

# Making food beautiful—and toxic

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At the market, you can come across fish preserved with formalin. Credit: SDN/J. Chongwang

Toxic chemicals are being used by food sellers across sub-Saharan Africa to improve the look of meat and fish, scientists and food inspectors say, putting the health of millions at risk.

Weak government testing capacities and informal food supply chains means there is little oversight of traders and fishermen, and almost no

protection for unwary consumers.

However, veterinary specialists say there are techniques which can help people identify contaminated food before they buy it.

With fish, the fraudulent activity often begins when they are caught.

According to Serge-Claire Nkolo, a veterinary surgeon and departmental delegate of the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) in the Cameroonian coastal city Douala: "What mostly happens is people pour a very toxic insecticide, Gamalin, into the water."

"After a few minutes, all aquatic forms of life in the area will die and come to the surface. That's when the fish are gathered."

Patricia Ngono, who sells smoked fish in the Youpwe fish market in Douala, says: "Rather than buy wood and use firewood, some saleswomen gather up leftover fabric from tailors and burn it to smoke the fish."

Wild meat is affected too. Clément Polewa, a farm advisor in Douala, says some hunters use formalin, especially if they have gone into the bush for a hunting expedition lasting several days. Used to embalm and preserve bodies in morgues, some butchers use formalin to keep meat from going off.

"They use this product on game they have killed to stop it from decomposing so it can be preserved until they get back to their village," Ngono says.

The US Environmental Protection Agency classifies formalin as a "probable human carcinogen", linked to cancers of the nasal cavity and leukaemia.

## Milk medicine

According to Ashagrie Zewdu Woldegiorgis, assistant professor of food science and nutrition at the College of Natural Sciences of Addis Ababa University, farmers in Ethiopia use high levels of formalin to preserve milk before selling it to factories.

For the farmers, he says, formalin is referred to as "milk medicine"—an indication of the lack of knowledge about the chemical. "Our preliminary tests in an ongoing study show very high levels of formalin in milk that is hazardous for human health," says Woldegiorgis.

Fisherman and traders do not admit to using these illegal substances: everyone simply claims to be aware of anecdotal evidence of such practices.

"A few years ago, after we stressed how vitally important this was, the fishermen in a village finally agreed to tell us which one of them had been bombing the river," says Douala's Serge-Claire Nkolo.

"The individual concerned kept claiming he was completely innocent, until one day, after a surveillance operation, we caught him red-handed."

Farm adviser Polewa is in no doubt as to the extent of the problem: "We've even had cases where our inspection services have found evidence of the use of formalin in fishmongers who operate from established retail outlets in our cities."

The practice constitutes food fraud, according to Markus Lipp, head of the Food Safety and Quality Unit at the Food and Agriculture Organization of the United Nations.

"The use of formalin to preserve meat and other produce for longer

periods is, as far as we know, not permitted anywhere and constitutes food fraud," Lipp says.

## Fruit and vegetables

Lipp distinguishes between products that are used illegally and other chemicals, which are permitted for use, but which are often employed on fruit and vegetables in an inappropriate way and without proper oversight.

Vendors cover fruit with phytosanitary products that accelerate the ripening process or make the produce appear to be perfectly ripe.

Guy-Merlin Wakam, a senior agricultural technician in Douala, explains that this practice draws on methods used in the cultivation of pineapples, where the plant growth regulator ethephon (also known as ethrel) or the plant hormones gibberellins are employed, following protocols for dosage and application.

"Ethrel is used while the fruit is still on the stalk, when it is already ripe, before it is picked," Wakam says. "The aim is to get them to take on a yellowish hue. Because some clients, especially overseas, believe a pineapple is not ripe if it isn't yellow."

Jean-Pierre Mba, head of the Quality Control Unit in the Douala regional office of Cameroon's Ministry of Agriculture, says traders then use the same fruit-ripening technique, leading to dosages that far exceed recommendations.

"Traders simply draw on this method to try to control the ripening process of bananas and plantain," he says.

### 'Abuse of science'

For Woldegiorgis, this has led to an "abuse of science" by some traders who use excessive amounts of a permitted chemical just because it has been approved for use. He says that his research on the safety of sodium benzoate for preservation of the flatbread injera, a staple in Ethiopia, was supported by the Ethiopia Food and Drug Authority (EFDA).

The additive, says Woldegiorgis, was meant to improve the shelf life of injera from three days to ten days. "But illegal and unprofessional people are adding this chemical by themselves by trial and error by adding a huge dose at the expense of human health," he says. "They only care about the shelf life being prolonged not safety and quality of the product and the chemical but for profits."

The practice appears to be widespread, says Raphaël Onguéné, an academic at the University Institute of Technology (UIT) in Douala, who is also a producer of banana, pineapple and cocoa in Cameroon's Yaoundé region.

"When I started out in agriculture, I very quickly noticed there was an overuse of phytosanitary products to help pineapples and plantain ripen," he says.

## Whistleblowing

Hilaire-Flavien Foumane, head of the Inspection and Fraud Repression Squad at Ministry of Commerce in Douala, says: "Thanks to other tradespeople turned whistleblowers, we dismantled a network of plantain traders who engaged in this practice. Strangely enough, the growers who provided them with the goods knew nothing about this."

Douala's Wakam describes how things work: "It's mostly resellers who are guilty of these practices. A trader might have taken an order to provide ripe plantain within two or three days. They go and buy the fruit

from a grower and then, without the producer knowing anything about this, treat it with ethrel or gibberellin to ensure it ripens ahead of their deadline."

These practices have real health impacts for the people who eat this food.

Researchers report that formalin and some chemicals used for extending the shelf life of fruits can cause dizziness, weakness, ulcers, [heart disease](#), skin disease, lung failure, cancer and kidney failure.

Gisèle Etamé Loé, a specialist in food and medicine quality control at the University of Douala, says she was "struck by the large number of cases of food poisoning we have already recorded as a result of people eating food treated with these products".

## Food safety

Loé describes a particularly memorable case she was involved in a few years ago: "Two people died after a whole family was hospitalised when they ate a local dish known as mbongo tchobi that was made with fish caught using Gamalin."



Smoked fish is not immune to this fraud. Credit: SDN/J. Chongwang

According to the first comprehensive report on food safety from the World Health Organization, the agency says that unsafe food is responsible for 600 million cases of foodborne diseases and 420,000 deaths globally each year.

The report, by the Foodborne Disease Burden Epidemiology Reference Group, said that 30 percent of foodborne deaths occurred among children under five, with sub-Saharan Africa and South-East Asia recording the largest burden of foodborne diseases.

Loé points out that this is linked to the fact that all of these products are

known to present a risk of acute or chronic toxicity. She adds that formalin, Gamalin, ethrel and gibberellin are all carcinogenic at certain doses.

"Formalin leads to significant respiratory difficulties and causes serious visceral lesions in the stomach, the intestine and the kidneys," she says. "As for Gamalin, it is a neurotoxin and can cause lasting damage even if death does not ensue.

"Ethrel can be very toxic and have an extremely corrosive effect on the oral cavity and the pharynx, which means there is a risk the stomach and the digestive tract could be perforated, and even that stomach cancer might develop," says Loé, who was behind the establishment of the industrial and pharmaceutical chemistry laboratory at UIT.

## Avoiding toxins

There are a few tips consumers can follow to avoid toxic foods, says farm advisor Polewa.

"If you go to an outlet and you see a bunch of bananas or plantain in which all the individual fruits have reached the same level of maturity, it's likely that they haven't been left to ripen naturally," he says. He points out that when a bunch of bananas is allowed to ripen naturally, the individual fruits will mature at their own pace; they will never all be ripe at the same time.

Veterinary surgeon Nkolo encourages consumers to be observant: "If you are being sold meat that does not attract a single fly, it is not good quality meat. Because when meat is on display, it's normal for flies to be buzzing around it, even if they can't land on it."

Woldegiorgis urges food authorities to do random checks, especially at

informal markets, to enhance the quality of food sold—but he admits that food quality control may not be an easy task.

But Woldegiorgis says that informal businesses are often small-scale, some with no physical addresses or registration permits.

The ever-increasing number of reports about the misuse of food additives and chemicals in the past four years forced Kenya's Ministry of Health and Agriculture to begin planning a National Food Safety Authority.

In addition to looking to the need for authorities to carry out regular food safety inspections, experts are unanimous in highlighting the need for greater awareness among producers of fruit and vegetables, meat, and fish, as well as consumers.

For Douala's Wakam, the solution also requires stronger regulation of the sale of controlled-use chemicals.

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