by inviting the best qualified chemical scientists from those countries to discuss how chemistry can address the problems of the region and contribute to the stability and prosperity of the Middle East.

For more information, contact Zafra Lerman <zafral@aol.com>.

www.iupac.org/web/ins/2008-044-1-020

Investigating Out-of-Specification Test Results of Chemical Composition Based on Metrological Concepts

By the current good manufacturing practice in pharmaceutical industry, out-of-specification (OOS) test results are results that fall outside the specifications or established acceptance criteria. Identifying OOS test results is described in FDA Guidance for Industry "Investigating OOS Test Results for Pharmaceutical Production" (2006). By analogy, measurement/test results obtained in other industries and such fields as environmental analysis, which do not comply with regulatory or specification limits, can be named also as OOS test results. When the compliance assessment is made on the basis of a measurement result accompanied by information on the uncertainty associated with the result, the rules developed in the EURACHEM/CITAC Guide "Use of Uncertainty Information in Compliance Assessment" (2007) are applicable.

After identification of the OOS test result it is important to determine its root causes: to ensure that another OOS test result is not possible or even inevitable. The FDA Guidance mentioned above formulates general rules for investigation an OOS test result, including production review, additional laboratory testing, reporting testing results, and determining the cause. Thus, it establishes an organizational approach to the full-scale investigation and decisions which can be accepted at the different stages of this investigation.

Another approach, outlined in the this new IUPAC project, is based on metrological concepts and includes assessment of the measurement process used for the test, from sampling to chemical analysis of a test portion. The project results will be formulated as a guide. In particular, the following should be addressed in a future development of the guide:

- assessment of validation data of the measurement process, including sampling, sample preparation, and chemical analysis
- use of the validation data for evaluation of the measurement uncertainty components
- assessment of traceability chains important for measurement parameters and environmental conditions influencing the test results

The project will be carried out in collaboration with the Cooperation on International Traceability in Analytical Chemistry. The planned IUPAC/CITAC guide will be helpful for full-scale investigations of OOS test results in pharmaceutical industry (in addition to the FDA Guidance) and in other fields of testing.

For more information and comments, contact the Task Group Chair Ilya Kuselman <ilya.kuselman@moital.gov.il>.

www.iupac.org/web/ins/2008-030-1-500

Young Ambassadors for Chemistry in Taipei, Taiwan, and Mauritius

by Lida Schoen, Mei-Hung Chíu, Erica Steenberg

The Young Ambassadors for Chemistry (YAC) project is a partnership of IUPAC's Committee on Chemistry Education (CCE) and Science Across the World (SAW), designed to facilitate the flow of ideas between chemistry and society using young people as mediators.

After five years of holding successful programs around the world—in Argentina, Bulgaria, Egypt, Jordan, Korea, Lithuania, Russia, South Africa, Taiwan—CCE submitted a new project proposal titled Research-Based Evaluation of the Young Ambassadors for Chemistry Project. This project was designed to

Students in Taipei produce a 30-second TV commercial.

evaluate the success of YAC and determine how to secure its sustainability and future sponsors.

The project targeted three countries: Taiwan, because of the earlier, successful events held there; Mauritius, because it was hosting ICCE 20 in August 2008; and Kenya, because it was hosting the post–ICCE 20 satellite conference. At this time, a program could not be started in Kenya. Thus, this report discusses the YAC events held in Taiwan and Mauritius and reports on the findings from questionnaires given to participating teachers, students, and members of the public. When possible, findings from a YAC event held in South Africa are included for comparison.

An article that appeared in the second largest newspaper in Taiwan: "High School Students Producing Hair Gel at Taipei's Main Train Station."

YAC in Taipei, Taiwan

This YAC course took place in the National Taiwan Normal University in December 2007. The event was held at Taipei's main train station, with 34 high school students and 120 members of the public participating.

Media Coverage

A goal of the YAC program is widespread media coverage; thus, it was a pleasure to see the event reported in Taiwan's second-biggest newspaper.

Evaluation

As part of the evaluation, three sets of questionnaires were developed for teachers, students, and the public. Some questions were first used in South Africa and modified for Taiwan.

1. Teachers: Taiwan Compared with South Africa

The teachers' questionnaire explored such issues as the teachers' use of chemicals, their attitudes toward science and chemistry, their teaching of chemistry, and their reflections on the YAC workshop. The teachers indicated that they enjoyed the YAC workshop and would like to participate in follow-up activities. They proposed using the Science Across the World topic "Chemistry in Our Lives" in their teaching, and were interested in using the Internet to communicate with teachers and students in other countries, although they expressed some concern about their ability to communicate in English.

Comparing these results with those from South Africa suggests that teaching approaches in Taiwan are more sophisticated. Teachers in Taiwan will use information and communications technologies to improve public understanding of chemistry, whereas South African teachers regard workshops and training programs as more valuable. The poor accessibility of ICT facilities in South Africa may be the reason.

Most teachers in South Africa were willing to organize a YAC event in their district but were concerned about the difficulty of obtaining chemicals and containers not easily available in rural areas.

Teachers were also asked to rank five images of chemistry from best to worst. In both nations, an image of a male and female chemist working on an experiment was ranked first; an image of an explosion, last.

2. Public: Taiwan Compared with South Africa

In Taiwan, as in South Africa, student "reporters" asked citizens their opinions about various topics related to chemistry. In Taiwan, 76% of those interviewed considered chemistry to have a positive impact on their daily lives and supported YAC activities as a part of school science learning.

In South Africa, 95% of those interviewed said that science has something to do with their everyday lives, although 87% stated that "chemicals are dangerous." TV programs and activities by students are thought to be most valuable in increasing the knowledge of the South African public about chemistry.

YAC in Mauritius

YAC Mauritius took place just before ICCE 20, and the event focused on students creating a new line of Mauritian cosmetics. Thirty students were asked to participate in the YAC event . . . but 70 came! The space in Trianon Park, adjacent to a major shopping area, was cramped, but roving reporters did a

Teachers in Mauritius perform a TV commercial as practice for teaching their students.

great job interviewing the public and guiding them to where their classmates were working hard on their new cosmetic products. A disc jockey was on hand, as well as a TV crew, allowing the students to create their own TV commercials for their cosmetics.

A roving reporter interviewing a member of the public.

In response to the teachers' enthusiasm, SAW personnel promised to stay in contact and help support future initiatives. In addition, Dean Prof. Wah, Prof. Gupta-Bhowon, and Prof. Jhaumeer-Laulloo of the University of Mauritius invited the group to use the university's facilities for future meetings.

Media Coverage

A local educational TV station recorded the preparations for the YAC event (i.e., training of teachers and students) and the event itself. The result was a 45-minute broadcast featuring the event and a DVD including coverage of the event and interviews with the event's organizers and two of the participating teachers.

Evaluation

1. Teachers: Mauritius Compared with Taiwan and South Africa

In Mauritius and South Africa, teachers regard newspapers and television as being valuable resources for knowledge about chemistry. In Taiwan, in contrast, activities by students were rated as being twice as valuable as information obtained from newspapers or television. The fact that university courses were regarded as valuable resources in all three countries is perhaps a consequence of the YAC workshops being hosted by universities.

Students in Mauritius act out their TV commercials.

In addition, 95% of the teachers in Mauritius and 100% of the teachers in Taiwan were interested in participating in similar YAC activities in the future and using them in their science teaching. During informal conversations in these countries, school headmasters also showed an interest in organizing YAC events in their communities.

In South Africa, 86% of teachers indicated that they would be willing to organize YAC activities in the future, but, as mentioned, were concerned about the availability of supplies in rural areas.

2. Students: Mauritius Compared with Taiwan

In Mauritius, 90% of the students liked the practical activities but were not sure whether they were qualified to act as "ambassadors for chemistry." In contrast, 70% of the Taiwanese students indicated their willingness to be young ambassadors for chemistry.

3. Public: Mauritius Compared with Taiwan

Figure 1 shows that public impressions of chemistry were positive in both Taiwan and Mauritius. (In addition, in the teacher questionnaire, relatively low percentages of teachers expressed negative impressions of chemistry.) These results suggests that a considerable effort may have been made by chemists, educational systems, or the media to raise the public image of chemistry.

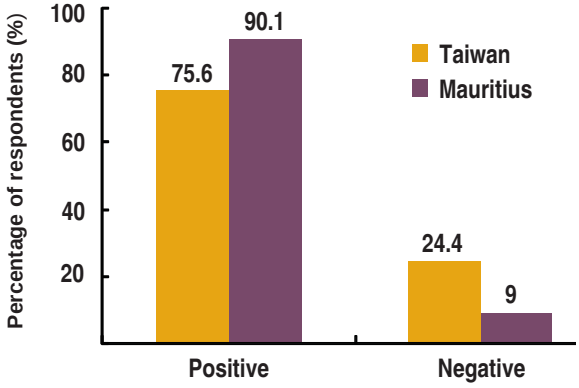

Figure 1. Positive impressions of chemistry in Taiwan and Mauritius

In addition, the public thinks that YAC's public events will benefit students' learning in science, as shown in figure 2 on page 25.

4. External Evaluators in Mauritius

Three external evaluators observed the three days of YAC activities and evaluated the teachers' course, the students' involvement, and the public setting and public engagement.

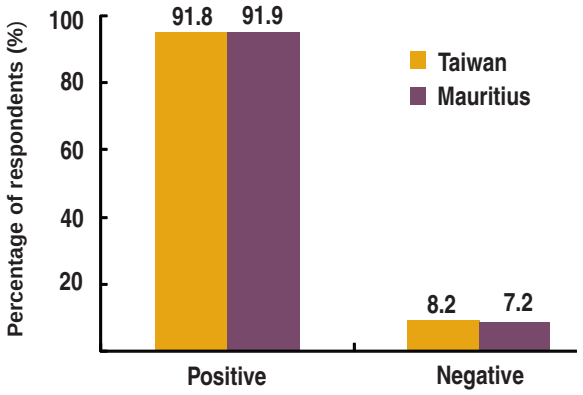

Figure 2. Public support for YAC's events

The reviewers agreed that the YAC instructors provided innovative resources for chemistry teachers. They also felt that the YAC program encouraged teachers to not only learn the chemistry activities but also to follow up by using Internet resources to teach chemistry. Finally, the reviewers reported that members of the public were quite involved in the chemistry display in Trianon Park and were very cooperative in the interviews conducted by the students.

Conclusions

Six conclusions can be made regarding YAC projects.

- Teachers highly value the YAC courses and events and are interested in learning more about the role of chemistry in their lives.
- Students feel that YAC activities help them understand the connection between chemistry and their daily lives. Interestingly, a relatively high percentage of the students have positive perceptions of chemistry, consistent with the public's positive impressions of chemistry in Mauritius, Taiwan, and South Africa.
- The public considers a YAC event an appealing, novel approach to helping students understand chemistry. This finding supports the idea that more YAC workshops and events are needed to promote public understanding of chemistry.
- Teachers and students can serve as ambassadors to help the public better understand chemistry.
- Teachers might need to be explicitly guided on how to help their students be young ambassadors for chemistry during future courses.
- Finally, the evaluation process provided detailed information about the success of the program and what can be done better in the future to help teachers, students, and the public understand the relevance and importance of chemistry in their lives.

For more information, contact Lida Schoen <amschoen@xs4all.nl>.

www.iupac.org/web/ins/2007-005-2-050

Provisional Recommendations

Provisional Recommendations are drafts of IUPAC recommendations on terminology, nomenclature, and symbols made widely available to allow interested parties to comment before the recommendations are finally revised and published in Pure and Applied Chemistry. Full text is available online.

www.iupac.org/reports/provisional

Convention on the Use of Units for Time in Earth and Planetary Sciences

The units of time (both absolute time and duration) most practical to use in Earth and Planetary Sciences are multiples of the year, or annus (a). Its proposed definition in terms of the fundamental SI unit for time, the second (s), for the epoch 2000.0 is 1 a = 3.1556925445 = 10^7 s. Adoption of this definition, and abandonment of the use of distinct units for time differences, will bring the Earth and Planetary Sciences into compliance with the SI standard regarding units of time.

Comments by 30 June 2009

To Dr. Igor Villa
Institut für Geologie
Universität Bern
CH-3012 Bern, Switzerland
E-mail: igor@geo.unibe.ch