

# BIO LIFE

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## ACI Launches First Integrated Agricultural Communication Platform

ACI has launched Fosholi- the android application, which brings the first step towards an integrated agricultural platform in Bangladesh. It enables 15 million farming families of Bangladesh to access high quality agricultural inputs, services and solutions in a singular platform. Fosholi offers intelligent information and

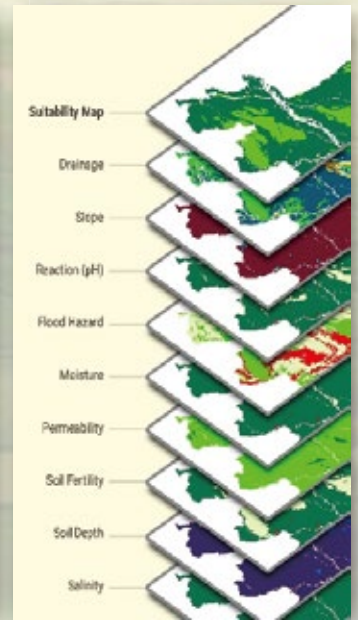
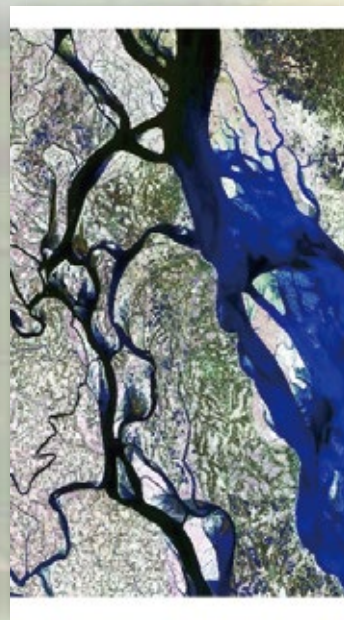
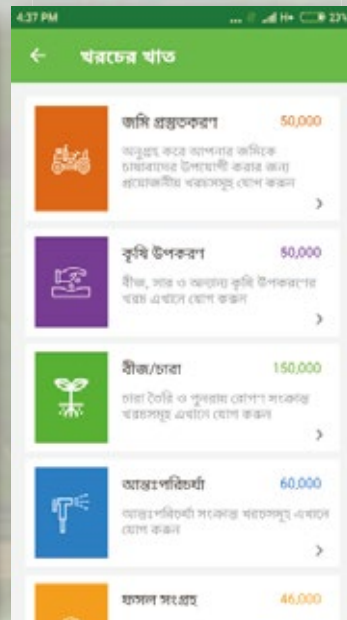
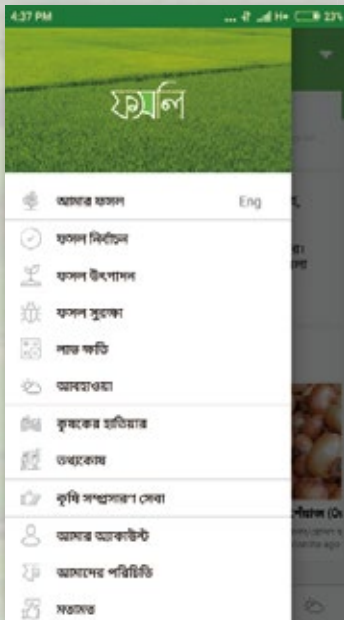
advisory services to local crop farmers for free.

(Google Play Store link: <https://goo.gl/USXF7F>).

Fosholi will help farmers by providing information on crop suitability, modern agronomic technology and practice, pest and disease alerts and weather

forecasts. Thus, it will improve farmers' decision making, increase farming productivity and ensure the overarching national goal of sustainable food and nutrition security.

**Dr. F H Ansarey**  
Managing Director & CEO  
ACI Agribusiness



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### Trichoderma sp for Organic Production of Tomatoes

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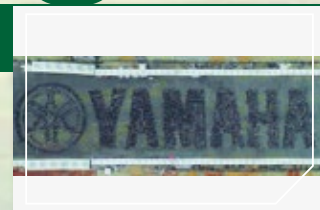


ASRBC Tomato  
Line 1

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### Yamaha presents "Shadinotar Shopoth" - Guinness World Records

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## Wheat breeding for high yield with heat and saline resistance



Wheat is the second most important grain crops of Bangladesh, rice being the first one. The yield per hectare of wheat on average of three years is almost 3 tons/hac. In case of rice, the average of three years is 2.9 tons/hac. (BBS 2016:xvii). Nutrient wise wheat is better than rice, production cost wise it is more cost-efficient and in terms of irrigation, much less water is required, thereby saves water during the dry Boro season of the year. In terms of use as food, wheat has been gaining more popularity in the consumer and processing markets irrespective of economic class differences. Finally, the wheat straw in recent years is not only being used as fuel but also as a roof of the poorer section of the population.

Improvement of varieties of wheat is somewhat difficult due to its large number of chromosomes from different wild/cultivated sources. There are already a good number of varieties in the national list where from the most favorable gene/s can be brought in into one variety through gene pyramiding and marker assisted breeding. Mutation breeding can also be used for the creation of micro-mutants suitable for not only high yield but also for tolerant to heat and salinity can be selected for. Salinity and Heat tolerance traits

are important for Bangladesh because the land areas of cultivation are increasing towards the south of the country where salinity in the soil and mostly in the wheat growing season is high so is the temperature of the area.

For the past few seasons, the ASRBC has been involved with wheat breeding, using the Gene mutation technique on BARI Gom28, as well as gene pyramiding of a number of promising varieties in collaboration with Hajee Mohammad Danesh Science and Technology University (HSTU) in Dinajpur. The finally selected materials from segregating population of

both programs are in the field during 2017-18 wheat growing season. Maximum of 3-4 lines will finally be selected for regional test during the next season from experiments at Debiganj, HSTU, Dinajpur and Sher-E-Bangla Agricultural University, Dhaka. The next step is to transfer gene/s and select varieties having strong thick leaves, with high vein density and high biomass over a shorter period of time. There are available genetic materials for this.

Assistance of Dr. Nahiyen and Mr. Saif of ASRBC is acknowledged

**Prof. Lutfur Rahman,**  
Advisor, ACI Agribusiness and  
Advisory Editor, Biolife



Fig 1-5: Fields and spikes of promising wheat lines developed by ASRBC in comparison to the check variety BARI GOM 28

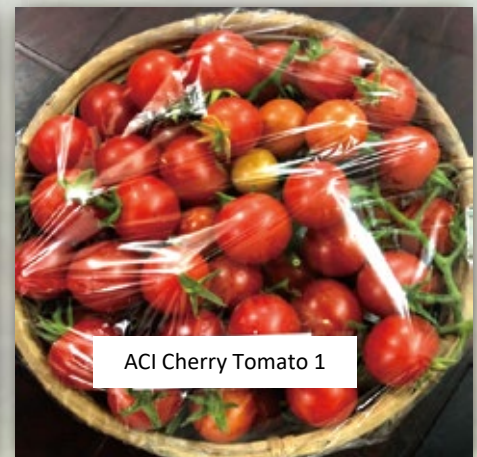
## Trichoderma sp for Organic Production of Tomatoes



ASRBC Tomato  
Line 1



ACI Tomato Line 3



ACI Cherry Tomato 1

The Advanced Seed Research and Biotech Centre, ACI Limited has been working with ACI Crop Care and Public Health to develop a bio-pesticide using *Trichoderma* sp. To understand the efficacy of the fungus, field trials were done on 4 varieties of tomato developed or in developing stage by the ASRBC. These include ACI Cherry Tomato 1, ASRBC Tomato Line 1, ASRBC Tomato Line 2 and ASRBC Tomato Line 3.

All 4 varieties are susceptible to *Fusarium* wilt at different levels and usually, chemical fungicides are used to control the disease. *Trichoderma* collected locally and purified by ASRBC had shown an efficient bio-control

effect against *Fusarium* in the laboratory. To test the product in the field, trials were conducted at the Sher-E-Bangla Agricultural University during the winter season of 2017. Apart from nutrients added during soil preparation, *Trichoderma* was sprayed on the plants, twice during the life cycle, instead of any chemical fungicides available in the market.

Results proved that the fungus actually makes the tomato plants tolerant to *Fusarium* wilt, while acting as a growth promoter as well. Pesticides formulated with *Trichoderma* spp of a specific race can successfully be used for organic farming in Bangladesh, making food safer from

toxic chemicals. This will also reduce production costs. At the moment ACI is taking steps to produce both liquid and powder formulations of this bio-control agent.



ASRBC Tomato Line 2

## Potato Breeding at ASRBC in collaboration with TCRC

Potato is one of the most important cash and food crops that support carbohydrate in the food chain. The crop is a winter one and covers the period from around October to March in Bangladesh. There are a number

of cold storages in different areas of the country. Where the concentration of cold storages is high the production is also high. Still, large volumes of freshly harvested potato cannot be marketed in time, resulting in a loss

to farmers of their high investment in the crop. Again the infestation of Late Blight is one of the most dangerous diseases that reduce the yields sharply and also immediately after the infestation. Thus, both these

## ASRBC Technology & Innovation Corner

problems need to be solved by introducing varieties that have higher dry matter and longer shelf life at ambient temperature. As a result, the slow market intake will not result into a loss. There is also a need for Late Blight (LB) resistant variety while increasing the production. The ASRBC thus took up the program of transferring the

desired LB resistant trait in collaboration with TCRC scientists. The ASRBC has been involved with potato research since 2012 and has improved the Lal Pakri-1 to yield 30 tons/ha. By the permission of Seed Wing, ACI- Pakri 1 is now being produced and marketed. Now ASRBC is looking towards improving the popular varieties in

Bangladesh by making them LB resistant through hybridization, marker-assisted selection, pathogen bioassays, and positive selection techniques. Potato improvement research activities are being conducted at the Debiganj ASRBC potato research station and at the laboratory in Dhaka.



Photo: Potato flowers for pollination followed by berry setting after hybridization and then true potato seeds harvested are grown in the fields for selection.

## Building Trust: ACI Seed Performance Trials



ACI Seeds PDS team is currently running over 200 trials (traits/accessions) across the country to find answers to the queries of farmers in a scientific method. Product Development Service (PDS) typically consists of several activities that firms employ in the complex process of delivering new products to the market. Farmers have a lot of questions when they are making their seed variety selection for the next season. How will this variety perform and yield in their area? Will it manage the disease pressures they are observing there? In addition to talking to local

growers, performance trial data can be a great source of information for them. So building trust with customers and staff through trials is a major concern for ACI Seeds.

The ACI Seed's PDS Trials consist of three different programs: local performance trials, field performance trials, and retail performance trials. These trials are run for vegetables and cereals, including rice and maize, with a growing list of producers signing up to take part. The data from these trials are used to select varieties that will advance for new product

commercialization; to collect agronomic observations and to build confidence in and awareness of the different varieties available from ACI. ACI Seed generally launches between five and ten new varieties each year across its seed portfolio.

The ACI Seed Performance Trial program is always growing and launching new varieties each year across a wide range of crops: vegetables, rice, maize, and potato, more than any other seed company. The credibility of the ACI Seed Performance Trial program plays a large part in that success.

## Launching Ceremony of “Soil Testing Kit”

Department of Soil Science of Bangladesh Agriculture University (BAU) and ACI Fertilizer jointly organized the launching ceremony of a new “Soil Testing Kit” on 6 March 2018. University Grants Commission member Professor Mohammad Yousuf Ali Mollah was the chief guest in this event. Bashir Ahmed, Business Director of ACI Fertilizer was present there as the special guest. Professor Dr. Monoranjan Das and Professor Dr. Lutful Hassan spoke on the occasion.

Currently, soil testing in the laboratory is highly expensive and time-consuming for mass level farmers. But now, they can use

this newly invented soil testing kit to examine the characteristics of their own cultivating land, which requires only 50 taka. This

project is financed by World Bank. ACI Fertilizer is providing technical support for the project.



## ACI Fertilizer at Agritech Fair 2018

ACI Fertilizer participated in “ACI Agribusinesses presents Agritech Fair 2018”. The fairs were jointly arranged by Crosswalk Communication and USAID. It took place on 1-2 March 2018 in Khulna, on 5-6 March 2018 at Jhenaidah and at Jashore on 9-11 March 2018. Various products of ACI Fertilizer

were displayed in its stall. For instance, visitors could get information on Organic Fertilizer, Gypsar, Vitamix, Bioferti, NEB, Compound Fertilizer etc. The main objective of these fairs is to make people and farmers aware of agricultural products, machineries, and their features. The slogan was “Revolution in agri-

culture with technological help”. People of different ages and from different places visited these fairs as well as ACI Fertilizer’s stalls. Visitors made different queries regarding soil health, proper use of fertilizer, activities of ACI Fertilizer, etc. and get instant expert’s response.



### Sonalika Tour to North Bengal



tour to observe Sonalika's journey to success in becoming the No.1 Tractor of the country. Starting from ACI Center, Dhaka the team reached Rangpur for attending a partners' meeting. Later they visited different Dealer Points at Muntakim Enterprise in Saidpur, Nilphamari and at Shukria Enterprise, Nilphamari. Another Partners' Meeting took place Fulbari, Dinajpur. The participants of the tour got an overview of Sonalika's grand success as the leading Tractor brand of the country.

ACI Motors arranged a tour in the northern part of the country from 16 to 19 March 2018.

Stakeholders including dealers and agents from the eastern part of the country participated in the





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On the occasion of 47th Independence Day, ACI Motors arranged “Shadinotar Shopoth” (“স্বাধীনতার শপথ”), an oath-taking program for ensuring road safety by and for the motorcycle riders. As part of the program, participants also made the world’s biggest Yamaha brand logo using 1,200 motorcycles. The earlier record of the biggest Yamaha logo was in Vietnam’s

possession. The logo was made with 554 motorcycles. The program was organized at Bashundhara International Convention Center, Dhaka. The event started with the national anthem and Mr. Anisul Haq from The Daily Prothom Alo conducted the oath for road safety with the participation of motorcycle riders. Mr. Mashrafe Bin Mortaza and Mr. Taskin Ahmed from

Bangladesh National Cricket Team were present in the event to motivate the two thousand motorcycle riders. Four observers from Guinness World Records were present at the venue to observe the record. Later, Guinness World Records officially recognized it as the new record for the biggest Yamaha brand logo made using motorcycles.



## Golden Rice Gets Approval from Health Canada

On March 16, 2018, Health Canada has notified the International Rice Research Institute (IRRI) that it has no objection to the food use of Provitamin A Biofortified Rice Event GR2E, more commonly known as Golden Rice. The decision coincides with the approval from Food Standards Australia New Zealand (FSANZ) in December 2017. In their announcement, Health Canada said that "the changes made in this rice variety did not pose a greater risk to human health than rice varieties currently available on the Canadian market." In addition, Health Canada also concluded that GR2E would have no impact on allergies and that there were no differences in the nutritional value of GR2E compared to

other traditional rice varieties available for consumption except for increased levels of provitamin A.

Scientists with expertise in molecular biology, microbiology, toxicology, chemistry, and nutrition conducted a thorough analysis of the data and the protocols provided by IRRI to ensure the validity of the results. Health Canada conducted a comprehensive assessment of Golden Rice according to its Guidelines for the Safety Assessment of Novel Foods. Their approach in the safety assessment of GM foods is based upon scientific principles developed through expert international consultation over the last 20 years with agencies such as the World Health Organization (WHO), the Food

and Agriculture Organization of the United Nations (FAO), and the Organization for Economic Co-operation and Development (OECD). This approach is also currently applied by regulatory agencies around the world in countries such as the European Union, Australia/New Zealand, Japan, and the United States.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. [www.isaaa.org](http://www.isaaa.org))



Photo Credit: IRRI

## Mexican Researchers Develop GE Tomato that Decreases Hypertension

A team of scientists from Universidad Autonoma de Sinaloa (UAS), Mexico, successfully developed a genetically engineered tomato that can help treat hypertension. Hypertension affects 30 percent of the world population, according to the World Health Organization. Thus, the researchers looked at scientific literature to search for proteins that help reduce hypertension and devised a way to incorporate the protein in tomatoes, which is a popular fruit globally.

The team extracted the desired protein from amaranth, expressed it into tomato, and fed the GE tomatoes to hypertensive rats in the laboratory. Results showed that the amarantin from GE tomatoes had therapeutic effects similar with captopril, a common drug for hypertensive patients.

The next stage of the project will include testing of the GE tomato on humans.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. [www.isaaa.org](http://www.isaaa.org))



## Gene Boosts Rice Growth and Yield in Salty Soil

Around 20% of the world's irrigated land is considered to contain elevated concentrations of salt, and the soil continues to get saltier as the climate warms. Agricultural production is hard hit by soil salinity; salt stress reduces the growth and yield of most plants, resulting in billions of dollars in crop yield losses annually. Rice -- the staple food of more than half the world's population -- is particularly sensitive to salty soil, with even moderate levels of salt resulting in substantial yield losses. There is thus an urgent need to develop rice lines that can withstand salty conditions.

A team of scientists led by Jian-Zhong Lin and Xuan-Ming Liu of Hunan University in Changsha, China recently identified a gene that contributes to salt stress tolerance in rice. The gene, which they named STRK1 (salt tolerance receptor-like cytoplasmic kinase 1), was activated under salt stress conditions. The researchers generated two sets of transgenic plants, one in which STRK1 was expressed at high levels, and the other in which expression was greatly reduced. Under regular growth conditions, both sets of trans-

genic plants appeared normal. However, when challenged with salt, the transgenic plants with elevated STRK1 expression were greener and larger than the non-transgenic control plants, and those with reduced levels of STRK1 expression were smaller and browner than the controls. Next, the team examined the effect of STRK1 on yield. "Notably, overexpression of STRK1 in rice not only improved growth but also markedly limited the grain yield loss under salt stress conditions," said Jian-Zhong Lin. The team then turned their attention to deciphering the mechanism by which STRK1 enhances the plant's tolerance to salt. Salt stress triggers the production of potentially harmful reactive oxygen species, such as hydrogen peroxide, in plant cells. The group found that STRK1 (the protein encoded by STRK1) interacts with and activates a protein named CatC, which belongs to a family of proteins that decomposes hydrogen peroxide into water and oxygen. Thus, STRK1 increases the plant's tolerance to salt stress by keeping the levels of hydrogen peroxide in check and thereby minimizing the damage caused

by accumulating reactive oxygen species.

These exciting findings bring the research community closer to developing rice plants that thrive in salty soil. "Agricultural productivity is increasingly threatened by the salinization of irrigated farmland...Our work demonstrates that STRK1 is a promising candidate gene for protection of yield in crop plants exposed to salt stress," stated Xuan-Ming Liu.

(Source: Agriculture and Food News, ScienceDaily. [www.sciencedaily.com](http://www.sciencedaily.com))



Members of the research team collecting samples in a rice paddy field in Changsha, China.

Photo Credit: Jianzhong Lin

## Stem Cell Pathway Controlling Plant Growth

A team of plant geneticists at Cold Spring Harbor Laboratory (CSHL) has identified a protein receptor on stem cells involved in plant development that can issue different instructions about

how to grow depending on what peptide (protein fragment) activates it. This is the first such multi-functional receptor found to work in this way to control plant development. The new findings

obtained by CSHL Professor David Jackson and colleagues may have important implications for efforts to boost yields of essential food crops such as corn and rice.

Jackson and colleagues recently discovered that a protein receptor they first identified in 2001, called FEA2, can trigger the release of one of two distinct chemical messengers, CT2 or ZmCRN, depending on which of two peptides, ZmCLE7 or ZmFCP1, switches it on. Receptors that release more than one messenger are rare. Jackson says this is the first one discovered that plays a role in crop production. FEA2 is an important receptor in the CLAVATA signaling pathway, which is known to activate stem cells. Jackson, as well as his CSHL colleague Professor Zachary Lippmann, have previously tweaked this

pathway to manipulate the meristem to boost the yield of prominent crop species including tomato, corn, and mustard.

Jackson and his team believe that FEA2 is bound to two different co-receptors, each of which acts as the "lock" for one of the two peptide "keys." Future research will explore how the two different peptide signals are translated by FEA2 into distinct chemical messages. "We think the way this stem cell signaling pathway works is fundamental to all plants," Jackson says. "We have shown that, in theory, the pathways that control stem cells can be modified to make bigger fruits or more seeds. With this

study we've learned something new about how these pathways work, giving plant scientists another tool for improving crop yields."

(Source: Agriculture and Food News, ScienceDaily. [www.sciencedaily.com](http://www.sciencedaily.com))



Pathways that control plant stem cells can be modified to make plants generate bigger fruits or more seeds. The tip of this ear of corn is growing abnormally but provided scientists with information about how to tweak expression of a key gene to boost yield.

Photo Credit: Jackson Lab, CSHL

## Graphene Promise for More Efficient Fertilizers

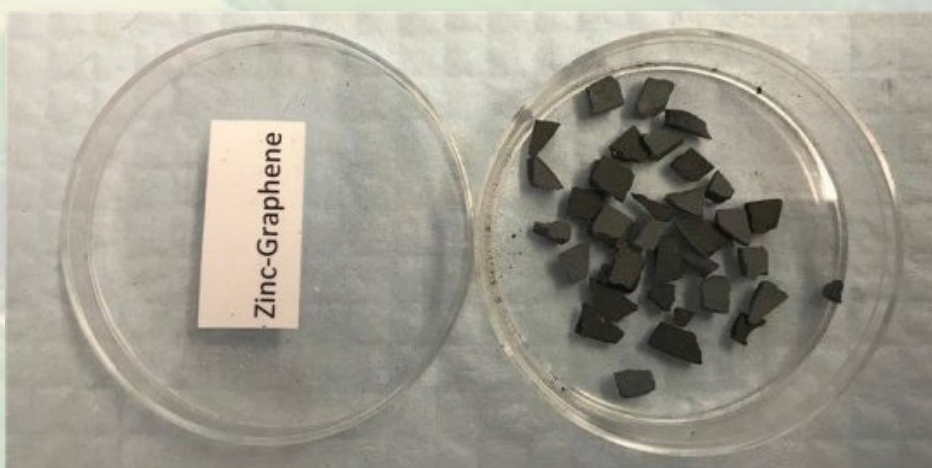
Fertilizers with lower environmental impacts and reduced costs for farmers are being developed by University of Adelaide researchers in the world-first use of the new advanced material graphene as a fertilizer carrier. In partnership with industry, the researchers have demonstrated effective slow-release fertilizers can be produced from loading essential trace elements onto graphene oxide sheets.

Using graphene as a carrier means the fertilizers can be applied in a more targeted fashion, with overall increased fertilizer efficiency and great nutrient uptake by the plants. The graphene-based carriers have so far been demonstrated with the micronutrients zinc and copper. Work is continuing with macronutrients such as nitrogen and phosphate.

"Fertilizers that show slower, more controlled release and greater efficiency will have reduced impact on the environment and lower costs for farmers over conventional fertilizers, bringing significant potential benefit for both agriculture and the environment," says Professor Mike McLaughlin, Head of the University of Adelaide's Fertilizer

Technology Research Centre at the Waite campus. "Our research found that loading copper and zinc micronutrients onto graphene oxide sheets was an effective way to supply micronutrients to plants. It also increased the strength of the fertilizer granules for better transport and spreading ability."

(Source: Agriculture and Food News, ScienceDaily. [www.sciencedaily.com](http://www.sciencedaily.com))



The slow-release fertilizer granules with zinc loaded onto graphene oxide sheets.

Photo Credit: Shervin Kabiri

## Nut Protein Healthier Than Meat Protein

A study conducted by researchers in California and France has found that meat protein is associated with a sharply increased risk of heart disease while protein from nuts and seeds is beneficial for the human heart.

Titled "Patterns of plant and animal protein intake are strongly associated with cardiovascular mortality: The Adventist Health Study-2 cohort," the study was a joint project of researchers from Loma Linda University School of Public Health in California and AgroParisTech and the Institut

National de la Recherche Agronomique in Paris, France. The study, which was published online on 3 April 2018 by the International Journal of Epidemiology, found that people who consumed large amounts of meat protein experienced a 60-percent increase in cardiovascular disease (CVD), while people who consumed large amounts of protein from nuts and seeds experienced a 40-percent reduction in CVD.

The study, which included data from more than 81,000 partici-

pants, is one of the few times detailed sources of animal protein have been examined jointly with animal fat in a major investigation.

(Source: Agriculture and Food News, ScienceDaily. [www.sciencedaily.com](http://www.sciencedaily.com))



## Breakthrough in Battle against Rice Blast

An international team of experts led by the University of Exeter used chemical genetic inhibition of a protein in rice blast and successfully stopped it from spreading in a rice leaf. The results are published in Science. Rice blast destroys up to 30 percent of the world's rice crop annually. The fungus has a powerful mechanism of infecting a rice plant. When it enters into a rice cell, the plasma membrane stays intact and the cells remain

viable, then the fungus moves to nearby cells through the plant's intercellular channels called plasmodesmata.

The researchers used a chemical genetic approach to selectively inhibit a single protein (Pmk1) in the blast fungus. When Pmk1 is inhibited, the fungus gets trapped within a rice cell. Pmk1 is responsible for the expression of genes involved in suppression of host immunity. It also controls the fungus' hyphal

constriction, which allows transfer into new host cells.

(Source: Crop Biotech Update, International Service for Acquisition of Agri-Biotech Applications. [www.isaaa.org](http://www.isaaa.org))





### Believe it or not!



- Bananas are a tropical plant and originated in the Indonesian archipelago; today they are grown in over 100 countries.
- Despite their firm texture and rather dry mouth-feel, bananas are composed of 75% water.
- Bananas “trees” are actually the world’s tallest herbaceous plant.
- Sweet bananas come in a variety of colors – green, yellow, red, purple, or brown.
- The fruits grow off the main stem (main axis of the inflorescence) in large clusters that can weigh over 100 pounds, with up to 400 individual bananas per cluster!



### Nutrition Chart

Banana (1 medium or 126 g)	
Calories	110
Fat	0 g
Sugars	19 g
Sodium	0 g
Potassium	450 mg
Carbohydrate	30 g
Protein	1 g

Source: USFDA Nutrition Information

### Tips

To keep your vegetables and fruits fresher for longer, you can follow these simple tips:

- Store salad greens and fresh herbs in bags filled with a little air and sealed tightly.
- Keep potatoes, onions, and tomatoes in a cool, dry place, but not in the fridge. The cold will ruin their flavor.
- Citrus fruits such as oranges, tangerines, lemons, and limes, will do fine for up to a week in a cool, dark place, away from direct sunlight, but you can lengthen their lives by storing them in the fridge in a mesh or perforated plastic bag.
- Store unripe fruits and veggies like pears, peaches, plums, kiwis, mangoes, apricots, avocados, melons, and bananas on the counter. Once they're ripe, move them to the fridge. Banana peels will turn dark brown, but it won't affect the flesh.
- Other types of vegetables and fruits such as carrots, lettuce, and broccoli start to spoil as soon as they're picked, so place these in separate plastic bags in the crisper in your fridge.

(Tips courtesy: popsugar.com)

## Sharing is caring!

Plastic bottles used for building houses got a new name – EcoBrick! An EcoBrick is actually a plastic bottle packed solid with non-biological waste to make a re-useable building block. Inter-

estingly, we don't need any fancy machines, special skills, engineers or even politicians to get started. We can easily save, segregate and pack used plastic materials into bottles to make

these building blocks. Such reuse of plastic bottles as well as other plastic materials shows that how we can build green spaces that enrich our community and the biosphere.



(Source: EcoBricks.org)



**ACI Agribusiness**  
Creating Wealth for Farmers

*ACI Agribusinesses, the leading agriculture integrator in Bangladesh, is dedicated to gaining prosperity of Bangladesh through food security. ACI Agribusinesses offers complete solutions to farmers and also educates them about the technical know-how.*

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