



2013 AWARD Fellow
**Ruth Adefolakemi
Gabriel-Ajobiwe**

Position	Senior Lecturer
Institution	Federal University Oye-Ekiti
Country	Nigeria
PhD	Food and Applied Microbiology Federal University of Technology, Akure, 2009
Mentor	Professor Esther Yetunde Aderibigbe, Deputy Vice Chancellor Development, Ekiti State University, Nigeria

Research area: Underused edible legumes (velvet beans, jack beans) for improved nutrition and health of rural communities.

Ruth Adefolakemi Gabriel-Ajobiwe has an entrepreneurial mind. When she did not find employment after graduating with her BSc in biochemistry and completing a year of national youth service, she started selling fish. With the proceeds, she produced and sold drinking-chocolate powder until she had saved enough money to do her master's degree in Food and Industrial Microbiology, with a research focus on the fermentation of jack beans (*Canavalia ensiformis*) and their biochemical composition. A newlywed, she was encouraged by her husband to pursue further training.

"Given my background in biochemistry, I was interested in what happens during the fermentation of legumes that many Nigerian women use to produce *iru*, a condiment and thickener for our traditional soup," says Gabriel-Ajobiwe. Natural fermentation of the beans, if uncontrolled, can lead to pathogenic organisms being introduced to the fermented legumes, as is common practice.

Iru or *dawa dawa*—as the condiment is called in many parts of Nigeria, Ghana, and Benin—is made out of African locust bean (*Parkia biglobosa*), the seeds of large trees. The beans are harvested by collecting those on the ground or in the trees. The pods, first produced after five years, are hard to crack, so women break them open with sticks.

Interested in finding nutritious alternatives to locust beans while reducing women's drudgery and sustaining the environment, Gabriel-Ajobiwe noticed that jack beans are also rich in protein and minerals. However, they are high in toxic anti-nutrients. After reading about microorganisms breaking down anti-nutrients in Malaysian crops, she subjected jack beans to a similar fermentation process that local women use for African locust beans. This worked well to detoxify the jack beans, as levels of both anti-nutritional and nutritional factors showed. Tests with mice, marker-enzyme analysis, and hematological and histopathological parameters confirmed a specific combination of organisms as optimal.

During the literature review for her PhD research, Gabriel-Ajobiewe found that velvet beans (*Mucuna pruriens*) exceed the protein content of jack beans. L-DOPA, its main anti-nutritional factor, is also used in the treatment of Parkinson's disease and in traditional Ayurvedic healing treatments in India.

"Nigerians had been eating velvet beans without fermenting them, with worrisome public health results," recalls Gabriel-Ajobiewe. "L-DOPA levels in velvet beans are too high for immediate consumption, but solid-state fermentation reduces their content to digestible levels." Velvet beans grow abundantly in the wild in Nigeria. Unfortunately, the leaves and pods exude a skin irritant when touched, causing itching, so harvesting them is difficult. Protective clothing and burning of the pods are essential to prevent spreading the substance.

Gabriel-Ajobiewe soon realized that to conduct her research she needed to establish trust with the women farmers. "At first, they thought I would trick them out of their indigenous knowledge, and they refused to work with me," she remembers. "When I shared my knowledge about fermenting African locust beans into *iru*, they realized that I actually knew about fermentation, so they were willing to listen."

Sensory evaluation comparing velvet-bean *iru* with that made from African locust bean was positive, as the taste of both is almost the same. On top of being easy to grow, velvet beans only take four months to mature. Gabriel-Ajobiewe now works with three villages and the International Institute of Tropical Agriculture to provide seed species that are less irritating than those grown in the wild. She will be working with an organism from Thailand that has been tested on African locust beans, which she plans to test on velvet beans. The aim is to achieve a safe level of detoxification, then empower local women to test this fermentation technology.

As a passionate scientist, Gabriel-Abjobiewe expects that AWARD will help her improve her technical knowledge. She also wants to network, become more visible, and share her knowledge and skills widely through AWARD. "I want to be known for solving local problems for Nigeria and other countries, creating useful products out of what others would call agricultural waste," she states.

Gabriel-Ajobiewe is one of a growing number of African women agricultural scientists who have won an AWARD Fellowship. AWARD is a career-development program that equips top women agricultural scientists across sub-Saharan Africa to accelerate agricultural gains by strengthening their research and leadership skills through tailored fellowships. AWARD is a catalyst for innovations with high potential to contribute to the prosperity and well-being of African smallholder farmers, most of whom are women.

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