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## Sapienza University of Rome: Postgraduate course in Chemical Hazard Evaluation and Management

Sapienza University recently presented a new, highly innovative, postgraduate course in Chemical Hazard Evaluation and Management. The presentation was attended by the University's academic authorities, representatives of a number of Italian Ministries and governmental bodies involved with chemical hazard management. The new postgraduate course was presented by the course director, Prof. Bruno Botta, Full Professor of organic chemistry at Sapienza University.

The postgraduate course in Chemical Hazard Evaluation and Management has been instituted to provide professional profiles specifically trained to evaluate and manage hazards that might occur in the manufacturing and use of chemicals, as well as the risks related to the whole manufacturing pipeline of products for specific uses which need to comply to social, industry and product regulations. It is a two-year postgraduate chemistry course that is very different to existing courses, more related to medical aspects.

*We talk about it with Domenico Misiti, Emeritus Professor at Sapienza University, who is very committed to promoting the course and strongly believed in.*

### **Prof. Misiti, which are the thematic areas dealt with?**

The novelty is that besides chemistry, we have included regulatory affairs, toxicology, human health and environment hazard analysis, evaluation and management and, lastly, an application area where we go into details on the methodological and application tools for implementing regulations in force.

### **What kind of professional skills are acquired through the course?**

The course is directed to professionals interested in expanding their knowledge on technical-scientific, regulatory and applications subjects related to the evaluation and management of chemical hazards, in conformity with national and European regulations. Topics included in the course as reported in the Decree of the establishment:

- a) *EU and national regulations in the field of chemicals, hazards and safety, with particular reference to*

*social, industry and product regulations that have the evaluation and management of chemical hazards as a methodological tool;*

- b) *methods and procedures for the characterization of substances;*  
c) *toxicological and eco-toxicological properties of substances;*  
d) *computational techniques for the estimation of the physical-chemical, toxicological and eco-toxicological properties of substances;*  
e) *methodologies and procedures for hazard evaluation;*  
f) *methodologies and procedures for the preparation of the dossiers and evaluation documents required by the regulations in force concerning hazard evaluation and management;*  
g) *evaluation of new materials, such as those manufactured through nanotechnologies and new evolutionary processes;*  
h) *strategies for the synthesis and production of substances that are alternative to toxic chemicals and / or are environment-friendly substances.*

### **Which are the EU and national regulations that have required to develop a course like this to specifically train professionals on chemical hazards?**

It's mainly the **REACH** (**R**egistration **E**valuation **A**uthorization and **R**estriction of **C**hemicals) regulation, implemented in 2007 and that will be fully in force in 2018. The REACH applies to all chemical substances; not only those used in industrial processes but also in our day-to-day lives. The following is a definition of the REACH by the Italian Chemical Society: *"The REACH Regulation requires that only registered substances can be produced and / or imported into the European Union,*





*and provides that all chemicals, either single substances or compounds, both as such or in a mixture, naturally occurring or obtained by synthesis, used or disposed of, or generated by any working activity, whether intentionally or not, be evaluated for registering purposes".*

### **What was the national and international regulatory scenario before the implementation of the REACH?**

Firstly, the harmfulness of certain classes of chemicals has been well known since ancient times (just think of Socrates' hemlock), yet it is only since the second half of 1900s that control authorities and the industry started focusing on these issues. This has led to a number of initiatives, also of a restrictive nature, for a number of classes of chemical substances because dangerous and / or harmful to the health of citizens, to industry workers and to the environment. A number of dramatic events also showed the public the downside of Chemistry (Seveso, Bhopal, CFCs, thalidomide). I have always been sensitive to these issues since I was a researcher in the Daniel Bovet's laboratory. I have been a member of the Environment Committee of the OECD and the EEC, the Commission for the Classification of Chemicals directed by Prof. Angelo Sampaolo of ISS (Istituto Superiore di Sanità - Italian Institute for Public Health) and similar committees of the Ministry of Health and Environment. I held a plenary Conference on the "Seveso incident" at the OECD headquarters in Paris. I shared these issues very much with my friend and colleague Prof. Luciano Caglioti, who exploited our discussions on these matters to take the opportunity to write his book "The two faces of Chemistry" in 1979, which well-illustrated how chemistry, if misunderstood, could turn harmful. It is in this scenario that the EU regulatory authorities decided to develop the REACH in 2006 (which became in force in 2007): a global regulatory effort targeting the industrial exploitation of chemistry.

### **How did the Italian regulatory authorities and the training industry react to the impact of such a thorough regulation on existing and new chemicals?**

They reacted instantly. Many and from many parts have been the initiatives for the implementation of the regulation and the training of the professionals involved. To name just a few: the Ministry of Health (and the National Institute of Public Health (Istituto Superiore di Sanità)), the Ministry for Economic Development (MED) and the Ministry for the Environment and for the Agriculture. Other institutions include Federchimica,

CNR, ENEA, ISPRA Ambiente, Confindustria, Farnindustria, the Italian Chemical Society.

The industry will need to become deeply involved and will certainly need to tackle issues in production by introducing revolutionary changes to avoid the use of solvents, reagents and catalysts classified according to different degrees of danger. The academic community, in co-operation with the local regulatory authorities, have established one-year Master courses that aim at training professionals to be qualified in dealing with the REACH. This led, in 2013, to establishing our postgraduate course, promoted by the National University Council (Decree of the Ministry of Research and University dated 26.06.2013), to train professionals to develop skills in managing and assessing hazards within such a complex matter.

The postgraduate course, the first in Italy at the time of writing, was developed with the help of prominent REACH experts. In fact, the course can boast lecturers from experts of the National Institute of Public Health - Istituto Superiore di Sanità - (evaluation of toxicity and eco-toxicity) and from INAIL experts (workplace hazards). Moreover, Executives of the Ministries of Health and Economic Development play an important role in the organization of courses with supplementary and specific seminars.

The School also provides basic training activities and on-the-job activities through operational in-company internships, the latter concluding the course training before admission the "final test".

### **In conclusion, how do you evaluate this new training School that Sapienza University is implementing?**

I believe that starting the postgraduate course in Chemical Hazard Evaluation and Management is an opportunity, also for employment, for many young people holding a specific master's degree, and it is suitable for many different jobs: public or private sector environmental consultants, public administrators specializing in the implementation of environmental protection, qualified employees or consultants of industry manufacturers or companies using or importing chemicals. These are just a few. As a teacher, I feel that starting this course will also help to broaden the number of University courses offered to students, in particular for Sapienza University, which adds a training course of great value to its already full educational basket.

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 Chimica Oggi - Chemistry Today (TKS Publisher)