

Contents

Introduction	1
Chapter 1 Molecular Basis of Genetic Engineering	18
1.1 The concept and structure of gene	18
1.2 DNA replication	20
1.3 DNA transcription and its regulation	23
1.4 Post-transcription processing and regulation of RNA	24
1.5 Protein expression and its regulation	28
1.6 Restriction endonuclease	30
Chapter 2 Principles and Applications of Genetic Engineering	32
2.1 Important events in the history of the development of recombination DNA	32
2.2 Isolation of target genes	34
2.3 Recombinant	35
2.4 Vectors for genetic engineering	37
2.5 Plant transformation methods	39
2.6 Methods of developing transgenic animals	42
2.7 General process of GMO research and development	44
Chapter 3 Development of Transgenic Biotechnology	45
3.1 Development of transgenic plants	45
3.2 Studies of transgenic animals	49
3.3 The researches on genetically modified microbes	63
3.4 Genetic engineering vaccine	70
Chapter 4 Potential Health Risks from Genetically Modified Organisms ...	76
4.1 Commercial production status of genetically modified food	77
4.2 The exposure of DNA	79
4.3 Potential risks of GM food to health	82
4.4 The scheme of risk assessment of genetically modified food	87
Chapter 5 The Potential Ecological Risk of Genetically Modified Organisms ...	90
5.1 Impact of GMOs on the ecological environment	90

5.2	Horizontal gene flow – biosafety concern for recombinant DNA	95
5.3	Vertical gene flow - theoretical foundation of alien gene escape	98
Chapter 6	Risk Assessment of GMO: Methods and Cases	110
6.1	Principle and methods of genetically modified organisms risk assessment	110
6.2	Risk assessment of the genetically modified crops	113
6.3	Risk assessment of the genetically modified food crops	121
6.4	Risk assessment of the genetically modified forests	126
6.5	Risk assessment of the genetically modified microorganism	128
Chapter 7	Risk Management for GMOs	129
7.1	The definition, goals and requirements of risk management	129
7.2	The theoretic foundation on GMOs risk management—Scientific Uncertainty	130
7.3	Principle of risk management—Precautionary principle	133
7.4	Practice of GMOs management—take EU as an example	139
Chapter 8	Detection and Monitoring of Transgenes	143
8.1	The significance and necessity of detection and monitoring of transgenes	143
8.2	Detective methods of transgenes	144
8.3	Immunology analysis of the proteins in GMOs	153
8.4	The detection method of transgenic microorganisms	155
8.5	The uniform standards of the GMO detection experiment	156
8.6	Environment monitoring of GMOs	158
Chapter 9	Biosafety International Law: Cartagena Protocol on Biosafety ...	165
9.1	The background of the Protocol	166
9.2	The basic principles of biosafety protocol	169
9.3	Main contents of biosafety protocol	173
9.4	The negotiation progress after Biosafety Protocol	181
Chapter 10	Biosafety Legislations in Some Countries	192
10.1	Biosafety legislation in European Union	192
10.2	Biosafety legislation in the United States	198
10.3	Biosafety legislation in Japan	201
10.4	Biosafety legislation in India	206
10.5	Biosafety legislation in Brazil	211
10.6	Biosafety legislation in Australia	214
Chapter 11	Framework of China's Biosafety Policies, Regulations and System ...	217
11.1	Policy framework of biosafety in China	217
11.2	Current laws and regulations on GMO biosafety in China	224
11.3	Management system and implementation procedures of GMOs	244

Chapter 12 Transboundary Movements and Labeling of Living Modified Organisms (LMOs)	254
12.1 Main contents of transboundary movements of LMOs	255
12.2 Negotiation process of transboundary movements of LMOs in the Protocol	257
12.3 Labeling requirements of LMOs and international tendency	264
12.4 Labeling of GMO in China	271
Chapter 13 Damage Liability and Redress in Biosafety Law	279
13.1 Principles and mechanisms of international environmental damages legislation	279
13.2 International negotiations on biosafety damage liability and redress	281
13.3 Proposed principles of international biosafety damages legislation	286
13.4 Proposed mechanisms in international biosafety damages legislation	288
13.5 Biosafety damages legislation of some countries and regions	291
13.6 China's legislation on biosafety damages and its impacts	293
Chapter 14 Socio-Economic Impacts of GMOs	298
14.1 Attention by the international society to the socio-economic impacts of GM crops	298
14.2 Types of social—economic impact of GMOs	304
14.3 Relationship between Biosafety Protocol and TWO	311
14.4 Possible Impact of Safety Management on the International Trade	317
Chapter 15 Emergency Management for Biosafety	329
15.1 Theoretical analysis	329
15.2 International law and the management of GMOs	331
15.3 National laws	335
15.4 Emergency management of GMOs safety in China	338
15.5 Improvement of emergency management of GMOs safety in China	340
Chapter 16 Public Education and Participation on Biosafety	346
16.1 Requirements of international environmental laws and regulations	347
16.2 Status quo of public awareness on GMO biosafety	351
16.3 National laws and regulations and requirements of public participation	362
16.4 Barriers and demands of public participation of biosafety in China	365
16.5 Establish mechanism of public participation in biosafety	368
References	374