

GDCh Memorandum Analytics

German Chemical Society (GDCh)



Analytics is an interdisciplinary science that embraces various branches of learning; if materials are the main focus it is also known as »Analytical Chemistry«. The end results of Analytics can be expressed in terms of quantity and quality. Material-analytical problems are indeed ubiquitous and by no means related solely to disciplines of the natural science. On the contrary, Analytics increasingly represents a dominating force in industry's added value chain. Ever increasing numbers of quality characteristics are attributed to products and processes, which illustrates the spreading dominance of Analytics in all areas of life.

Society is no longer content to base its decisions related to everyday life or to industry on empirical or simple traditional elements, but rather on analytically validated data and assessments. For instance, analytical and bioanalytical chemistry methods continue to gain importance in the field of medical diagnostics. We all now recognize buzzwords such as »food safety« or »water pollution«, »greenhouse gases« or »doping tests«, »genetic analyses« or »proof of origin« whose concepts are related to advances made in the domain of Analytical Chemistry. Authoritative analytical work helps build confidence and also represents a prerequisite for successful production and marketing.

The rationale behind political and economic decisions has long been based on ecological data, i.e. the results of environmental analyses. Of even greater consequence is the concept of *sustainability*, in as much as it will continue to gain significance in the future; this challenge will require even greater analytical competence than any other task undertaken by humanity in the past. In brief, more and more decisions in the spheres of politics, medicine, law and economics are based on analytical data. This also pertains to publicly protected assets such as health, environment, security and resources as well as to the regulation of commercial and economic processes. The decisive impetus for the development of key technologies (microchips, high-tensile materials, medical diagnostics) increasingly presupposes highly sophisticated Analytics.

Ongoing globalization and advancing European unification have led to a dismantling of trade barriers at national borders. The goal here is to achieve free and unimpeded movement of products and services. However, this presupposes the ability to clearly differentiate between various product qualities. The marketability of a product depends on the availability of information about the product's composition, purity and reliability. International guidelines have been introduced such as Good Laboratory Practices (GLP), Good Manufacturing Practices (GMP) and Standards for Acceptable Analytical Practices (e. g. EN ISO 17025) to ensure a unified cross-border approach to the standardization of analytical information.

These aspects clearly illustrate the fundamental importance of Analytics and how it will continue to gain in significance. Analytics represents a collective challenge for a number of responsible partners, particularly for universities, industry, analytical laboratories, equipment manufacturers as well as for governmental authorities. It is thus clear that Germany's need for suitable analytical chemists, laboratories and training/research facilities will continue to grow in the future.

Present Situation at Universities

According to a study conducted by the *GDCh*, only 43% of all German universities with Departments or Faculties of Chemistry currently offer courses in »Analytical Chemistry«. In about half of these cases the subject is coupled with »Inorganic Chemistry« because fledgling chemistry students have traditionally learned the basic concepts of chemistry via simple analytical laboratory exercises. Such erroneous categorization or sub-classification harms the status of an interdisciplinary science such as Analytical Chemistry, especially in view of the increasing number of research tasks related to a broad spectrum of issues in

Zusammenfassung

Analytische Informationen sind wichtig in vielen Gebieten unseres Lebens und unserer Gesellschaft:

- Immer mehr politische, medizinische, juristische und wirtschaftliche Entscheidungen beruhen auf analytischen Daten.
- Die zunehmende Globalisierung und das Zusammenwachsen Europas verlangen gut charakterisierte Waren und Dienstleistungen.
- Internationale Normen und Richtlinien garantieren eine zuverlässige Analytik.

Die Situation der Analytik an den deutschen Hochschulen ist bedrohlich. Sparschwänge behindern eine gute Aus- und Weiterbildung in Analytischer Chemie.

Alle Entscheidungsträger aus Politik, Behörden, Industrie und Hochschule sind aufgerufen, sich für eine Stärkung der analytischen Ausbildung und Forschung einzusetzen. Die Qualitätsaussage »Made in Germany« muss auch für die Analytik gelten.

the fields of materials science, life sciences and medicine.

As a result of persisting pressures to downsize, a disproportionate number of jobs now earmarked for Analytical Chemistry will be cut, transferred elsewhere or kept vacant resulting in a lack of qualified staff in the future. It is precisely the interdisciplinary nature of Analytical Chemistry and the future demand for analytical experts that necessitates the strengthening of this subdiscipline of chemistry and the cementing of its independent and broadest possible cross-disciplinary status. Even prior to the revisions made to the German *Higher Education Framework Act* (HRG), the *GDCh* stated in its »Wurzburg Memorandum« not only that analytical chemistry should be »equally ranked« with other subdisciplines of chemistry, but the *GDCh* also proposed formula for learning models (tiered system of studies) that facilitate a flexible adaptation of the HRG law in the context of educational and research demands. The core message of this memorandum is directed at faculties, universities, Ministers of the Federal States, institutions promoting research as well as at decision-makers in the relevant industrial and political arenas in Germany.

Conclusions and Proposals

Given society's increasing demand for robust data and validated methods as the basis for Making important decisions, we need to focus our efforts on education and research in the field of Analytics. The *GDCh*'s own code of conduct deems *sustainability* to be of pivotal importance, this concept must be extended to the formulation of syllabi – scholarship needs to be expanded beyond the already complex subject matter of natural sciences, i.e. to identify the consequences implicit in the data and to implement them in a material sense. This is the most demanding tasks faced by the universities, which needs to impact the best possible chemical-analytical understanding.

We make an unequivocal plea to the Departments/Faculties of Chemistry and heads of the universities to further strengthen Analytical Chemistry when interpreting or revising existing curricula of chemical education or setting up new ones, moreover that they defend and to fully exploit the subjects matter's interdisciplinary character.

When addressing issues of university planning and capacities, the responsible Ministers of the Federal States and die regulatory authorities must understand that the task of improving the quality and quantity of research and training in Analytical Chemistry extends

far beyond the mandatory sectors of food chemistry, pharmacy and medicine for instance.

Demands from a technologically advances society for improved quality will continue to grow. To defend their position in international competition, our national industries need to realize that the notion »Made in Germany« must indeed be firmly anchored in the very best possible analytical-chemical research and its implementation here at home.

The financial backers of research should set clear priorities: it is imperative that chemical-analytical research assume a pivotal role in the development of methods and that we explicitly take on the challenges of the most demanding issues. The persons responsible for promoting research are well advised to aspire to the highest possible quality within a stable, interdisciplinary, analytical research framework; this will provide industry (manufacturers and users) with the automated or reliably practicable methods that it will need to successfully market its products and services on a worldwide basis.

To safeguard long-term academic public policy and economic interests, sound structures need to be put in place that will guarantee the best possible training and research in the field of Analytical Chemistry.

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