenol in food supplements for weight loss
- Microbiological quality of baby food, nuts, honey and carob syrup (from supermarkets) and pasteurized eggs from confectioneries
- Authenticity of ouzo and raki by using FT-IR/NIR spectroscopy in beverages

Environment and Water area:

- Uranium radioisotopes in drinking water

Consumer Products area:

- Flammability testing of children's carnival costumes
- Acetone in nail discoloration products marked as "Acetone free"
- Hydrogen peroxide in tooth whitening products
- Preservative Butyl paraben and banned preservative isobutyl paraben in cosmetic products

Forensic Chemistry and Toxicology:

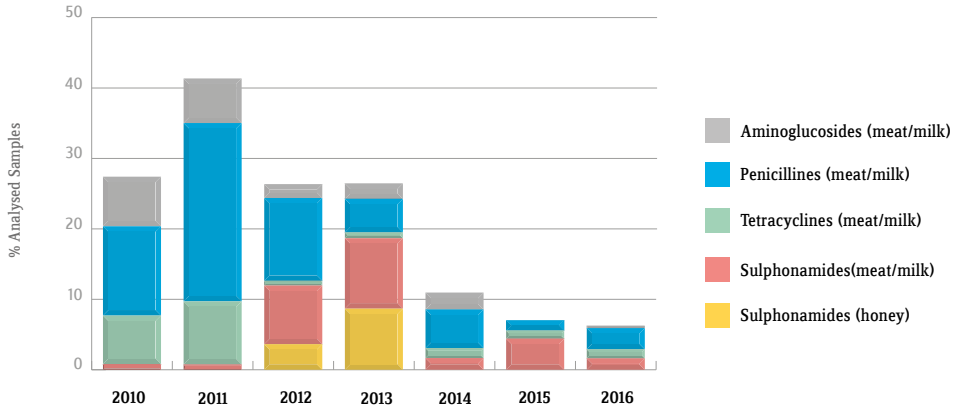
- Tetrahydrocannabinol (THC) in food products and cosmetics

D. Prompt and effective response to food, environmental and other crises / incidents that occurred in 2016, such as:

- Contribution to the combat of food fraud by controlling a number of samples such as honey, fruit drinks, ice-creams, salad oils and meat products.
- Participation to the investigation of an outbreak of food poisoning cases due to viral gastroenteritis (Norovirus).
- Contribution to the investigation of possible sabotage at the P. Gialias community's aqueduct in Pafos District.
- Contribution to the investigation of a marine pollution incident in the region Vrysoudia A in Pafos District.
- Contribution to the investigation of extraordinary beach pollution incidents (microbiological and chemical).
- Scientific support to the Police as regards the management of serious and major cases involving drugs (e.g. large quantities of cocaine (weight 140 kg))
- Collection and transmission of information on new psychoactive substances to the European Monitoring Centre for Drugs (EMCDDA), for the purpose of risk assessment of new psychoactive substances.
- Contribution to the investigation of 16 murder cases.
- Response to 83 incidents of hospitals' Emergency and Intensive Care Departments.

E. Continuous contribution to tackling Antimicrobial Resistance (AMR), with the intensive control of products of animal origin for antibiotics residues.

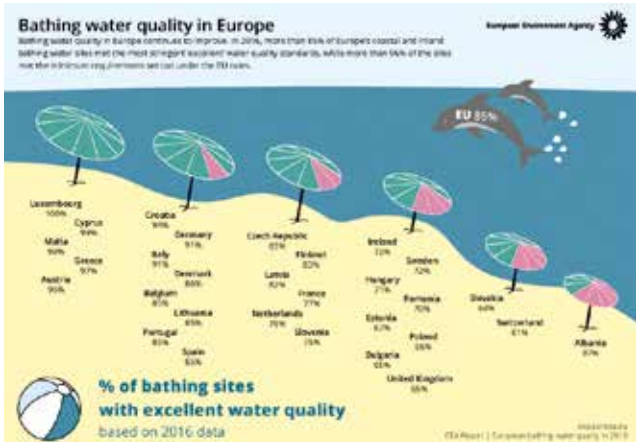
Distribution of non compliant samples of animal product origin for Antibiotics over the years 2010-2016



F. Extension of the "Isotopic Mapping of Cyprus Food and Drinks" to create databases, in order to certify their authenticity and promote them.

G. Extension of the scope to cover the "Isotopic Mapping of Cyprus waters " with the aim of enriching the Geochemical Atlas of Cyprus with new data.

H. Continuous contribution, through the systematic microbiological monitoring of marine waters it carries out, towards the classification of Cyprus waters among the cleanest bathing waters in the EU in recent years, within the framework of Directive 2006/7/EK and the "Blue Flag" EU programme.



I. Strengthening and effective expanding of ammunition controls by the National Guard Laboratory, which has been set up and scientifically supported by the SGL since 2014, and completion of over 1.240 samples controls.

J. Involvement in the University of Cyprus project "Black Gold: Analysis of carobs and carob-based products", which aims to boost carob production growth in Cyprus and to promote carob products with nutritional added value. In this context, two theses have been drafted at the SGL in 2016.

K. Substantial contribution to EFSA actions, within the context of Food Risk Assessment in particular, in cooperation with EFSA. More specifically the SGL, using its "Improrisk" deterministic model for food risk assessment of the population at individual level, conducted food risk assessment for the Cypriot population (adolescents) exposure to chemicals (in 2016, to aflatoxin B1 and Nitrates).

L. Continuation of the implementation, since December 2014, and in cooperation with the national "Research and Education Institute of Child Health", of the first official national dietary survey according to EFSA requirements. The survey, "The National Dietary Survey of the Cyprus population (Lot 1 & Lot 2)", will cover all ages from infants to 74-year-old people, including pregnant women. The survey's objective, carried out in the framework of the "EU MENU" project of EFSA and lasting till 2020, is the harmonised collection of food consumption data in the EU member states for calculating the exposure of the population to chemical and other hazards through food. Its ultimate goal is the use of these data in risk assessment studies for the Cypriot population exposure to various chemicals through food.

M. Completion of the four-year research programme on the "Prospects for the cultivation of stevia plant in Cyprus" in collaboration with the Institute of Agricultural Research of the Ministry of Agriculture. Through the findings of the programme, the most suitable variety (among four varieties) to be used as a sweetener was identified (the one that produces most of the glycosides and the highest concentration in the desired glycoside Rebaudioside A).

N. Creation of the Cyprus Pollen Atlas (CPA) in collaboration with the Department of Agriculture, which identified the morphology of the pollen of 120 Cyprus honey plants. Pollen analysis can confirm the botanical and geographical origin of bee products (i.e. honey and bee pollen). The CPA includes pictures of each flower and its pollen grains, and will be used for the identification and confirmation of Cyprus honey (It is expected to be published and be available online in 2017).

O. Participation on behalf of Cyprus in the preparation of a proposal to the European Commission for the development of a new European initiative on "Human Bio-monitoring". The proposal was adopted by the European Commission in June 2016 and will receive co-financing from the participating countries

and the "Horizon 2020 programme" to develop a five year Joint Research Programme called HBM4EU (1/2017 - 1/2021). It is based on the successes of the European projects COPHES (FP7, 2009-2012) and DEMOCOPHES (Life +, 2010-2012), in which the SGL also participated.

P. Publications (3 in total) in reputable international journals of the results of research projects on the following subjects: a) Multi-mycotoxin method for nuts and cereals, b) Authenticity of Cypriot wine, and c) A fatal intoxication related to MDPV and pentedrone combined with antipsychotic and antidepressant substances in Cyprus.

Q. Participation in 22 research programmes: 13 programmes were funded by the EU (six by FP7, Horizon 2020 and the Research Promotion Foundation and seven by the EFSA) and nine pilot research programmes were funded by the Ministry of Health.

R. Appointment of 11 new Chemists; the filling of these vacant positions was pending since 2011.

RECOGNITION

The approval for the organisation in Cyprus of the "11th European Pesticide Residues Workshop (EPRW 2016)" - an established and internationally recognised forum for the exchange of information and experiences in the field of Pesticide Residues- and its successful realisation with the participation of 450 representatives from 48 countries worldwide, is a recognition of the work of the SGL by the European Scientific Committee of the EPRW.

FUTURE GOALS

The SGL seeks to substantially respond to the continuous scientific challenges, the new requirements of the EU legislation and the various emerging issues while having as a driving force for the accomplishment of these targets its highly professional and dedicated staff.

Based on the above, the following future goals have been set by the SGL:

1. Response to increasing monitoring and control requirements in areas of its competence and continuous improvement of its services.

2. Continuous development of its human resources and completion of its reorganisation, which is pending due to the hiring freeze imposed by the Government, and consolidation its scientific excellence with permanent scientific staff.

3. Provision of timely, reliable, science-based information to the competent Authorities, the Parliament, the media, various stakeholders and the public at large.

4. Expansion and support for the following:
   - Targeted educational programmes for all stakeholders, including the private sector, with the aim of protecting public health through prevention and improving the socioeconomic development of the country.
   - Networking with European centers of excellence and research institutes and organisations, with the aim of enhancing its scientific role at the EU level.
   - Establishment of the SGL as centre of expertise and excellence at a national, regional and European level.

5. Further strengthening of the following:
   - Coordination and collaboration between competent Authorities for more efficient and effective official controls.
   - Food Safety Council's (FSC) activities, especially with the continuous improvement of its "Improrisk" deterministic model for the food risk assessment of the population at individual level, as well as with the required risk assessment studies and better exploitation of the results of official controls.
   - Anti-Narcotics Council activities.
   - Applied research mostly through utilisation of EU funds (Since 2004 the SGL has already absorbed a total of €8,2 millions).

6. Completion of the first official national pancyprian dietary survey in the framework of the "EU MENU" project of EFSA; its data are to be used in risk assessment studies for the Cypriot population exposure to various chemicals through food.

7. Construction of the SGL's new building, following the preparation of the "Project Note" pursuant to the new requirements of the Ministry of Finance for major projects. A new building will reflect its high scientific level as a center of expertise and excellence at national, regional and European level.

8. Upgrading and extending of the existing Laboratory Information Management System (LIMS).

9. Continuous improvement of its credibility, transparency and responsiveness to crises with the aim of preserving the confidence that every Cypriot and European citizen has in the SGL.

MAIN AREAS OF ACTIVITY

The wide range of the SGL responsibilities and competences is covered by the following four wide areas: **Foodstuffs,** the **Environment, Consumer Products** and **Forensic Chemistry and Toxicology**.

FOODSTUFFS

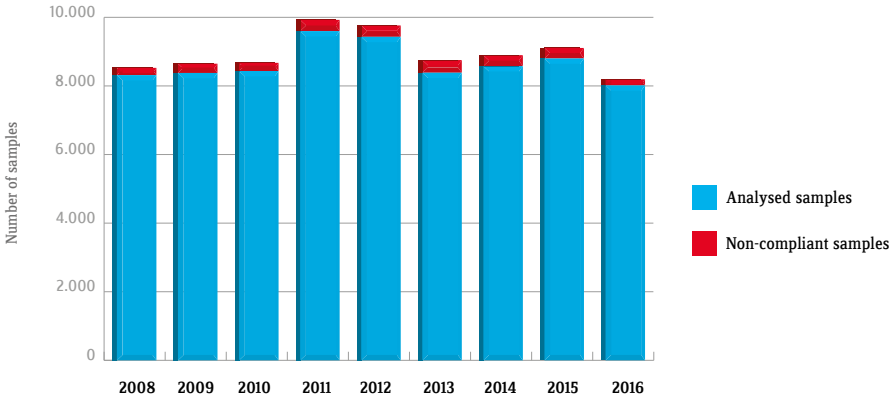
Ensuring safe, healthy and quality food is a very important component of protecting public health. The SGL carries out regular official controls and surveillance on foodstuffs, covering all parts of the food production chain, "from the field or farm to the consumer's table". For this purpose, it carries out various national control programmes with the cooperation of the competent Authorities. Controls are of a preventive nature and focus mainly on basic foods that are consumed frequently or may raise a specific problem, and on foodstuffs expected to be consumed by vulnerable groups of the population such as children and pregnant women. The SGL goes one step beyond the analysis. It evaluates the degree of exposure to toxic substances and to related risks, therefore providing scientifically sound advice to competent Authorities for risk management through appropriate measures.

The SGL has been designated as the National Reference Laboratory (NRL) for a large area of food analyses and applies an Integrated Multiannual National Control Plan consisting of individual programmes for surveillance, monitoring and control programmes, as well as applied research, focusing on:

- The prevention, investigation and problem solving throughout the food chain for long-term food safety.
- The effective implementation of the "acquis communautaire".
- Risk assessment, nutritional data and food composition in order to achieve stable supply of safe and wholesome food and healthy choices to consumers.
- The right information, through its laboratory data, to help consumers form correct nutritional/ eating habits.
- The analysis, characterisation, standardisation and authenticity of traditional or local food.

The effectiveness of the 33 national control-monitoring-surveillance programmes on foodstuffs (chemical, microbiological / biological, radiological and physical safety), managed to prevent the trade of non-compliant food both in the national and EU market and to provide useful information for the compilation of future control programmes.

Foodstuffs Control
(Chemical, Microbiological, Biological, Radiological, Physical Safety)
(2008-2016)



There are 16 specialised food laboratories in total which support and guarantee the extensive analytical control of the highest standards.

Surveillance and control is carried out based on annual and multiannual programmes in the areas of quality / authenticity and safety of foodstuffs:

Quality / Authenticity of Foodstuffs

Nutritional value, composition, adulteration and authenticity of foodstuffs:

- **Nutritional value and composition of foodstuffs** (Moisture, Proteins, Fat, Carbohydrates, Salt, Total Dietary Fibre, Fatty acids, Cholesterol, ω3-ω6 fatty acids etc.)
- **Milk and dairy products** (Moisture, Fat, Proteins, Ash, Salt).
- **Determination of milk identity** (cow's, sheep's, goat's) **on dairy products**, including cheeses bearing the Protected Designation of Origin (PDO) label.

- **Honey** (Sugars: fructose / glucose/sucrose, Hydroxy-methyl-furfural, Diastase activity, Electrical conductivity, Iso-glucose).
- **Olive and vegetable oils** (Acidity, Peroxide number, UV absorbance, ECN42, Fatty acid profile, Chlorophyll).
- **Detection of animal DNA** (Detection of horse DNA in meat products).
- **Fish products** (Histamine, total volatile base Nitrogen)
- **Authenticity and geographical origin of foodstuffs (e.g. alcoholic beverages, wines, honey, juices, vinegar)** (Use of spectroscopic and isotopic techniques: SNIF-NMR, IR-MS, ICP, FTIR-NIR, and chemometrics).
- **Cyprus Food Composition Tables** (macro & micro components: Moisture, Proteins, Fat, Carbohydrates, Salt, Total Dietary Fiber, Fatty acids, Cholesterol, ω3-ω6 fatty acids, Calcium, Magnesium, Iron, Zinc etc.)

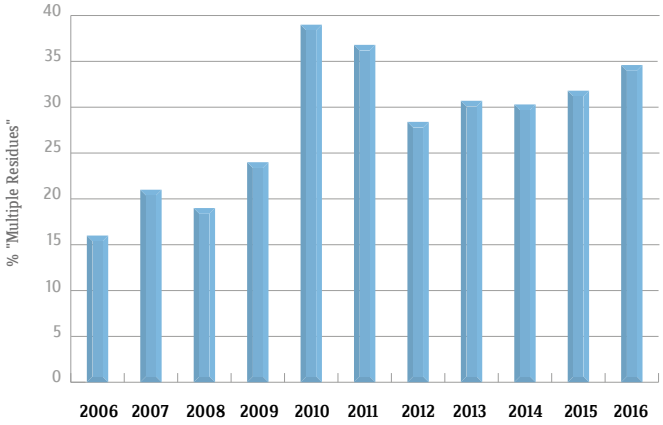
- **Food customs control and other samples** (e.g. chocolates, biscuits, cake mixtures, food supplements and drinks for special medicinal health purposes and any agricultural products of chapters 17-21 of the Combined Nomenclature which are imported from third countries), (parameters: Moisture, Total Fat, Butyric Acid Methyl Ester, Milk fat, Protein, Milk protein, Cocoa, Caffeine, Theobromine, Starch/ Glucose, Sucrose/Isoglucose), juices and baby foods (sugars), nuts (Polyphenoloxidase, Peroxidase, Moisture, Salt), seaweeds (Brix, Salt, Moisture, Swelling properties), determination of aroma complex HPLC (Unsaturated Ketones & Heterocyclic substances) in dry/roasted nuts, determination of denaturants (Isopropanol, Methyl Ethyl Ketone and Bitrex) in denatured products e.g. bioethanol.

Safety of Foodstuffs

- **Food additives**: **Preservatives** (Sulphur dioxide, Benzoic/Sorbic acid, Propionic acid, Nitrates/ Nitrites), **natural and watersoluble synthetic colours** (Tartrazine, Carmoisine, Ponceau 4R, Allura Red AC, Carmines etc.), **synthetic colours** (Sudan I, II, III, IV, Para Red), **sweeteners** (Acesulfame potassium, Aspartame, Saccharin, Cyclamates, Steviol Glycosides), **antioxidants** (BHA, BHT, tBHQ, Ascorbic acid), **flavouring enhancers** (Glutamic acid), **food flavourings** (Coumarin), **caffeine**
- **Methanol in spirits**
- **Pesticide residues** mainly in fruit and vegetables, cereals, pulses, baby foods, biological products, products of animal origin and oils, wines and honey (Organophosphorous, Organochlorines, Carbamates, Pyrethroides, Amides, Strobilurines, Dinitroanilines, Triazoles,

Benzimidazoles, Neonocotinoides, Phenylureas, Benzoylureas, Dithiocarbamates, Chlormequat, Mepiquat and other pesticides including highly polar pesticides)

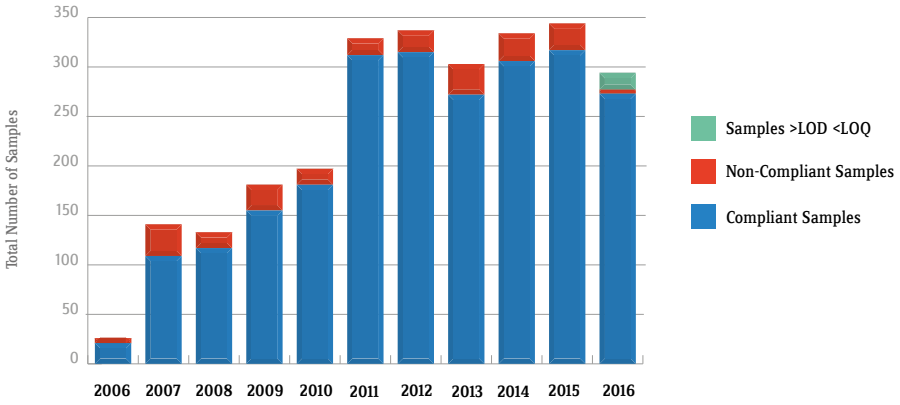
Percentage of plant origin samples with "multiple pesticides" over the years 2006 - 2016



- **Veterinary drug residues in meat and animal products** (Tetracyclines, Sulphonamides, Penicillins, Cephalosporines, Aminoglucosides, Quinolones, Chloramphenicol, Nitrofurans, Carbadox, Olaquindox, Dyes, Nitroimidazoles, Coccidiostats, Anthelmintics, Tranquillizers, Zearanols, NSAIDs, β-Agonists, Hormones, Anabolic substances, Thyreostats, Gestagens, Corticosteroids)
- **Environmental and other contaminants in foodstuffs and natural toxins** (Aflatoxins B1, B2, G1 and G2, Aflatoxin M1, Ochratoxin A, Zearalenone, Deoxynivalenol, Fumonisins B1 and B2, Toxins T2 and HT2, Patulin, Citrinin, Alternaria Toxins [AOH, ALT, AME, TEN, TEA], Tropane Alkaloids [Atropine, Scopolamine], Ergot alkaloids, Enniatins and Beauvericin, Chemical Elements [Al, Cr, Mn, Fe, Co, Ni, Cu, Zn, Se, Sn], Heavy Metals [Pb, Cd, Hg, As, etc.], Nitrates/Nitrites, Polycyclic Aromatic Hydrocarbons-PAHs, PFOA and PFOS, Furan, Acrylamide, 3-MCPD, Ethyl Carbamate, etc.)
- **Radioactivity levels in foodstuffs** (Gamma Radionuclides, Sr-90)
- **Materials and products in contact with food and various substances, including endocrine disrupters** (Overall & specific migration of substances: Polyadipates, Cadmium, Lead, Formaldehyde, Phthalates, Primary Aromatic Amines, Melamine, Styrene, Bisphenol A etc.)
- **Genetically Modified Organisms** (Detection of GMOs in food and feed containing soya, maize, rice, honey, papaya, oilseed rape, flax)
- **Meat fraud** (Beef, pork, chicken-poultry, horse, turkey, fish)

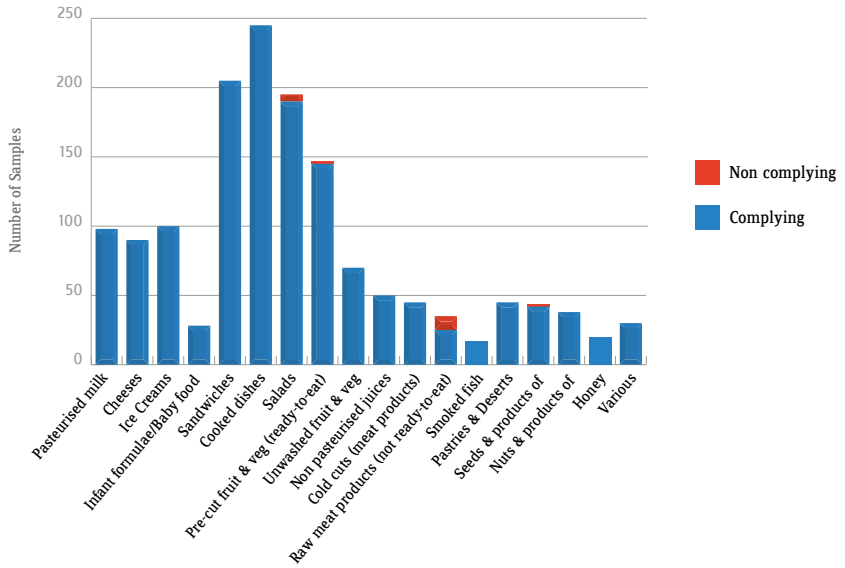
- **Allergens** (Milk, soya, egg, fish, crustacean, peanut, mustard, celery, hazelnut, almond, walnut, pistachio, gluten, sesame, lupin, mollusks and cashew)

Control of allergens in foodstuffs over the years 2006 - 2016



- **Microbiological quality of foodstuffs** (*Salmonella spp., Listeria monocytogenes, Campylobacter spp., Cronobacter spp., coagulase-positive staphylococci, staphylococcal enterotoxins, Bacillus cereus, Enterobacteriaceae, Escherichia coli, Shiga toxin - producing E. coli, Clostridium perfringens*, aerobic colony count, yeasts and moulds, noroviruses, hepatitis A virus)

Microbiological control per foodstuff category (2016)



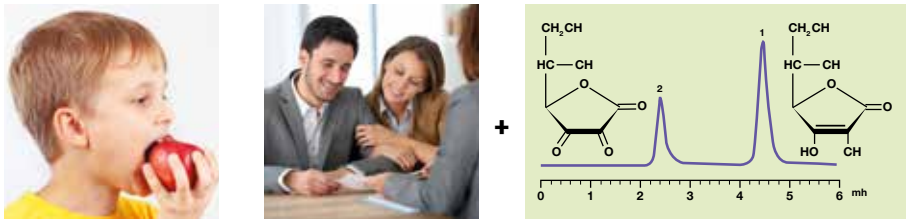
- **Food supplements** (Anabolic Steroids, Stimulants, Vitamins, Heavy metals, PDE- 5 analogs, pharmaceutical substances for Weight loss (Sibutramine HCl, Synephrine, Hydrochlorothiazide, Caffeine, Phenolphthalein, Triamterene, 2,4-Dinitrophenol), 1,3-DMAA (1,3-Dimethylamylamine) and other Pharmaceutical substances as Levodopa in Food Supplements)
- **Novel Foods / Nutrition and health claims of foodstuffs** (according to EU Regulations 258/97, 2283/2015 and 1924/2006 respectively)

Risk assessment in the areas of foodstuffs and water

The SGL provides risk assessment for the exposure of the population to chemical substances and microbiological or other hazards from food consumption (Regulation No. 178/2002). Risk assessment is carried out by the SGL within its remit and its participation in the National Food Safety Council, and is continuously upgraded mainly due its participation in EFSA's Advisory Forum and EFSA's Networks, as well as due to its capacity as the Cyprus Focal Point of EFSA.

In 2016, the SGL continued the exposure assessment from food consumption to chemicals (to aflatoxin B1 and Nitrates in particular) of the Cyprus population at individual level, using the "Improrisk" deterministic exposure assessment model that was developed at the SGL.

Exposure assessment from food consumption



Food consumption data + Occurrence data (Analytical data)

ENVIRONMENT

The EU strategy for the Environment and Sustainable Development is a framework for a long-term vision of sustainable development, where economic growth, social cohesion and environmental protection go hand in hand and are mutually supporting. To this end, the 7th EU Environment Action Programme (2012 - 2020) includes a comprehensive environmental policy to be implemented according to the principles of sustainability, prevention, the principle of "the polluter pays" and the reparation of the pollution at source. The substantial contribution to the implementation of such policy is one of the key objectives of the SGL.

The SGL contributes significantly to pollution prevention and effective treatment having developed 18 control-monitoring-surveillance programmes that meet the EU environmental legislation and enable the early identification of accidental or malicious contamination. Surveillance and control is carried out based on annual and multiannual programmes in the areas of **Water**, **Effluents** and **Atmospheric Air**.

It has a unique infrastructure to cover chemical, microbiological, biological, eco-toxicological and radiological aspects of environmental monitoring and pollution control of water as well as human bio-monitoring to detect the environmental impact to human health.

Seven specialised laboratories provide a wide range of highly sophisticated analytical services, which keep abreast with the latest worldwide scientific and technological trends.

The SGL, as a vital supporting service of the environmental authorities, utilises its state-of-the-art infrastructure and expertise aiming at the following:

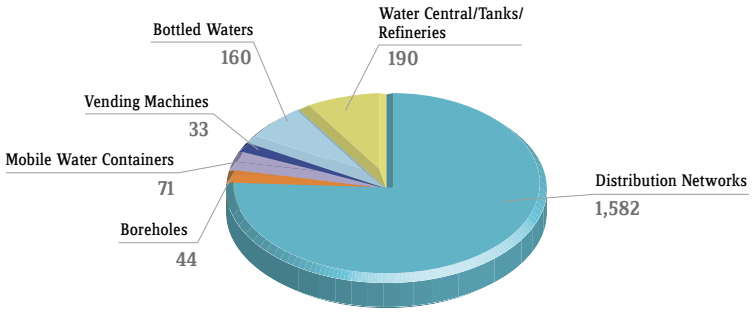
- Continuous support, development and implementation of the environmental policy and legislation by providing reliable laboratory results and expertise.
- Development of effective mechanisms for the early detection of pollution. The ultimate goal is to contribute to the prevention and the long term safety and sustainability of the water resources.
- Investigation of the links between environment and health and, in particular, the effects of pollution on health, which aim at the prevention and reduction of potential health hazards originating from environmental factors, as well as support of political decisions. Emphasis is also given to the quality of indoor air and the effects of toxic substances on children. In addition, human bio-monitoring is being developed in order to investigate the real levels of toxic substances in the human body.
- Furthermore, new programmes are being developed, that focus on new potentially dangerous substances and emerging hazards, such as pharmaceuticals in waste water.

Water

Drinking Water, Bottled Water (including Natural Mineral Water)

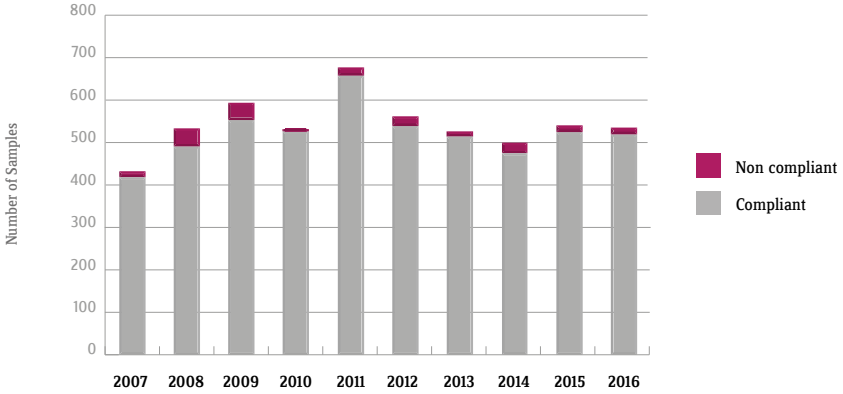
- **Physicochemical parameters / Anions / Cations** (Conductivity, pH, Chlorides, Sulphates, Nitrates, Nitrites, Sodium, Boron, Ammonium, Fluorides, Total Organic Carbon, Cyanides), heavy metals (Lead, Cadmium, Chromium, Nickel, Arsenic, Selenium, Antimony, Mercury, Manganese, Copper, Aluminium, Iron, Barium)

Chemical control of various types of drinking water - 2016



- **Organic pollutants** (THMs, pesticides, VOCs, PAHs, organic micropollutants)
- **Radioactivity levels** (Gamma Radionuclides, Gross α/β- activity, Uranium radioisotopes)
- **Microbiological control** (Total coliforms, *Escherichia coli, Enterococci, Pseudomonas aeruginosa*, Total Bacterial Count at 22 & 37°C, Sulphite reducing clostridia, *Clostridium perfringens, Legionella species*)

Microbiological control of bottled water over the years 2007 - 2016



- **Determination of toxicity** (Tap water: Microtox Test using *Vibrio fischeri* (EC10-TU10 measured at 5', 15' and 30' / Water from water refineries: {EC20-TU20 or (depending on the stage of the process) EC10-TU10 measured at 5', 15' and 30'}). Also Thamnotox test using *Thamnocephalus platyurus* is applied on tap water and water from water refineries {LC50-TU50 measured at 24Hrs}

Surface and Ground Water (dams, rivers, freshwater, underground water, boreholes, salt lakes)

- **Chemical control** (pH, Conductivity, Sodium, Potassium, Calcium, Magnesium, Chromium, Zinc, Copper, BOD5, COD, Mercury, Cadmium, Lead, Nickel, Boron, Barium, Iron, Maganese, Cobalt, Arsenic, Total Phosphorus, Free Ammonium, Total Ammonium, Chlorides, Sulfates, Fluorides, Silicates, Total Hardness Carbonates, Bicarbonates, Nitrites, Total Alkalinity, Total residual chlorine, Suspended solids, Total Organic Carbon (TOC), VOCs, Pesticides, PAHs, Organic micro-pollutants, PCBs, Dissolved Organic Carbon (DOC) and Nitrates)
- **Microbiological control** (Total coliforms, *Escherichia coli, Enterococci*)
- **Determination of toxicity** (Microtox Test using *Vibrio fischeri* (EC20-TU20 measured at 5', 15' and 30'), Daphtox Test using *Daphnia magna* (EC50-TU50 measured at 24 and 48 hours), Algaltox test using *Pseudoklebsiella subcapitata* (EbC50-TU50 measured at 72))
- **Environmental biomonitoring** (Spectrophotometric determination of Chlorophyll α)
- **Radioactivity levels** (Gamma Radionuclides, Gross a/b-activity)

Seawater / Costal Sea Water

- **Chemical control** (Chromium, Iron, Nickel, Copper, Cadmium, Zinc, Lead, Mercury)
- **Microbiological control** (*Escherichia coli, Enterococci*)
- **Radioactivity levels** (Gamma Radionuclides)

Swimming pool Water

- **Chemical control** (Conductivity, pH, Total Residual Chlorine, Free Chlorine, Total Alkalinity)
- **Microbiological control** (Total coliforms, *Escherichia coli*, Total Bacteria Count 37°C, *Staphylococci species, Pseudomonas aeruginosa*)

Monitoring of the Ezousa underground water

- **Chemical control** (Nitrates, Total Phosphorous, Ammonium, TOC, Kjeldhal-N, BOD5, COD, total Nitrogen, Suspended solids, Arsenic, Lead, Cadmium, Mercury, Trichloroethylene, Tetrachloroethylene, pesticides residues, organic pollutants)

- **Microbiological control** (*Escherichia coli, Somatic coliphages*)
- **Determination of toxicity** (Microtox Test using *Vibrio fischeri* (EC20-TU20 measured at 5', 15' and 30'), Daphtox Test using *Daphnia magna* (EC50-TU50 measured at 24 and 48 hours), Algaltox test using *Pseudoklebsiella subcapitata* (EC50-TU50 measured at 72 hours)

Effluents

Domestic effluents - Treated water

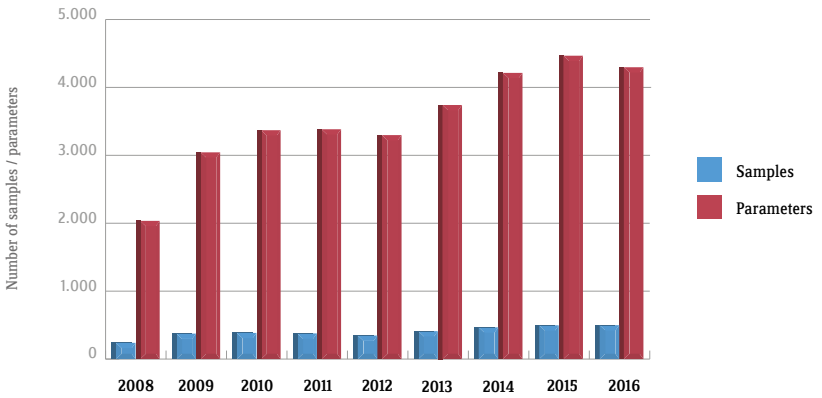
Water scarcity and increased needs due to population growth as well as lifestyle and climate changes make the safe reuse of recycled water from liquid municipal waste extremely important for the water balance of Cyprus.

An important prerequisite for the use of recycled water is strict quality control to ensure the protection of human health and the environment from possible effects of the long term use as well as to address the concerns and bias of citizens towards the use of recycled water.

The quality control of recycled water includes both chemical and toxicity control:

- **Chemical control** (pH, conductivity, residual Chlorine, BOD5, COD, Suspended Colids, Chlorides, Nitrates, Sulphates, Boron, total Phosphorus, Kjeldahl-Nitrogen, metals (Calcium, Magnesium, Potassium, Sodium, Zinc, Copper, Lead, Cadmium, Mercury, Chromium, Nickel), Carbonates, Bicarbonates, pesticides and Polyaromatic Hydrocarbons (PAHs), in total 20 compounds, in treated domestic wastes. PAHs have also been determined in sediments using another method.

Chemical control of effluents over the years 2008-2016



- **Determination of toxicity** (Recycled water of tertiary wastewater treatment plants: Microtox Test using *Vibrio fischeri* (EC50-TU50 measured at 5', 15' and 30'), Daphtox Test using *Daphnia magna* (EC50-TU50 measured at 24 and 48 hours), Algaltox test using *Pseudoklebsiella subcapitata* (EC50-TU50 measured at 72 hours))

Atmospheric Air

Quality of outdoor air

- **Chemical control** (Metals (Aluminium, Calcium, Iron, Potassium, Magnesium, Sodium, Zinc, Titanium, Vanadium, Chromium, Maganese, Nickel, Cobalt, Copper, Arsenic, Cadmium, Tin, Barium, Mercury, Lead), Anions (Fluorides, Chlorides, Bromides, Nitrates, Phosphates, Sulphates), Cations (Lithium, Sodium, Ammonium, Potassium, Magnesium, Calcium), Polyaromatic Hydrocarbons (PAHs) (Benzo(α)anthracene, Benzo(j)fluoranthene, Benzo(b) fluoranthene, Benzo(k)fluoranthene, Benzo(α)pyrene, dibenzo(a,h)anthracene, Benzo(g,h,i) perylene,indeno(1,2,3-cd)pyrene)

- **Radioactivity levels** (Gamma Radionuclides, Gross β- activity)

Environment and Health

According to the World Health Organisation, many diseases are associated with human exposure to environmental factors, such as toxic chemicals in the food chain, the environment and consumer products. These diseases are often chronic (e.g. cancer, allergies, asthma, neuro-developmental abnormalities, disorders of the reproductive system) and influence healthy ageing. In addition, the fiscal constraints of the European countries, socioeconomic inequalities, gender inequalities, extreme climatic events, the increase of non-communicable diseases, the ageing of the population and the unprecedented migration between and within countries, exacerbate these factors. There is therefore an urgent need to continue and strengthen efforts to address environmental factors that affect health.

Recognising that the study of the relationship between environment and health can lead to better public health policy and the prevention of diseases, the SGL implemented several actions in response to commitments arising from European, international and national strategies and action plans, as well as from other national priorities. Specifically, since 2004, the SGL has been actively involved in five research programmes related to environment and health, and has coordinated in Cyprus the following two European bio-monitoring projects for the harmonisation of bio-monitoring in Europe:

1. **COPHES** (FP7/ENV2009/244237) (2009-2012), where a harmonised methodology for bio-monitoring in Europe has been developed http://www.eu-hbm.info/, and

2. **DEMOCOPHES** (LIFE09ENV/BE/000410) (2010-2012), where the COPHES methodology was applied in 17 European countries (including Cyprus), proved to be possible to harmonise human bio-monitoring across Europe, and comparable cross-border bio-monitoring data for the general population http://www.democophes.org/.

Furthermore, the SGL, participated on behalf of Cyprus, in the preparation of a proposal to the European Commission for the development of a new European initiative on Human Bio-monitoring. The proposal was adopted by the European Commission in June 2016 and will receive co-financing from the 25 participating countries (among them Cyprus) and the "Horizon 2020 programme" to develop a five year Joint Research Programme called HBM4EU (1/2017 - 1/2021). The aim of this initiative is to create a common European programme to examine the exposure of European citizens to chemicals and the possible impact of this exposure on human health. The initiative is based on the results of the COPHES and DEMOCOPHES projects and brings together research and policy activities at national and EU level. The expected outcome is to find strong evidence at EU level to support sound policy making, which will help to better regulate the internal market while at the same time striking a balance between the interests of industrial competitiveness and public health.

The SGL in 2016, also participated in the preparation of the **"Ostrava Declaration"** and the **"6th Inter-Ministerial Conference on Environment and Health"**, to be held in June 2017 in Ostrava - Czech Republic.

CONSUMER PRODUCTS

The laboratory testing of consumer products (pharmaceuticals (for human and veterinary use), cosmetics, textiles, adhesives, stationery, chemical mixtures for household use and toys), and customs samples is executed by five specialised laboratories of the SGL having developed nine control-monitoring-surveillance programmes in the framework of national and EU legislation.

Pharmaceuticals

The control of pharmaceuticals, along with the foodstuffs control, was one of the first priorities of the SGL, since its foundation in 1932.

The SGL contributed over time to ensure the quality, efficacy and safety of pharmaceuticals traded in the domestic market or produced by the Cypriot pharmaceutical industry for export. Furthermore, the frequent laboratory control contributed to the qualitative development of the Cypriot pharmaceutical industry as well as to the trade improvement of pharmaceuticals.

In order to protect public health, the SGL performs quality control of pharmaceuticals for human and veterinary use to evaluate their quality, safety and efficiency according to the specifications of the finished product dossier of the MHA (Manufacturers Authorisation Holder) and/or official compendial method.

- **Physicochemical and pharmaceutical specifications that are usually tested**:

  Quality: identification, uniformity of weight, assay of the active ingredient, uniformity of content, pH, water determination, optical rotation, clarity and degree of opalescence of liquids, refractive index.

  Efficiency: disintegration of tablets, capsules and suppositories, dissolution test for solid dosage forms.

  Safety: related substances, impurities, degradation products, visible and sub-visible particles in parenteral preparations).

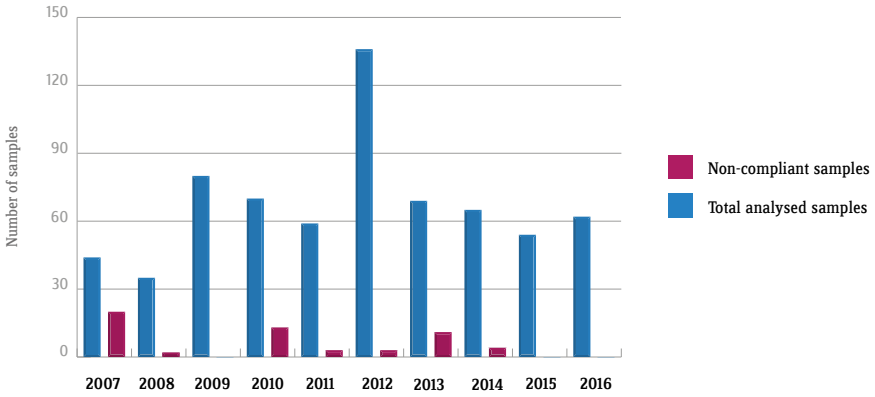
- **Microbiological control** (Sterility test, *Limulus amoebocyte* lysate endotoxin test, Bioassay, Presence/absence of *Escherichia coli*, Total aerobic microbial count, Total yeast and molds count).

Cosmetics

The SGL is also the official laboratory for the quality control of cosmetics, in collaboration with the Pharmaceutical Services of the Ministry of Health.

- **Chemical control** (Determination of preservatives (methyl-, ethyl-, propyl-, butyl- and isobutyl- parabens, sorbic and benzoic acid), presence of Phthallic Esters, Glycols (Ethylene glycol, Diethylene glycol), Fluoride, Oxidative dyes, Bleaching agents (such as Hydroquinone, Hydroquinone · monomethyl ether, 29 Hydroquinone·monobenzyl ether) Lidocaine, Benzocaine, heavy metals, NDELA, Free Formaldehyde, Para-Phenylenediamine (PPD), Allergens, Hydrogen Peroxide), Triclosan, Methylchloroisothiazolinone / Methylisothiazolinone (MCI/MI), Acetone in acetone-free nail polish removers.

Official chemical control of cosmetics over the years 2007-2016



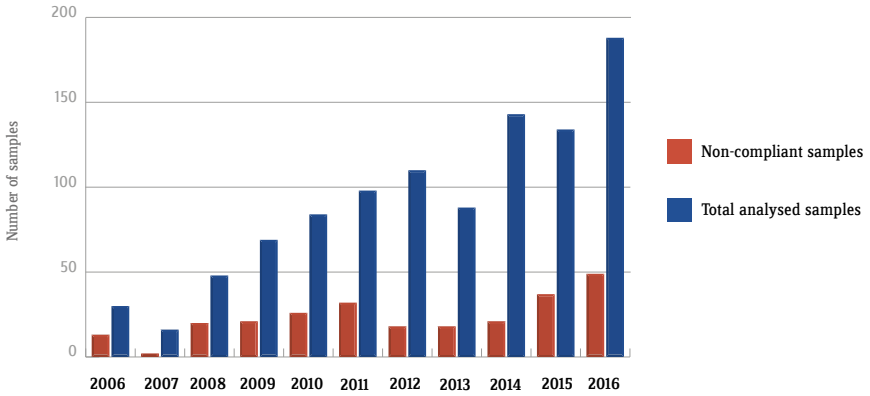
- **Microbiological control** (Presence/absence of *Escherichia coli*, Presence/absence of *Staphylococcus aureus*, presence/absence *Pseudomonas aeruginosa*, presence/absence of *Candida albicans*, total aerobic microbial count).

Children's Toys

The main purpose of the control of children's toys is to protect children and infants from exposure to chemical risks i.e. chemicals (heavy metals, phthalates, etc.) found in toys, as well as from risks from poor mechanical/physical properties or flammability. Children may be at risk from poor quality materials or poor construction of toys which can result in injury or drowning of a child.

- **Mechanical properties** (Drop test, impact tests etc.)
- **Chemical control** (Phthalate esters, migration of certain elements from wooden and metallic toys with painted surfaces, plasteline, crayons, coloured pencils and watercolours).

Official control of toys over the years 2006 - 2016



Other consumer products

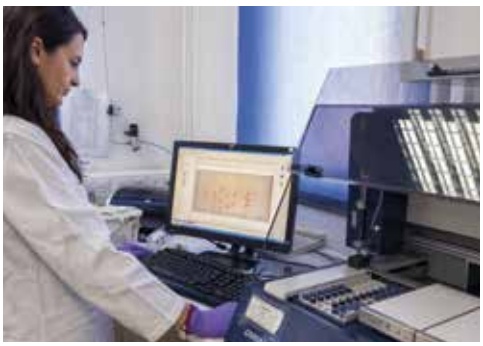
The SGL collaborates with the Cyprus competent authority (Department of Labour's Inspection of the Ministry of Labour, Welfare and Social Insurance) for the implementation of: the Chemical Substances Law of 2010 (N.78(I)/2010) and the European Regulation (EC) 1907/2006 (REACH) for the control of dangerous chemicals in various consumer products and the European Regulation (EC) 1272/2008 (CLP) for the classification, labeling and packaging of chemical substances and mixtures.

In 2016, the following categories of consumer products from the Cypriot market were analysed within the framework of the above regulations:

- **Adhesives** for chloroform, toluene and benzene
- **Felt-tip pens, markers and correction fluids** for chloroform, toluene and benzene
- **Air fresheners** for 1,4-dichlorobenzene and other restricted chemicals and allergens
- **Household chemical preparations** to determine pH
- **Various other products** for targeted investigations

FORENSIC CHEMISTRY AND TOXICOLOGY

The Laboratory of Forensic Chemistry and Forensic Toxicology of the SGL is the only official laboratory in Cyprus conducting analyses of police exhibits in relation to: trafficking and use of drugs, arson, explosives materials and explosives residues, traffic accidents, malicious damage, unnatural deaths and poisoning cases, murder, robbery, rape, etc.



The scientific results of the SGL provide the basis for the Police to investigate cases and for the Attorney General for the administration of justice.

Forensic Chemistry

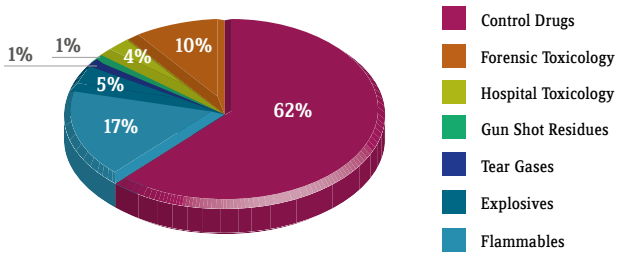
- **Controlled drugs** (Cannabis, Heroin, Cocaine, and New Synthetic Drugs: Synthetic Cannabinoids, Cathinones, Benzofurans etc.)
- **Tetrahydrocannabinol** in food products and cosmetics
- **Ignitable liquids** (Petrol, Diesel, Kerosene, thinners and other ignitable liquids)
- **Explosives and explosives residues** (Trinitrotoluene (TNT), Nitroglycerine (NG), Ethylene glycol dinitrate (EGDN), Cyclotrimethylenetrinitramine (RDX), Pentaerythritol tetranitrate (PETN), inorganic explosive mixtures and pyrotechnic compositions)
- **Scanning Electron Microscope** (gunshot residues, hairs, wood etc.)
- **Tear gases** (α-Chloroacetophenone (CN), 2-Chlorobenzalmalononitrile (CS), Capsaine (OC), Nonivamide, etc.)

Forensic Toxicology

- **Qualitative control** Controlled drugs, Benzodiazepines, antidepressants, pesticides, and various drugs according to each case.
- **Quantitative analysis**: Alcohol in blood, urine or eye fluid and various drugs according to each case.

The scientific results are utilised both by the Police and coroners to cast light on unnatural deaths. In certain cases, when samples are sent from the hospitals, the results provide profound information for the treatment of patients in intensive care units.

Analysed samples of Police exhibits by category - 2016



STATE GENERAL LABORATORY

REPUBLIC OF CYPRUS