

# GMO's Foods: Regulatory Mechanism and Challenges in India

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**Abbreviation:** COP: the Conference of the Parties; GMOs: Genetically modified organism; DBT: Department of science and technology; MOEF: Ministry of environment and forest; GEAC: Genetic Engineering Appraisal Committee; SBCC: State Biotechnology Coordination Committees; DLC: District Level Committees; RCGM: Review Committee on Genetic Manipulations; WTO: World trade organization (Figure 1) [1].

## Biosafety and GMO's

The battle is still among people who oppose or supports GMO's product. Nevertheless feeding of mounting population is main concern. That's why Public Interest Litigation (PIL) on GMOs products release were kept in front of Supreme Court in 2014 and surprisingly, the report of scientific members were in support of GMOs. Therefore, its case study is very important. Bt-cotton was released in 2002 in Gujarat where, there was report of 24% decrease in pesticide consumption [2] but some author assumed that bt-cotton was responsible for the death of Vidarbha farmers [3]. Recently Forbes magazine report shows many features behind failure of not responding GMO crops such as soil condition, and biggest problem of farmers not understanding GMOs and thus selling too low to buyers 2015 report [4].

If we look data of increasing GM crops in developing countries then its around 26% in 2001 while China has approved around 31 GM crops [5]. Now need to change the mind of people. Current Modi government now supporting large scale trials of GMOs products and has allowed to grow various transgenic crops such as transgenic, cotton, rice, mustard, maize (corn), brinjal and chickpea. This may change the future of crops since India is second largest producer of crops and 50% oil is produced alone by Indian farmers [1]. Anti GMO groups protested heavily against launch of Bt-brinjal in 2010 India but now it becomes fourth largest GMO crop in world after United States, Brazil and Argentina.

Application of biotechnology seems to be one of the essential option to foster benefits but environmentalist opposing on the ground of its future impact. Genetic engineering allow to modify the crops genetics intentionally and thus any feature can be added to these products called as GMOs. GMOs may be plant, maybe animal, or may be the microbes. GMOs may even be created after protoplast fusion or direct gene transfer from unrelated organism. One might be familiar with lateral and horizontal gene transfer. The Cartagena protocol on biosafety finally issued various guidelines in 2000 in view of GM related biohazards. Transgene added may be beneficial in killing some insect but also may kill some other beneficial insect. Biosafety testing is performed often in proper containment facility to avoid any harmful impact in the environment. The level of risk is decided by the category of infectious agent and then work is performed as per guideline of Biosafety level (BSL1-4) which is being monitored by various levels of authority from time to time. Field trials are also monitored which is being conducted after the notification and as per RCGM approved protocols [6]. Capacity building at institutional level is major issue in India. For GMO foods its essential to follow Codex standard (as per WTO guidelines) and practices Hazard Analysis and Critical Control Point (HACCP). Risk assessment is performed at every level of GM food release and likewise state or district level committee monitors post

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Received August 20, 2015; Accepted August 21, 2015; Published August 22, 2015

Citation: Sheelendra BM (2015) GMO's Foods: Regulatory Mechanism and Challenges in India. J Bioremed Biodeg 6: e165. doi:10.4172/2155-6199.1000e165

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DBT has been setup under Ministry of science and technology