

Greening chemistry in Africa

Since its inception in 2006 with UNESCO support, the Federation of African Societies of Chemistry (FASC) has conducted three Pan-African conferences on green chemistry: in Ethiopia (2007), Egypt (2009) and South Africa (2011). Individual societies of chemistry have also conducted meetings of their own.

While these efforts are highly appreciated, they will only have a sustainable impact on African societies if green chemistry permeates all echelons of the education system from the primary to tertiary levels. In Ethiopia, for instance, individual instructors have attempted to introduce the concept of sustainability into their chemistry courses but neither the recently developed secondary school chemistry curriculum, nor the harmonized undergraduate chemistry curriculum for Ethiopia's 21 universities make any reference to green chemistry.

The more African universities engage in advanced chemistry research, the more they will need safe, secure facilities and related skills. This year, UNESCO's International Institute for Capacity Building in Africa, conducted a survey of chemical safety in African universities, via a quiz for Ethiopian undergraduate students and a questionnaire sent to colleagues at FASC and the Pan-African Chemistry Network. Overall, the study showed that students tended not to wear protective gloves in the chemistry laboratory and received little or no training in how to handle incidents of chemical intoxication. Of the 51 Ethiopian students surveyed, 80% were unable to differentiate among chemicals which become toxic after a single (acute), intermittent (repeated) or long-term (chronic) exposure. The chemistry instructors themselves admitted that their laboratories lacked functional basic safety equipment, reagents and skilled staff, especially in instrumentation. Moreover, the instructors were unaware of whether there were any government regulations regarding the safe use of chemistry laboratories in their respective

countries. UNESCO is working with a number of African countries to introduce microscience kits into schools and universities to foster low-cost, safe chemistry experiments (see page 17).

It is true that universities and other stakeholders in Africa are pushing legislation to reduce toxicity and ensure safety guidelines are respected in the development and use of chemical products. For instance, the Chemical Society of Ethiopia is working with other NGOs to raise awareness of hazards related to pesticides used in agriculture. The Kenyan Chemical Society meanwhile is studying the extent to which DDT permeates the Kenyan environment. It has uncovered evidence suggesting that DDT remains a huge problem in Kenya.

Development partners who share Africa's goal of sustainable development need to collaborate with African chemical societies and FASC to institutionalize the principles and practices of green chemistry in African universities and industries. For instance, development partners can introduce 'advance market commitments,' by which they ensure a market for the green products and processes developed by African scientists.

At the University of Johannesburg in South Africa, for example, scientists are hoping to use nanosponges to purify water, SciDev.net reported in May. If the technology can be perfected, the idea would be to clamp the sponges onto the end of a tap or pipe to filter impurities such as pesticides or pollutants while allowing the purified water to continue on its way. Nanosponges were invented more than a decade ago at the Los Alamos National Laboratory in the USA.

The same month, the online journal reported that Olufunke Cofie from Ghana had won a US\$100,000 research grant from the Bill and Melinda Gates Foundation to develop fertilizer pellets from treated human waste. A soil scientist, she hopes her project will not only improve agricultural productivity in Ghana but also sanitation.

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Drums of toxic waste at the Kitengela Store in Athi River in Kenya. In 2005, an inventory conducted by the Kenyan Chemical Society found 1500 tonnes of obsolete pesticides and contaminated soils. The polluted sites were situated in Nairobi, the Western Coast, Rift Valley and in the Central Nyanza, Eastern and Northeastern provinces. The main holding facility was at the Kitengela Store in Athi River.



Photo: Ilina Kenya