

## Major breakthrough for farmers and scientists as Nigerian biotech body approves commercial release of genetically modified cowpea

Following more than two decades of research, field trials, and risk assessment by multiple organizations, on 29 January, the [Nigerian Biosafety Management Agency](#) (NBMA) approved the commercial release of the resulting genetically modified (GM) cowpea to farmers in Nigeria. This places the country on the path to becoming the first country ever to cultivate biotech cowpea. This development adds a new crop to the global biotech basket from Africa.

NBMA's approval allows the [Institute for Agricultural Research](#) (IAR) to commercially release Pod Borer-Resistant Cowpea (PBR Cowpea)-event AAT709A, genetically improved to resist *Maruca vitrata*. Maruca is one of the most damaging insect pests that attack the cowpea plant. This permit is valid until the end of 2022. The release provides a relief to millions of Nigerian farmers who depend on cowpea for food and income, as well as the consumers of cowpea.

Leena Tripathi, IITA Principal Scientist in Plant Biotechnology, expressed delight

stating, "This is indeed good news for IITA and Nigeria at large, as the first GM food crop will be available for commercialization."

Cowpea is an important staple crop in sub-Saharan Africa, serving human consumption needs as well as being a good source of quality fodder for livestock. However, cowpea farmers face a challenge with a traditionally low yield factor due to its susceptibility to many insect pests at different stages of its production lifecycle. As a result, if farmers want to get a good yield they need to apply multiple insecticide

sprays during the course of the production in the fields.

*Maruca vitrata*, commonly called the maruca pod borer, causes 70–90% yield loss for farmers. Due to high costs and, sometimes,



*Bt cowpea is expected to increase yield by up to 20%.*

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## Women scientists in IITA speak on "International Day of Women and Girls in Science"

IITA joins the world in celebrating on 11 February the fourth International Day of Women and Girls in Science themed "Investment in Women and Girls in Science for Inclusive Green Growth." According to the United Nations, a significant gender gap has persisted throughout the years at all levels of science, technology, engineering, and mathematics (STEM) disciplines all over the world.

Although women have made tremendous progress towards increasing their



*Olufisayo Kolade, Postdoctoral Fellow, Virology and Molecular Diagnosis, and member of IITA Women's Group, encouraging young girls to get involved in science.*

participation in higher education, they are still underrepresented in these fields. [IITA](#)'s continuing efforts to ensure gender parity across the Institute has given rise to many initiatives that are bringing recognition to female scientists.

An important aspect of fostering women's participation in science is the sensitivity of the leadership at IITA to gender needs. While speaking on IITA gender policy enacted in 2014, [Nteranya Sanginga](#), IITA Director General, described women's participation in science as one which is not only fundamental, but also a necessary foundation for a peaceful, prosperous, and sustainable world.

IITA policies address two of the most commonly cited reasons for the low participation of women in science: lack of community to network and lack of mentorship. The Institute recognizes that full and equal access to and participation in science, technology, and innovation for women and girls of all ages is imperative for achieving

gender equality and the empowerment of women and girls. In the view of [Olufisayo Kolade](#), Postdoctoral fellow, Virology and Molecular Diagnosis, "IITA gives allowance to both male and female gender, being an equal opportunity employer."

Several factors contribute to the disparity between males and females in science, many of which are sociocultural. According to [Bussie Maziya-Dixon](#), IITA Nutrition Specialist, "participation of females in science and technology is necessary, but socialization and traditional roles assigned to the girls at birth still determine the level of participation of girls in science because the life of the person is influenced or affected by sociocultural norms." The culture learned directly or indirectly to a large extent determines how the person thinks and feels as well as his or her actions and outlook in life.

However, this attitude is changing. Cultural values are being reorganized such that society now accepts and appreciates the contribution of women in scientific ventures.

Speaking on the popular opinion about women's participation in science, [Ranjana Bhattacharjee](#), IITA Molecular Geneticist, proposed that the responsibility of erasing the disparity among males and females lies essentially on women and girls. She said "women and girls need to have confidence in themselves and be prepared to grab any opportunity that comes their way. There is no rule that says women cannot operate machines or pilot scientific innovations, but it requires effort. Whatever you do, do it in a unique way; always strive to be the best and remember that nothing comes easy."

[Mercy Diebiru-Ojo](#), IITA Cassava Seed System specialist, corroborates this by saying, "if your mind can conceive it, you can achieve it."

With activities such as education and public awareness-raising, the International Day of Women and Girls in Science aims at promoting the full and equal participation of women and girls in education, training, employment, and decision-making processes in the sciences.

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unavailability of suitable insecticides, many cowpea farmers resort to harmful cotton insecticides to spray their cowpea fields. This has unfortunately led to significant numbers of intoxication and deaths.

[IITA](#), which has cowpea as one of its mandate crops, along with other research partners, decided to focus on developing an improved cowpea variety that would be resistant to maruca. To achieve this, more than 15,000 cowpea varieties in the IITA germplasm bank were evaluated for resistance to maruca.

Giving an overview of the project, IITA Legume Geneticist and Breeder [Christian Fatokun](#) stated that the researchers also evaluated wild relatives of cowpea where resistance to this pest was detected in one called *Vigna vexillata*. Concerted efforts were made at crossing this wild relative to cowpea but proved unsuccessful.

With the lack of success of conventional breeding for resistance, the collaborators on the project decided to adopt a biotech approach that would result in genetically modified cowpea.

Previous research using a bacterium called *Bacillus thuringiensis* (*Bt*) to confer resistance in maize crops had proved quite successful and some of the *Bt* gene strains have been found to be effective against maruca.

With genes provided by [Monsanto](#) and initial phases of product development conducted at the [Commonwealth Scientific and Industrial Research Organisation](#) (CSIRO) in Australia, significant milestones were achieved in developing cowpea lines expressing the *Bt* (Cry1Ab) gene that confers resistance to maruca pests. The successes graduated to confined field trials (CFT) which were conducted successfully at IAR in Zaria, Nigeria.

Results from the research have shown that *Bt* cowpea will reduce the use of pesticides from eight sprays per season to about two targeted sprays and increase yield by up to 20%. This means that Nigeria will record a revenue increase of more than ₦48 billion (US\$132 million) annually from cowpea. Extensive safety studies have shown that the *Bt* cowpea is safe for both human and livestock consumption.

The research was led by IAR in partnership with the [African Agricultural Technology Foundation](#) (AATF) to which Monsanto licensed the *Bt* gene for use in the project. Other collaborators include [Purdue University](#), USA, CSIRO, Australia, Network for Genetic Improvement of Cowpea for Africa (NGICA), the [IFPRI](#)-facilitated Program for Biosafety Systems (PBS), and IITA with support from [United States Agency for International Development](#) (USAID).



*A selection of cowpea varieties.*

In a document dated 22 January 2019, NBMA stated that it issued the permit after taking into consideration the advice of National Biosafety Committee, National Biosafety Technical subcommittee, and the risk assessment and risk management report provided by IAR. "After a thorough analysis of the application dossier which included Risk Assessment and Risk Management Plan prepared in connection with assessment of the application, it is unlikely that the proposed release will have an adverse impact on the environment and human health," read part of the document.



# IITA scientists recommend packaging and storage for yellow-seeded maize flour

Research has shown that compared to other packaging and storage facilities, polyvinyl plastic containers (PPC) and dark compartment storage have the highest retention of [Pro-vitamin A carotenoid](#) (pVAC) and [xanthophylls](#) in yellow-seeded maize.

Pro-vitamin A carotenoid (pVAC) foods contribute to the reduction of vitamin A deficiency diseases within the human body. Yellow-seeded maize flour, being a pVAC-rich food, needs the right packaging materials and storage conditions that retain pVAC as it is essential for health benefits.

Traditionally, maize flour is stored in different packaging materials to increase its shelf life. For this reason, research has been carried out to investigate the effect of storage packaging materials such as polypropylene woven sacks (PWS),

high-density polyethylene bags (HDPE), polyvinyl plastic containers (PPC), and storage condition associated with temperature and relative humidity, in retaining pVAC in yellow-seed maize flour.

In achieving the above, a sample of yellow-maize grains was collected from the Maize Improvement Program of IITA, Ibadan, ground into flour, divided into portions, packed and sealed in PWS, HDPE, and PPC. Some of the packed samples were stored in an upper compartment of a storage wooden box, lightened with aluminum foil and fitted with fluorescent tube to increase the light intensity; others were in the lower compartment darkened with gloss black. The flour samples were stored for 28 days, while samples were collected for pVAC and xanthophylls analyses at 7-day intervals using standard methods.

The outcome demonstrated how PPC packaging and dark compartment storage resulted in the highest pVAC of 92.39% and xanthophylls, 89.44% retention and retinol equivalent (RE) (0.40

µg/g), while HDPE packaging and lighted compartment storage resulted in the lowest pVAC of 44.92% and xanthophylls, 46.76% retention and RE (0.19 µg/g). In line with this, PPC packaging and dark compartment storage is recommended for maximum retention of carotenoids in yellow-seeded maize flour.

The article can be found here: [Impact of packaging material and storage condition on retention of provitamin A carotenoids and xanthophylls in yellow-seeded maize flour. Functional Foods in Health and Disease 2018](#) by [Awoyale W.](#), [Alamu E.O.](#), [Maziya-Dixon B.](#), [Menkir A.](#), [Irondi, E.A.](#) <https://doi.org/DOI#>



*Yellow-seeded maize and flour.*

## Training unit announces the commencement of CARE project...

The Capacity Development Office (CDO) of [IITA](#) has announced 30 research fellowships for 2019 under the framework of “Enhancing Capacity to Apply Research Evidence (CARE) in policy for youth engagement

in agribusiness and rural economic activities in Africa” funded by the [International Fund for Agricultural Development](#) (IFAD). IITA carries out this project in partnership with IFAD and aims to provide fellowships for young

African scholars, with special emphasis on young female professionals and students.

The goal of the CARE project is to enhance the understanding of poverty



*Past IFAD fellowship awardees with training organizers.*

reduction, employment impact, and factors influencing youth engagement in agribusiness, and rural farm and non-farm economies. This understanding and the proper implementation of research findings will significantly increase the evidence of how policies and investments can contribute to

economic growth and an enabling environment for African youth.

The grantees will be supervised by IITA's socioeconomics scientists in close collaboration with their national or university supervisors. Grantees will also be offered training on research methodology, data management, and

scientific writing as well as training on production of research evidence for policymaking.

To apply and for further information on eligibility visit <https://bit.ly/2AYv1NY> (English) and <https://bit.ly/2RYfebW> (French). You can also contact [IITA-TrainingUnit@cgiar.org](mailto:IITA-TrainingUnit@cgiar.org).



*Awardees with facilitators and supervisors of previous training sessions.*

## ...and Staff Talent Development Competitive Grant for 2019

The [IITA](#) Staff Talent Development Competitive Grant is an annual offering organized by CDO to help achieve the Institute's commitment to the professional development of staff. The 2019 edition has been announced and applications are now open until 1 March.

A Joint Selection Committee of CDO, HRS, and other staff representatives along with the regional hubs will review applications and approve awards according to set criteria. NRS

in all IITA locations with two or more years employment in the Institute are eligible to apply. However, short-term staff, consultants, casual staff, research fellows, NYSC members, and IT students are ineligible. Previous recipients from the past two years are also ineligible.

For eligible staff, the maximum grant limit per person or group will be US\$4000, which would cover course fees, travel, and accommodation

related to training where applicable. Therefore, applications exceeding \$4,000 must be indicated in the application. The grant must be used in 2019 as it is not transferrable. However, CDO reserves the right to negotiate the final grant with successful applicants.

All applications should be made using this link: <http://cdo.iita.org/training>. For further clarification, please contact: Stanley Nwachukwu ([s.nwachukwu@cgiar.org](mailto:s.nwachukwu@cgiar.org)).

## Got a story to share?

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