

Webinar on

“Role of CRISPR in crop improvement”

Resource Person: Dr. Kutubuddin Molla

Scientist, NRRI

Dt: 26.01.2021

Identification of gene function is ambiguous for manipulation of gene expression which is achieved by reducing or completely disrupting its normal expression. Over a decade RNAi serves as a magic bullet in this field. Targeted genome editing with site specific nucleases opens an efficient and precise pathway for reverse genetics, genome engineering and targeted transgene integration experiments. The revolutionary invention of CRISPR/Cas9 technology opens a new era of genome editing. The CRISPR/Cas system is basically a prokaryotic immune system that offers a type of acquired immunity against invading bacteriophage or plasmids by degrading the exogenous gene. CRISPR stands for clustered regularly interspaced short palindromic repeats and Cas9 is a CRISPR associated nuclease. To start with, this technology has been deemed to be more accurate and target specific for editing the sequences within the genome, thereby becoming one of the most widely used tool to create variations and mutations. CRISPR/Cas9 system has been widely applied to plant biological research for crop improvement.

With increasing demand for this new age technology, one Faculty Development Programme (FDP) had been organized on 26th January, 2021 in new auditorium of Paralakhemundi campus. Around 42 faculty members attended the FDP. The main aim of the FDP was to provide an introduction about the emerging technology CRISPR, how to design CRISPR construct, how to utilize it for crop improvement and to focus on its advantages as well as disadvantages. The FDP was started with an introductory speech given by Hon’ble Registrar, Dr. Anita Patra, focusing on the importance of the technology in crop improvement. A brief introduction about the emergence of this technology was given by resource persons. This one day FDP showcased the importance of CRISPR/Cas9 as a promising tool for genome modification in plants due to its simplicity, efficacy, high specificity and fewer off-target effects through power point presentation and lectures given by the resource persons.

The FDP showcased all the below mentioned steps involved in utilizing CRISPR-CAS9 system for gene editing and genetic engineering:

1. Select an organism for the experiment
2. Select a gene of the target location
3. Select a CRISPR-CAS9 system
4. Select and Design the sgRNA
5. Synthesizing and cloning of sgRNA
6. Delivering the sgRNA and CAS9
7. Validating the experiment
8. Culturing the altered cells
9. Gene expression study
10. Analyzing results

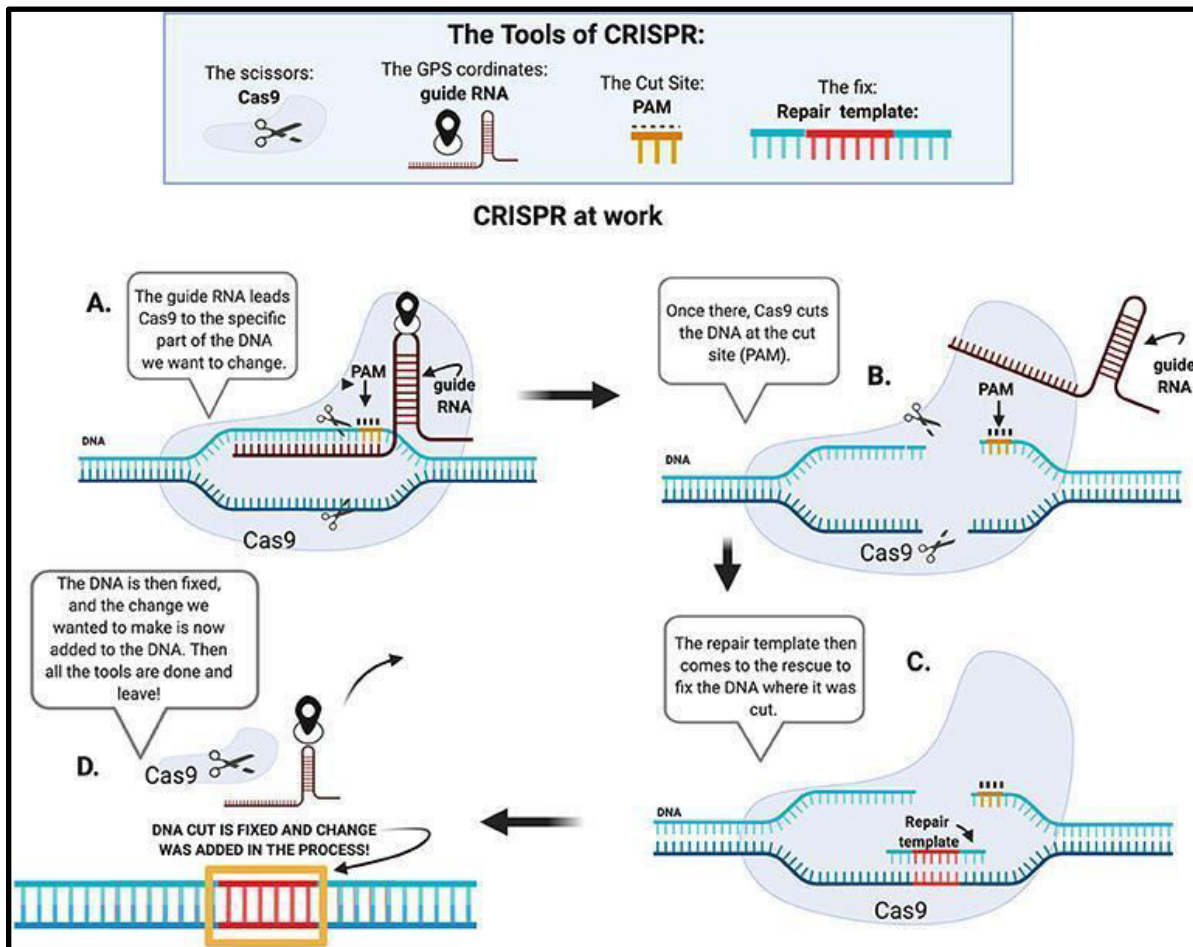


Figure 1: Working of CRISPR

The participants had understood that genome editing can accelerate plant breeding by introducing precise and predictable modifications directly in elite cultivars or accessions, saving the time-consuming backcrossing procedure in conventional breeding schemes. CRISPR/Cas9 system can simultaneously edit multiple traits. For the elimination of genes that negatively regulates the grain quality and disease resistance, NHEJ-mediated gene knockouts is the best implication of CRISPR/Cas9 system leads to increase crop yield as well as confer resistant to pathogens. They have got an idea about the plants muted with CRISPR/Cas9 system is not classified under genetically modified crop as for target gene delivery it often uses agroinfiltration, viral infection, or preassembled Cas9 protein sg-RNA ribonucleo proteins transformation technologies. The participants got a brief introduction about the importance of CRISPR/Cas9 system on modern agriculture and the FDP developed an enthusiasm in them to work with this new age technology for crop improvement.

Role of CRISPR in crop improvement

Date: 26-01-2021

Resource person

Dr. Kutubuddin Molla
Scientist NRI



Organised by :
Centurion University of Technology and Management

Figure 2: Brochure of the Webinar “Role of CRISPR in crop improvement”

Participants List:

1. Dr. Pushpalatha Ganesh
2. Dr. Satyabrata Nanda
3. Dr. Preetha Bhadra

4. Dr. Koustava Kumar Panda
5. Dr. Dinkar Gaikwad
6. Dr. Pradipta Banerjee
7. Dr. Bhisma Rath
8. Dr. B. Praveen
9. Dr. Raghu Gogada
10. Mr. Chandrasekhar sahu
11. Dr. Narayan Gouda
12. Mr. I Siva Ram Koti



Dr. Prasanta Ku. Mohanty
Dean Academic



Prof. KVD Prakash
Dean - IIE & HRD