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Groundnut: A Natural Source of Medically Important Resveratrol

In this Issue:

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Besides being a rich source of energy (586 kcal $100g^{-1}$), groundnut kernels contain other beneficial functional constituents including minerals; essential vitamins particularly vitamin E, folic acid and niacin; L-arginine; myo-inositol; soluble and insoluble fibers; antioxidants and biologically active phytosterols; and polyphenolics such as p-coumaric acid and resveratrol. Of late, due to its health benefits, resveratrol, chemically a stilbene, gained its importance worldwide. It was first identified in 1940s in the roots of white hellebore, *Veratrum grandiflorum* O. Loes, a perennial herb and later in 1963 as a component of *Polyganum cuspidatum* roots used in Japanese and Chinese folk medicine for treatment of disorders affecting liver, skin, heart and circulation, and lipid metabolism. The importance of resveratrol was recognized only after the widely publicized historic "French Paradox" associated with drinking of red wine. The occurrence of resveratrol in edible peanuts was first reported by Sanders and McMichael in 1997 at the American Chemical Society meeting in Las Vegas, Nevada, which was followed by press releases and wide media coverage. The primary food and beverage sources of resveratrol in the human diet are red wine grapes varieties (19 to 508 $\mu g.g^{-1}$ skin); red wine (0.6-8.0 $\mu g.\ mL^{-1}$); groundnuts (0.02 to 1.80 $\mu g.g^{-1}$); blueberries (32 $ng.g^{-1}$) and pistachios. In five Indian groundnut genotypes (M335, T64, M13, GG20 and JSP39) we observed resveratrol content in the range of 0.8 to 1.6 $\mu g.g^{-1}$ with the mean value of 1.24 $\mu g.g^{-1}$ kernels. Reports suggest resveratrol improves metabolism, provides cardio-protection, and prevents both type 2 diabetes and cancer. More recently, resveratrol has been implicated in reducing risk of Alzheimer's disease and in delaying aging. As groundnut kernels contain a substantially good amount of this bioactive compound, hence addition of groundnut or its products to our daily diet regime is advisable. Most resveratrol capsules sold in the U.S. contain extracts from the Japanese and Chinese knotweed plant whereas other forms of the supplements are made from red wine or red grape extracts. However, in developing countries like India, groundnut can be a perfect substitute for the resveratrol supplements.

Inputs: Sujit K Bishi, Mahesh K Mahatma and Lokesh K Thawait

Strategic Relay Cropping of Pigeonpea in Groundnut Crop: A major Climate Change Adaptation Strategy in Saurashtra

The effects of climate change and variabilties are becoming more evident in agriculture during recent years. Based on their experiences, expertise and resources at disposal farmers respond in their own ways to reduce yield losses due to climatic variabilties. The most common responses of farmers for climate change adaptation observed in Saurashtra region of Gujarat are: rain water harvesting for bore well recharge, micro-irrigation for supplementary irrigation, piped irrigation, frequent inter-culturing for moisture conservation, growing resilient crops and their varieties, strategic relay cropping etc. Groundnut is major *kharif* crop in Saurashtra region of Gujarat. In Gujarat, groundnut was grown on 1.32 m ha area with production of 2.75 MT and productivity of 2080 kg/ha during *kharif* 2015 (2015-16 second adv.). Strategic relay cropping of pigeonpea in groundnut has been adopted by farmers as one of the major climate change coping strategies in this part of the country. After final interculturing and earthing up operation, at about 40-45 days after sowing, farmers do sowing of relay crop of pigeonpea. Relay sowing by this time has minimum adverse effects on growth and productivity of main crop of groundnut. After every two or three rows of groundnut one row of pigeonpea is introduced generally with bullock drawn seed drill. The fate of relay crop is decided by the availability of ground water in wells/bore wells at the end of rainy season. If there is good rainfall during monsoon and ground water is sufficiently available for raising high value *rabi* crops like coriander, wheat etc., farmer plough down the relay crop of pigeonpea as green manure crop in soil and prepare field for sowing of *rabi* crops. This helps to improve fertility status of the soil when availability of traditional organic manures like FYM has been decreasing drastically. Contrary to this, if ground water is not sufficient to raise *rabi* crops, farmers do allow relay crop of pigeonpea to grow till grain maturity. The relay crop of pigeonpea has rewarded farmers richly during 2015-16 with yield levels as high as 2000 kg/ha and net monetary benefits varying from Rs. 40,000 to 70,000/ha. Considering the climate change coping potential of strategic relay cropping, same may be replicated in other parts of the country where crop losses due to climatic change related weather aberrations have become a common feature.

Relay crop of pigeonpea after two (left) and three (right) rows of groundnut

Input: Ram A Jat

Krishi Mela

March19-21, 2016 at IARI, Pusa Campus

National Agriculture Fare "*Krishi Unnati Mela*" was held for display the usable technologies of the institute at IARI, Pusa, New Delhi from 19-21st March 2016. ICAR-Directorate of Groundnut Research, Junagadh also put a stall and demonstrated research technologies developed by ICAR-DGR. Dr. Ram Dutta, Principal Scientist, Plant Pathology led the team comprising Dr. Narendra Kumar, Scientist, Plant Breeding, Dr. SD Savaliya, ACTO and Mr. AM Vakharia, TO. Hon'ble Prime Minister, Sh. Narendra Modi inaugurated the *Mela* on 19th March. During *Mela* period Sh. Radha Mohan Singh, Union Agriculture Minister, Sh. Sanjeev Balyan, Minister of State for Agriculture and Food Processing & Dr. T. Mohapatra, Director General (ICAR) and Secretary (DARE) visited the exhibition stalls. Large number of farmers from different states, govt. officers, guides and other stakeholders visited the *Mela*. During the *Mela* about 2000 farmers visited the ICAR-DGR stall, and about 130 farmers registered their name for demanding seed of groundnut varieties. Among the visited farmers, majority of farmers were from UP, Rajasthan, Haryana, Punjab, MP, Jharkhand, Bihar, Assam, West Bangal, AP, Karnataka and Tamil Nadu. Major issue of all the farmers was availability of good quality seed and their sources.

Farmers Training Programme on Groundnut Seed Production

There is a huge gap in demand and supply of quality seed in groundnut. So there is need to produce quality groundnut seed by farmers themselves for rapid varietal spread in groundnut. ICAR-Directorate of Groundnut Research, Junagadh conducts short but regular training programmes for farmers coming from different villages of Junagadh districts, preferably those villages which have been covered under "*Mera Gaon Mera Gaurav*" scheme. Following training programmes were conducted during which all aspects of scientific seed production, improved groundnut varieties recommended for Gujarat, good agronomic practices, integrated management of insect-pests and diseases, post-harvest management of seed, etc. were covered by the experts.

Farmers Training	Duration	Conducted by
Quality Seed Production for Summer Groundnut	18-20 February, 2016	Dr. Narendra Kumar (Course Director), Dr. SK Bishi and Dr. Gangadhara K (Course Coordinator)
Scientific Techniques for Seed Production of Groundnut during Summer	02-04 March, 2016	Dr. Ram A Jat (Course Director), and Dr. Narendra Kumar and Dr. Sujit K Bishi (Coordinators)
Improved Seed Production Technologies for Groundnut	14-16 March, 2016	Dr. Narendra Kumar (Course Director), Dr. RS Yadav and Dr. Mahesh K Mahatma (Course Coordinator)

In addition, farmers were exposed to different farm machineries and implements required in groundnut cultivation and visits to experimental fields were also arranged. Subject experts from Gujarat State Seed Corporation and Soil Testing Laboratory, Junagadh were also invited for imparting the knowledge. Farmers were also trained on timely and effective management of insect-pest and diseases in groundnut, and scientific post-harvest storage of groundnut seed to minimize losses caused by storage insect-pests, aflatoxin contamination and seed viability. A visit to the DGR farm, Technology Park, laboratories and farm machinery shed were also arranged for farmers. Further, a training manual of delivered lectures in Gujarati language was also provided to the farmers. The Director, ICAR-Directorate of Groundnut Research appreciated the farmers for showing interest in training programme and also gave assurance for intellectual support related to the groundnut.

Science Day Celebrated

"National Science Day" is commemorated in the honours of Dr. C.V. Raman for his legacy, who discovered Raman Effect on 28th Feb, 1928. For his discovery, Raman was awarded the Nobel Prize in Physics in 1930.

National science day is celebrated as one of the main science festivals in India every year during which students of the schools and colleges demonstrates various science projects as well as national and state science institutions demonstrates their latest researches.

Children from schools of Junagadh city and adjoining suburbs came together at ICAR-Directorate of Groundnut Research Campus, in enthusiastic celebrations of National Science Day. The theme of the year 2016 was "Make in India".

Institute Seminars

Speaker	Date	Topic
Dr. Koushik Chakraborty	February 6, 2016	Elucidating dominant enzyme mediated ROS detoxification pathway in peanut under salinity stress

Foreign Deputation

Dr. Debarati Bhaduri, Scientist (Soil Science) received '**Endeavour Research Fellowship-2016**' by Australia Awards, Dept. of Education & Training, Australian Govt. for carrying out post-doctoral research programme at University of New England, Armidale, NSW, Australia.

Awards

Best Paper awarded to Dr. RS Yadav, Senior Scientist (Soil Science) for his paper entitled "Distribution of soil phosphorus in different soil types in Saurashtra region of Gujarat" presented at 25th National Conference on Natural Resource Management in Arid and Semi-arid Ecosystem for Climate Resilient Agriculture and Rural Development, held during 17-19th February, 2016 at SKRAU, Bikaner.

Photo Gallery