

Immediate Press Release

Indian scientific community, students and farmers review and endorse the safety, efficacy and commercial release of DU's GM mustard

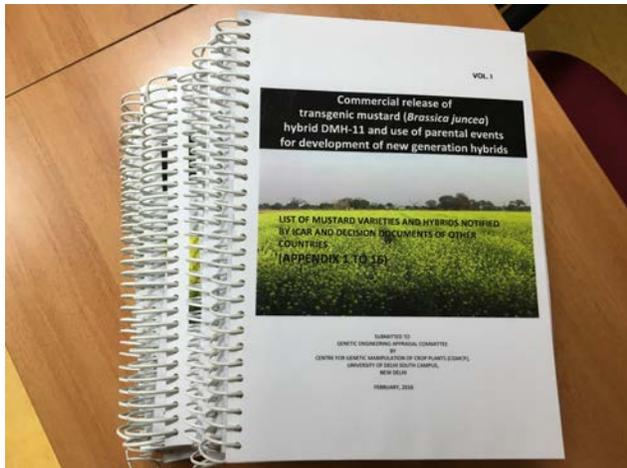
- **4000+ pages biosafety dossier on GM mustard prepared by DU**
- **Patents on modified barnase-bartsar mustard jointly owned by India's NDBB-DU**

New Delhi (Oct 07, 2016) – 4000+ pages biosafety dossier of GM mustard packed in IX volumes generated over a period of more than 15 years reaffirm the scientific scrutiny, safety and supremacy of Indian regulatory system in assessing biosafety of GM crops in India. During the public comments period as announced by MOEF&CC yesterday, around 759 comments were submitted by experts familiar with the subject of agriculture and crop improvement including the visits of dozens of researchers, students and farmers to MOEF&CC demonstrate the public participation and participatory engagement in the process of the commercial approval of GM mustard in India. Apparently, Delhi University's GM mustard technology and DMH-11 have received a tremendous support from different institutions including scientific academies, student unions, farmers organizations, independent not-for-profit societies, researchers and students from across the country.

In addition to the summary report "Assessment of Food and Environmental Safety (AFES)" of GM mustard, which was made available to public through website on 4th Sept 2016, more than 4000+ pages biosafety dossier was made available for comments at the MOEF&CC, New Delhi. The GM mustard biosafety dossier is one the most voluminous report on safety, efficacy and agronomic performance of any GM crops prepared by Delhi University South Campus in the history of Indian agriculture. The GM mustard biosafety dossier "**Commercial Release of transgenic mustard (*Brassica juncea*) hybrid DMH-1 and use of the parental events for development of new generation hybrids**" consists of following IX volumes;

- **Volume I - List of Mustard Varieties and Hybrids Notified by ICAR and Decision Documents of Other Countries (Appendix 1 to 16)**
- **Volume II - Biology of *B. Juncea*, Molecular Characterization, Detection Protocol and Expression Analysis (Appendix 17-24)**
- **Volume III-Production of Pure Protein and Acute Toxicity Studies (Appendix 25 to 31)**
- **Volume IV - Sub-Chronic Toxicity Studies (Appendix 32 to 33)**
- **Volume V - Allergenicity Assessment Studies (Appendix 34 to 38)**
- **Volume VI - Compositional Analysis (Appendix 39 to 40)**
- **Volume VII - Field Trials and Environmental Safety Studies (Appendix 41 to 52)**
- **Volume VIII- List of Publication and Socio-Economic Impact (Appendix 53 to 54)**
- **Volume IX- Summary Report of the Dossier**

Download High Reso Pictures of GM mustard biosafety dossier Vol I to IX from:
<https://goo.gl/photos/F6jJo6MzLU87pZQH6>



The GM mustard biosafety dossier has not only been reviewed by RCGM but also by GEAC and a Sub-Committee, which was constituted by GEAC on 04 January 2016. The Sub-Committee thoroughly reviewed the technical details and biosafety dossier related to environmental release of genetically engineered (GE) mustard (*Brassica juncea*) hybrid DMH-11 and use of parental events (varuna bn 3.6 and EH2 mod bs 2.99) for development of new generation hybrids.

Unfortunately, some groups fundamentally averse to the crop improvement techniques, have gathered, demonstrated and shouted loudly, without having seen the GM mustard biosafety dossier in last one month and their PR seems to have pronounced the developer of GM mustard guilty. These groups have created apprehensions and propagated fallacies & fears based on their convenience on range on issues including terminator gene, long-term safety, loss of biodiversity, low yield, herbicide tolerant gene and the intellectual property rights.

The scientific research community in India has addressed some fallacies propagated by activists and highlighted below some of the important scientific arguments that underpin innovation and reasoning in support of the barnase-barstar technology and GE mustard hybrid DMH-11:

- **NON-TERMINATOR TECHNOLOGY & MALE STERILITY TRAIT IN MUSTARD:** the system of male sterility in one of the parents is a fundamental necessity for efficient hybrid seed production irrespective of use of methodologies such as the cytoplasmic male sterility (CMS) or the barnase-barstar system. Efforts should be made to ensure that the general public should not be confused with the system of male sterility induced by the barnase-barstar technology with the GURT or terminator technology.
- **EFFICIENT HYBRIDIZATION & INCREASING MUSTARD YIELD:** the barnase-barstar system provides opportunity to produce fully fertile hybrids with enhanced yield levels, reduce hybrid seed production cost and increased farmers' income.
- **MUSTARD CROSSABILITY:** The issue of crossability of GE mustard with the conventional mustard or wild relatives has been overstated and exaggerated to stall the commercial cultivation of this powerful hybridization technology.

- **HERBICIDE TOLERANCE IN MUSTARD:** the herbicide tolerance is not a prime target for the barnase-barstar GE mustard hybrid DMH-11. However, all efforts should be directed to develop mustard seeds tolerant to popular herbicides including glyphosate and glufosinate to allow farmers to increase mustard productivity and production in India.
- **IPRs ON GM MUSTARD:** None of the patents on barnase-barstar system were ever filed by developers in India. Global patents on barnase-barstar genes have already expired. Notably, the patents of the modification of the barnase-barstar technology in mustard developed by Delhi University South Campus were filed in India and other countries such as USA and Canada, are held jointly by the National Dairy Development Board (NDDDB) and Delhi University. A list of patents on barnase-barstar GM mustard jointly held by India's public sector institutions NDDDB-DU are tabulated below;

Table: Patents on modified barnase-barstar GM mustard owned jointly by India's NDDDB-Delhi University

Patent Title	Patent Nos	Countries
Regulation of lethal gene expression in plants.	6833494 2449250	USA/2004 Canada/2012
Method for producing insulator construct.	199542	India/2006
An insulator construct for controlling leaky expression of a lethal gene.	244022	India/2010
A method for obtaining improved fertility restorer lines for male sterile crop plants developed using transgenic approaches for hybrid seed production and a DNA construct for use in said method.	7741541 1644506 238973	USA/2010 EU/2009 India/2010
A new cytoplasmic male sterility for <i>Brassica</i> species and its use for hybrid seed production in Indian oilseed mustard <i>Brassica juncea</i> (filed & obtained in USA, Canada, Australia and India).	2005276075 8,030548 B2 2,578,187	Australia/2005 USA/2011 Canada/2015

For more information about GM mustard technology and GM mustard hybrid DHM-11, visit www.sabc.asia

About SABC:

The South Asia Biotechnology Centre (SABC) is a not-for-profit scientific organization that aims at serving as a knowledge hub and helps in bridging the knowledge gap between science and society about biotechnology and its vitally important contribution to food, feed and fibre security, and growth prospects for the bioeconomy of India. The objectives of SABC are two folds; share credible information on biotechnology with the society to improve public understanding, and to facilitate the transfer of biotechnology applications from the lab to land. More about SABC at: www.sabc.asia