



ISSN : 2350-0743

www.ijramr.com



International Journal of Recent Advances in Multidisciplinary Research

Vol. 05, Issue 07, pp.3964-3966, July, 2018

RESEARCH ARTICLE

AN OUTLAW ON SEED MONOPOLIES WITH RESPECT TO GENETIC USE OF RESTRICTION TECHNOLOGY - INDIA

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ARTICLE INFO

Article History:

Received 20th April, 2018

Received in revised form

14th May, 2018

Accepted 17th June, 2018

Published online 30th July, 2018

Keywords:

Terminator Technology,
V-GURT, T-GURT,
Genetically modified seeds,
Patent, Plant variety rights.

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ABSTRACT

The terminator technology is the main application of a broadly framed pattern for the “control of plant gene expression”. The terminator is a genetically engineered suicide mechanism that can be triggered off by a specific outside stimulus. As a result, the seeds of the next generation will self-destruct by self-poisoning. Terminator technology is the Trojan horse for the spread of generality-Engineered crops in the south. The most alarming is the terminator genes themselves could infect the agricultural gene pool of the neighbour’s crops and of wild and weedy relatives. Temporary “gene silencing” of the poison gene or failed activation of the terminator countdown enables such infection. The terminator increases the risks through the new toxins and allergens will show up in our food and animal fodder.

INTRODUCTION

The proprietary of anything is possible, because everything, including living things is just commodities, with commercial value. This is reflected in the Locke’s theory of property, in Hegel’s theory of property and any other property jurisprudence, where they advocate that when a person catches a bird, that bird becomes his property. This is exactly opposite to the above mentioned concept of human beings’ relation with nature and the living things around them in the Indian tradition. As Science and technology developed, this human nature which considered everything as property got different dimensions. For finding out the hidden mysteries of nature, property right is given. Patent laws allow patenting of even living things over which the holder is given exclusive right. For having found out peculiarities of certain plants also patent was given. However, patenting of life forms and restriction technologies was condemned by many countries, as they believe that natural things are not to be the property of anyone¹.

Genetic use of restriction technologies: Genetic use of restriction technologies (GURTS) are providing a specific genetic switch mechanism that restrict the unauthorized use of genetic material by hampering reproduction in the name of Variety specific (V-GURT) or the expression of a trait in the name of Trait- Specific (T-GURT) in a genetically modified (GM) plant. Variety – GURT² is also known a suicide or

sterile seeds or terminator technology is designed to control, plant fertility or seed development through a genetic process triggered by a chemical inducer that will allow the plant to grow and to form seeds, subsequently effects the embryo of each of those seeds to produce a cell toxin that will prevent its germination³. T-GURT⁴ ironically known as traitor technology is designed to switch on or off a trait such as herbicide, cold, drought, stress tolerance, pest resistance, germination, flowering, ripening, colour, taste and nutritional qualities of the plant, defence mechanisms, or production of industrial or pharmaceutical compounds⁵. V-GURT, before being sold to the consumer (in most cases, to the farmer), these seeds are exposed to the inducer that inhibits the function of the repressor. During late embryogenesis, the ribosomal inactivating protein (the terminator gene) is expressed, leading to the abortion of all embryos. Thus, the seeds purchased by farmers will be able to germinate in the field, and the culture will develop normally. However, the seeds produced in the harvest will be sterile and thus cannot be stored for later cropping. Regarding T-GURTs, there are two mechanisms by which they work⁶. In the first one, a gene cassette is expressed

³Fisher, W.W. (2002) The impact of terminator gene technologies on developing countries. In *Biotechnology, Agriculture, and the Developing World*

(Swanson, T., ed.), pp. 137–149. Cheltenham: Edward Elgar Publishing.

⁴w.econexus.info/publication/v-gurts-terminator-technology

⁵ FAO (2001a) Potential Impacts of Genetic Use Restriction Technologies (GURTs) on Agricultural Biodiversity and Agricultural Production Systems. Wageningen University Research Centre, The Netherlands: FAO Commission on Genetic Resources for Food and Agriculture

⁶ibid

¹COURSE III, International Environmental Law and Policy-II, NLU

²International Trade and Policies for Genetically Modified Products, edited by Robert Eugene Evenson, V. Santaniello.

in the seed and programmed so that the gene responsible for the production of a toxin/disrupter protein is instructed to undo a particular plant trait of interest, without, however, killing the embryo. Thus, a desirable characteristic may be excised selectively by applying or withholding chemical application before being sold to farmers; consequently, the first generation plant is capable of expressing the trait of interest, but the second generation is not (e.g. Zeneca patent WO 9403619 titled 'Improved Plant Germ-plasm'). In the second mechanism of action, the gene encoding the trait of interest is kept silent, but it can be activated by the farmer through the application of a chemical inducer to the plant or seed. In the subsequent fertile generations, the gene is inherited in the inactive state, so that the chemical must be purchased each year that farmer needs the trait to be expressed.⁷

Intellectual property protection

The first patent application related to a biological switch mechanism regulated by external inducers date back to the first years of the 1990s. In 1991, DuPont filed a patent application, granted in 1994 (U.S. 5,364,780), entitled 'External regulation of gene expression by inducible promoters' that described a method 'utilized to transform plants and bring the expression of the gene product under external chemical control in various tissues of monocotyledonous and dicotyledonous plants'. In 1992, Zeneca (today Syngenta, after the merger with Novartis Agribusiness in 2000) filed a technology application entitled 'Improved plant germplasm' published by WIPO (World Intellectual Property Organization) in February 1994 (WO9403619A2, where the letter A indicates the request for approval), providing 'a gene switch which is inducible by external application of a chemical inducer and which controls expression of a gene product which affects expression of a second gene in the genome'; the second gene could encode a cytotoxic molecule fatal to the plant or a desirable characteristic that may be excised selectively by applying or withholding chemical application. The true watershed was marked when Melvin Oliver, a British researcher, was assigned (1990) by the United States Department of Agriculture (USDA) to develop together with the Delta & Pine Land (DPL) Company a seed-embedded protection technology. The challenge was to create a cultivar that would become sterile only in farmers' fields by means of an external stimulus to protect the varieties developed by biotech companies, thus preventing farmers from seed saving. The conception of this 'genetic switch' was realized with the filing of a patent application on 7 June 1995. It was registered at WIPO in 1996 under the number WO 9604393 and finally, on 3 March 1998, the United States Patent and Trademark Office (USPTO) granted the joint application of Delta & Pine Land Corporation and the U.S. Department of Agriculture's Agricultural Research Service and issued the patent U.S. 5,723,765 entitled 'Control of plant gene expression. Under a research agreement with the USDA, the Delta & Pine Land Co had the exclusive rights to license the new technology to other parties. Fierce protests raged worldwide as many saw it as a very disadvantageous and unethical mechanism for poor farmers, especially in developing countries where saving seeds also known as 'brown-bagging'. These objections are borne out by the fact that seed saving is estimated to account for between

15% and 20% of the world's food supply, practised by 100 million farmers in Latin America, 300 million in Africa and 1 billion in Asia (IIPTA, 2012). In June 1999, as a result of the great opposition to this technology by the public opinion, nongovernmental organizations and farmers, Zeneca announced that they would not market terminator seeds. Four months later (October 1999), Monsanto's ⁸CEO Robert Shapiro, under the advice of Gordon Conway, president of the Rockefeller Foundation, pledged not to commercialize gene protection systems that render seeds sterile to avoid compromising the public image of the company (technically at that time Monsanto did not possess GURT patents, as it acquired Delta & Pine Land Co. along with its patents only in 2007; however, the announcement that the two companies would merge was made in May 1998). In 2000, D&PL claimed that they would continue trials for commercializing the technology protection system (Collins, 2000), and in 2005, Monsanto opened the possibility of using terminator technology in nonfood crops such as cotton and grass.⁹

- The patent can and should be rejected on the grounds that it is in conflict with public morality¹⁰. And contravene the TRIPS Article 27.2 principles, Article 8.1¹¹ and . The terminator is a threat to food security and destructive of agricultural biodiversity. Clinton administration might do well to heed Abraham Lincoln advice before allowing the terminator to enslave the worlds farmers today.¹²
- Agreement on technical barriers to trade recognising, No country should be prevented from making provisions to ensure the quality of its exports, or for the protection of human, animal or plant life or health, of the environment, or for the prevention of deceptive practices.
- As a consequence of the moratorium and of the rising farmers' alarmism, in 2001, the Indian Parliament ratified the 'Protection of plant varieties and farmers' rights Act 2001' banning the registration of seeds containing terminator technology Section 18(1)(C). and further seed variety incurred with GURT technology can't able to influence the scope of the section 2(x)¹³. Criteria for obtaining protection under this act is stated under the section 15(1) novelty, distinctiveness, uniformity and stability.

⁸ Shapiro, R.B. (1999) Open letter from Monsanto CEO Robert B. Shapiro to Rockefeller Foundation President Gordon Conway and others. (available at: <http://www.monsanto.com/newsviews/Pages/monsanto-ceo-to-rockefeller-foundation-president-gordon-conway-terminator-technology.aspx>).

⁹Genetic use restriction technologies: a review ,Luca Lombardo, Department of Crop Systems, Forestry and Environmental Sciences, University of Basilicata, Potenza, Italy

¹⁰Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.

¹¹Principles - Members may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement

¹²Abraham Lincoln, "Annual Address by Hon. Abram Lincoln of Illinois delivered at Milwaukee, Sept. 30, 1859" pages 287-299 in Transactions of the Wisconsin State Agricultural Society, Carpenter and Hyer, (Madison) 1860.

¹³section:2(x) "seed" means a type of living embryo or propagate capable of regeneration and giving rise to a plant which is true to such type:

⁷Shi, G. (2006) Intellectual property rights, genetic use restriction technologies (GURTs), and strategic behavior. Selected paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Long Beach, California, July 23–26, 2006. 31 pp.

Novelty, The variety must be new and novel, prior variety should not be existed in the public domain. Novelty will be determined through anticipation. novel, at the date of filing of the application for registration for protection, the propagating or harvested material of such variety has not been sold. Distinctiveness, if it is clearly distinguishable by at least one essential characteristic from any other variety whose existence is a matter of common knowledge in any country at the time of filing of the application. Uniformity if subject to the variation that may be expected from the particular features of its propagation it is sufficiently uniform in its essential characteristics. Stability, stable, if it's essential characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle. since it lacks the criteria of stability, incompetent to claim the protection under this Act.

- Similarly, in Brazil, Article 6 of law number 11.105 of 24 March 2005 prohibited (point VII) 'utilization, marketing, registration, patenting and licensing of use restricted genetic technologies',
- Whereas in Canada, the 2009 Bill C-353 was introduced as an 'Act to prohibit the release, sale, importation and use of seeds incorporating or altered by variety- genetic use restriction technologies (V-GURTs)',
- The first session of the FAO Panel of Eminent Experts on Ethics in Food and Agriculture (2001b) unanimously stated that the 'terminator seeds are generally unethical, as it is deemed unacceptable to market seeds who's offspring a farmer cannot use again because the seeds do not germinate.
- Seed bill 2004 in India introduced a ban on GURT technology under section 18(2)¹⁴. If any kind or variety of seed containing Genetic use of restriction technology, which is harmful, or potentially harmful, shall not be registered.

- GURT (terminator) forbidden¹⁵: Breeders will have to submit an affidavit that the variety does not contain a Gene Use Restricting Technology (GURT) or terminator technology¹⁶.
- Under The Protection of Plant Varieties and Farmers' Rights Act, 2001 section 29(3)¹⁷, excluded the GURT technology variety.

Enforcement mechanism against GURTS

- Under the Seed bill 2004 section 38(3)¹⁸, If any person imports, stocks or exhibits for sale or barter, or otherwise supplies any seed of any kind or variety without a certificate of registration its held to be punishable.
- Whereas under The Protection Of Plant Varieties And Farmers Right Act 2001, if any person is falsely representing a variety as registered. It held punishable under Section 72 and further for the second time if the infringer commits, he will be held liable under section 73.
- According to Article 41 of the TRIPS Members shall ensure that enforcement procedures as specified are available under their law so as to permit effective action against any act of infringement of intellectual property rights covered by this Agreement, including expeditious remedies to prevent infringements and remedies which constitute a deterrent to further infringements. These procedures shall be applied in such a manner as to avoid the creation of barriers to legitimate trade and to provide for safeguards against their abuse.

¹⁴18. (1) Notwithstanding anything contained in this Act, no registration of any kind or variety of seeds shall be made under this Act, if prevention of commercial exploitation of such kind or variety is necessary to protect public order or public morality or human, animal or plant life and health, or to avoid serious prejudice to the environment.

(2) A kind or variety of seed containing any technology, which is harmful, or potentially harmful, shall not be registered.

Explanation.— For the purposes of this sub-section, the expression "technology" includes genetic use restriction technology and terminator technology.

¹⁵section 18(1)(c), The Protection of Plant Varieties and Farmers' Rights Act, 2001

¹⁶India's plant variety protection and Farmers' Rights Act, 2001, Suman Sahai, Gene Campaign, J-235/A, Sainik Farms, Khanpur, New Delhi 110 062, India.

¹⁷(3) Notwithstanding anything contained in sub-section (2) and sub-section (1) and (2) of section 15, no variety of any genera or species which involves any technology which is injurious to the life or health of human beings, animals or plants shall be registered under this Act. Explanation.—For the purposes of this sub-section, the expression "any technology" includes genetic use restriction technology and terminator technology.

¹⁸(3) If any person furnishes any false information relating to the standards of genetic purity, misbrands any seed or supply any spurious seed or spurious transgenic variety or sells any non-registered seeds he shall, on conviction be punishable with imprisonment for a term which may extend to six months or with fine which may extend to fifty thousand rupees or with both.