



# Biotechnology Use and Development Survey - 1999

### Confidential when completed

Collected under the authority of the Statistics Act, Revised Statutes of Canada, 1985, c. S-19. Completion of the questionnaire is a legal requirement under the Statistics Act.

Si vous préférez ce questionnaire en français, veuillez cocher



### Survey Purpose

Statistics Canada is undertaking this survey in support of the Canadian Biotechnology Strategy. The purpose is to produce information about firms engaged in biotechnology activities by addressing the following question. What are the characteristics and activities of firms that use or develop biotechnology as an important part of their firm's activity?

Biotechnology is a dynamic emerging sector of the Canadian economy and its impact has the potential to be felt through all parts of Canadian society. An accurate understanding of biotechnology requires comprehensive data. Information from this survey may be used by businesses for economic or market analysis, by trade associations to study industry performance, government departments and agencies to assist policy formation, and the academic community for research purposes. Statistics Canada will create a database combining survey responses with existing Statistics Canada data records. **An executive summary of the results will be sent to all respondents.**

Please report on Canadian biotechnology activities of your firm. Complete a separate questionnaire for each firm engaged in biotechnology activity in Canada.

### Authority

Collected under the authority of the Statistics Act, Revised Statutes of Canada, Chapter S19. Completion of this questionnaire is a legal requirement under the Statistics Act.

### Confidentiality

Statistics Canada is prohibited from publishing or releasing any statistics that would divulge information obtained from this survey that relates to any identifiable firm without the previous written consent of that firm. The data reported in this questionnaire will be treated in strict confidence, used for statistical purposes and released in aggregate form only. The confidentiality provisions of the Statistics Act are not affected by either the Access to Information Act or any other Legislation.

**If you require assistance in the completion of the questionnaire or have any questions regarding the survey, please contact:**

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**Please indicate the name of the person completing this form so we know who to contact should we have questions about this report.**

Name	Title
Telephone Number <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/>	Email
Fax Number <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/>	

1 Biotechnologies						
1. Please review the following list of biotechnologies and check the applicable circle or circles.						
Biotechnologies	Currently Used in Operations	If currently using, do you use them for			Number of Years in Use	If No ↓ Do you plan to use within 3 years
		Product/Process Research & Development	Current Production	Environmental Purposes		
	0	1	2	3	4	5
<b>DNA Based</b>						
1110 Gene Probes/DNA Markers	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1120 Bio-Informatics	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1130 Genomics/Pharmacogenetics	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1140 Genetic Engineering/DNA Sequencing/Synthesis/Amplification	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Biochemistry/Immunochemistry</b>						
1150 Vaccines/Immune Stimulants	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1160 Drug Design & Delivery	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1170 Diagnostic Tests/Antibodies	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1180 Peptide/Protein Sequencing/Synthesis	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1190 Cell Receptors/Signalling/Pheromones/Structural Biology	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1200 Combinatorial Chemistry/3D Molecular Modelling	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1210 Biomaterials	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1220 Microbiology/Virology/Microbial Ecology	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Bioprocessing Based</b>						
1230 Cell/Tissue/Embryo Culture Manipulation	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1240 Extraction/Purification/Separation	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1250 Fermentation/Bioprocessing/Biotransformation/Natural Products Chemistry	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Environment</b>						
1260 Biobleaching/Biopulping/Biobleaching/Biodesulphurization	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1270 Bioremediation/Biofiltration/Phytoremediation	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
<b>Other (please specify)</b>						
1280	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No
1290	<input type="radio"/> Yes → <input type="radio"/> No	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>	<input type="radio"/> Yes <input type="radio"/> No

→ If you use at least one of the biotechnologies in Question 1 go to Question 3.

→ If you don't use any of the biotechnologies listed in Question 1 go to Question 2.

**2 Barriers to Using Biotechnologies**

2. Rate the following factors' influence on your firm's decision **not** to use biotechnology. Use the following scale where 1 is low importance and 5 is high importance. Indicate if not applicable to your firm.

		Importance					Not Applicable
		Low				High	
		1	2	3	4	5	0
<b>Lack of Financial Justification</b>							
2100	Small market size	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2110	High cost of equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2120	High cost to implement/integrate biotechnology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2130	Cost of capital	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Human Resources</b>							
2140	Shortage of skilled or trained staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2150	Worker resistance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2160	Increased labour costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>External</b>							
2170	Government regulations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2180	Public acceptance/perception of biotechnology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Technology</b>							
2190	Biotechnology not sufficiently developed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2200	Lack of external technical expertise/support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Other (please specify)</b>							
2210		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**If you are not using any biotechnology, please stop here.**  
 Please return the questionnaire in the return prepaid envelope.  
 Thank you for your co-operation

### Information Sources on Biotechnology

3. Rate the importance of the following sources of information on biotechnology as used by your firm. Use the following scale where 1 is low importance and 5 is high importance. Indicate if not applicable to your firm.

Sources of Information on Biotechnology	Importance					Not Applicable 0
	Low 1	2	3	4	High 5	
3100 Internal resources/staff or parent/subsidiary firm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3110 Academic journals/trade publications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3120 Universities/colleges/private training institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3130 Federal government department/agency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3140 Personal contact with others (tacit knowledge)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3150 Other companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3160 Provincial government department/agency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3170 Professional/industry associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3180 Library/literature search	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3190 Database retrieval services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3200 Conferences/workshops/trade shows	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3210 Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Benefits from Using Biotechnology

4. a) Does your firm use biotechnology in its production or processing operations?

4100  No → Go to Question 5.

Yes



- b) Rate the benefits from using biotechnologies in your firm's production or processing operations. Use the following scale where 1 is low importance and 5 is high importance. Indicate if not applicable to your firm.

Benefit of Using Biotechnology	Importance					Not Applicable 0
	Low 1	2	3	4	High 5	
<b>Productivity Improvement</b>						
4110 Lower labour costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4120 Lower capital costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4130 Lower energy costs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Product Improvement</b>						
4140 Develop new products or processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4150 Extend product range	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4160 Improvement in product quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Plant Organization</b>						
4170 Increase production flexibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4180 Lower maintenance expenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4190 Cleaner production/pollution reduction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Market Performance</b>						
4200 Improve market position	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4210 Increase sales	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4220 Reduced time to market/Faster delivery time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Other (please specify)</b>						
4230	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Human Resources**

**For the purposes of this survey Employees are defined as those workers for whom you completed a Revenue Canada T4-Statement of Remuneration Paid Form for the 1999 tax year. Include working owner(s). Do not include students.**

5. a) How many employees does your firm currently employ?  5100
- b) How many employees have biotechnology-related responsibilities?  5110

c) In the table below provide the number of biotechnology employees. Class the employee by their primary area of responsibility. For example, a person working 60% of their time on biotechnology research would be counted once as mainly working in scientific/research direction.

Position	Number Currently Employed		
	Working full-time on biotechnology (more than 50% of time) 1	Working part-time on biotechnology (less than 50% of time) 2	Estimated number to be employed in biotechnology in 2002 3
<b>Biotechnology R&amp;D Activities</b>			
5120 Scientific/Research Direction			
5130 Technicians/Engineering			
5140 Regulatory/Clinical Affairs			
<b>Biotechnology Administration &amp; Production</b>			
5150 Production			
5160 Finance/Marketing			
5170 Management/Licensing/Administration			

d) Does your firm currently have unfilled full time biotechnology-related positions?

- 5180  No → Go to Question 5 e)
- Yes ↓

Position	If Yes, was the reason due to			
	Number of Unfilled Full-Time Positions 1	Lack of qualified candidates 2	Compensation required by qualified candidates too high 3	Other 4
<b>Biotechnology R&amp;D Activities</b>				
5190 Scientific/Research Direction		<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3
5200 Technicians/Engineering		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5210 Regulatory/Clinical Affairs		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Biotechnology Administration &amp; Production</b>				
5220 Production		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5230 Finance/Marketing		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5240 Management/Licensing/Administration		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

e) Does your firm employ (either paid or unpaid) post-secondary students in biotechnology-related activities? Include co-op placements, part-time, and full-time positions.

5250  No → Go to Question 5 f)

Yes → What level of education? →

1  Technical/Trade/College  
 2  Undergraduate level  
 3  Graduate level

f) Does your firm contract out any of the following biotechnology-related activities?

Biotechnology Activity	No	Yes	If yes, what is the value (in \$000) of contracts in 1999? If more than one what is the total value?
	0		1
5260 Research & Development	<input type="radio"/>	<input type="radio"/> →	\$ _____,000
5270 Regulatory/Clinical Affairs	<input type="radio"/>	<input type="radio"/> →	\$ _____,000
5280 Marketing/Distribution	<input type="radio"/>	<input type="radio"/> →	\$ _____,000
5290 Management/Licensing/Administration	<input type="radio"/>	<input type="radio"/> →	\$ _____,000

### 6 Recruiting Practices

6. Check any of the following methods used to fill biotechnology-related positions.

- 6000
- 1  Internet resources  
 2  University recruitment  
 3  Use under-qualified staff  
 4  Temporary/contract staff  
 5  Employment agencies  
 6  In-house training
- 7  Use over-qualified staff  
 8  Networking  
 9  Newspaper/journal ads  
 10  Professional associations  
 11  Other (please specify) \_\_\_\_\_  
 \_\_\_\_\_

7. a) Did you attempt to hire biotechnology staff from outside Canada in 1999?

6100  No → Go to Question 7 c)

Yes → From where? →

1  USA  
 2  Europe  
 3  Asia  
 4  Latin America  
 5  Other

b) Were you successful in hiring biotechnology staff from outside Canada?

6120  No

Yes → How many biotechnology staff did you hire from outside Canada in 1999? 1

c) Did biotechnology personnel leave your firm in 1999?

6130  No

Yes → How many? 1

### 7 Product/Process Development

8. a) Is your firm currently **developing product** that **requires** the use of biotechnologies?

7000  Yes

No

8. b) Is your firm currently **developing** processes that **requires** the use of biotechnologies?

- 7110  Yes  
 No

c) Does your firm consider biotechnology central to its activities?

- 7120  Yes  
 No

Did you answer "Yes" to any part of Question 8?

- 7130  Yes → Go to Question 9  
 No → Please stop here. Return the questionnaire in the prepaid return envelope. Thank you for your cooperation.

**8 Biotechnology Products**

9. Please provide the **number** of biotechnology products or processes your firm has at each stage of development.

Biotechnology Sector	Number of biotechnology products/processes by development stage			
	Research & Development 0	Pre-clinical trials/ Confined field trials 1	Regulatory phase/ Unconfined release assessment 2	Approved/ On market/In production 3
<b>Human Health</b>				
8110 <b>Diagnostics</b> (e.g. biosensors, immunodiagnosics, gene probes)				
8120 <b>Therapeutics</b> (e.g. vaccines, immune stimulants, biopharmaceuticals, rational drug design, drug delivery, combinatorial chemistry)				
<b>Agriculture Biotechnology</b>				
8130 <b>Plant Biotechnology</b> (e.g. tissue culture, embryo-genesis, genetic markers, genetic engineering)				
8140 <b>Animal Biotechnology</b> (e.g. diagnostics, therapeutics, embryo transplantation, genetic markers, genetic engineering)				
8150 <b>Non-food Agriculture</b> (e.g. fuels, lubricants, commodity and fine chemical feedstocks, cosmetics)				
<b>Natural Resources</b>				
8160 <b>Energy</b> (e.g. microbiologically enhanced petroleum recovery, industrial bioprocessing, biodesulphurization)				
8170 <b>Mining</b> (e.g. microbiologically enhanced mineral recovery, industrial bioprocessing, biodesulphurization)				
8180 <b>Forest Products</b> (e.g. biopulping, biobleaching, biopesticides, tree biotechnology, industrial bioprocessing)				
<b>Environment</b>				
8190 <b>Air</b> (e.g. bioremediation, diagnostics, phytoremediation, biofiltration)				
8200 <b>Water</b> (e.g. biofiltration, diagnostics, bioremediation, phytoremediation)				
8210 <b>Soil</b> (e.g. biofiltration, diagnostics, bioremediation, phytoremediation)				

**Biotechnology Products**

Biotechnology Sector	Number of biotechnology products/processes by development stage			
	Research & Development 0	Pre-clinical trials/ Confined field trials 1	Regulatory phase/ Unconfined release assessment 2	Approved/ On market/In production 3
<b>Aquaculture</b>				
8220 Fish health, broodstock genetics, bioextraction				
<b>Bioinformatics</b>				
8230 <b>Genomics &amp; molecular modelling</b> (e.g. DNA/RNA/protein synthesising & databases for humans, plants, animals, and micro-organisms)				
8240 <b>Gene therapy</b> (e.g. gene identification, gene constructs, gene delivery)				
<b>Food Processing</b>				
8250 <b>Bioprocessing</b> (e.g. using enzymes and bacteria culture)				
8260 <b>Functional Foods/Nutraceuticals</b> (e.g. probiotics, unsaturated fatty acids)				
<b>Other (please specify)</b>				
8270				
8280				

**9 Cooperative/Collaborative Arrangements**

10. Was your firm involved in biotechnology-related **cooperative/collaborative arrangements** with other companies or organizations in 1999?  
**Cooperative and collaborative arrangements** involve the active participation in projects by your company and other companies or organizations in order to develop and/or continue work on new or significantly improved biotechnology processes, products and/or services. Pure contracting-out is not regarded as collaboration.

- 9100  No → Go to question 13
- Yes → How many? →  1

11. Please indicate for which purposes. Check any that are applicable.

Arrangement Purpose	
9110 To conduct research & development (R&D)/ Access to specialized inputs	<input type="radio"/>
9120 Regulatory affairs	<input type="radio"/>
9130 To access knowledge/skills/critical expertise	<input type="radio"/>
9140 Prototype development/production/manufacturing	<input type="radio"/>
9150 Access markets/distribution channels	<input type="radio"/>
9160 Access to capital	<input type="radio"/>
9170 Intellectual Property Protection	<input type="radio"/>
9180 Other (please specify)	<input type="radio"/>



12. Check collaboration/co-operation arrangements by each type and their geographic location.

Partner Category	Canada 0	USA 1	Europe 2	Latin America 3	Asia 4
9190 A firm of smaller or equal size	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9200 A larger firm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9210 Government department/agency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9220 University/Hospital/Research network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9230 Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Would you describe your firm as a 'spin-off'?

**A Spin-off** is defined as a new firm created to transfer and commercialize inventions and technology developed in universities, firms or laboratories.

9240  No → Go to Question 14

Yes → Was your firm a spin-off from; →

- 1  University/hospital
- 2  Another company
- 3  Government agency/lab
- 4  Other (please specify)

**10 Obstacles to Biotechnology Commercialization**

14. Rate the following **obstacles to advancement of biotechnology commercialization** activities in your firm. Use the following scale where 1 is low importance and 5 is high importance. Indicate if not applicable to your firm.

	Importance					Not Applicable 0
	Low 1	2	3	4	High 5	
<b>Inputs</b>						
10100 Access to capital	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10110 Access to technology/information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10120 Access to human resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Markets</b>						
10130 Domestic market too small	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10140 Lack of access to international markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10150 Transportation regulations on biotechnology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10160 Lack of distribution & marketing channels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Constraints</b>						
10170 Public perception/acceptance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10180 Regulatory requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10190 Time/cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10200 Patent rights held by others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10210 Lack of patent protection for plants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10220 Lack of patent protection for animals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10230 Lack of patent protection for human components (e.g., organs, tissues)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10240 Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**11 Patents**

15. a) How many patents and/or pending patents does your firm currently have in each region. (Indicate '0' if none).

		Geographic Location					
		None 5	Canada 0	USA 1	Europe 2	Latin America 3	Asia 4
11100	Existing patents						
11110	Pending patents						

b) Please indicate the number of **patent applications** your company submitted to the following Patent Offices. (Indicate '0' if none)

11120 Patent Office/Year	1998	1999
11130 Canadian Intellectual Property Office (CIPO)	0	1
11140 United States Patent & Trademark Office (USPTO)		
11150 European Patent Office (EPO)		
11160 Other (please specify)		

c) Please indicate the number of applications for **plant breeders' rights** your company submitted. (Indicate '0' if none)

Patent Office/Year	1998	1999
11170 Canadian Plant Breeders' Rights Office	0	1
11180 Plant Variety Protection Office, USDA		
11190 Community Plant Variety Office, EU		
11120 Other (please specify)		

**12 Intellectual Property**

16. During the last two years, 1998-1999 did your firm **grant the right to use intellectual property** to another firm or did your firm **acquire the right to use intellectual property** from another firm?

12190  No → Go to Question 17

Yes → Please indicate the type and direction of such intellectual property transfer.

Intellectual Property	Granted Rights to Canadian Firms 0		Granted Rights to Foreign Firms 1		Acquired Rights from Canadian Firms 2		Acquired Rights from Foreign Firms 3	
	Yes	No	Yes	No	Yes	No	Yes	No
12110 Trade Secrets/Licensing Agreements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12120 Patents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12130 Plant breeders' rights	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Revenues, Expenditures & Trade**

17. Please provide financial details in the following table. Please report for fiscal years and in thousands of dollars (\$,000's). Indicate "0" if none

	Please provide details in \$,000's for the years		What is your forecast for 2002
	1998	1999	2002
	0	1	2
13100 Total Firm Sales/Revenue	\$ ,000	\$ ,000	\$ ,000
13110 % of Total Sales/Revenue From Biotechnology	%	%	%
13120 Total R&D Spending	\$ ,000	\$ ,000	\$ ,000
13130 % of R&D Spending on Biotechnology R&D	%	%	%
13140 Total Exports (including licensing agreements)	\$ ,000	\$ ,000	\$ ,000
13150 % of Exports from Biotechnology	%	%	%
13160 Total Imports	\$ ,000	\$ ,000	\$ ,000
13170 % of Imports from Biotechnology	%	%	%

18. If your firm **exported** biotechnologies, what percentage (%) of biotechnology **exports** went to the following geographic locations in 1999? Include licensing agreements. What is your forecasted distribution for 2002?

Year	Geographic Location				
	Canada	USA	Europe	Latin America	Asia
	0	1	2	3	4
13180 1999					
13190 Forecast for 2002					

19. If your firm **imported** biotechnologies, what percentage (%) of biotechnology **imports** came from the following geographic locations in 1999? Include licensing agreements. What is your forecasted distribution for 2002?

Year	Geographic Location				
	Canada	USA	Europe	Latin America	Asia
	0	1	2	3	4
13200 1999					
13210 Forecast for 2002					

20. a) Did your firm attempt to raise capital for biotechnology in fiscal year 1999?

- 13220  No → Go to Question 20 c)  
 Yes

b) Were you successful in raising capital?

- 13230  No → Go to Question 20 c)  
 Yes → How much did you raise? → \$ \_\_\_\_\_,000  
 (in thousands)

Indicate the sources of capital and the percentage (%) of total capital that source provided in 1999.

Source	% of Total Capital
13240 Angel investors/family/friends	
13250 Government loans/grants/incentives	
13260 Venture Capital funds	
13270 Conventional sources (i.e. banks)	
13280 Initial Public Offering (IPO)	
13290 Collaborative alliance	
13300 Other (please specify)	
<b>TOTAL</b>	<b>100%</b>

20. c) Does your firm plan to raise capital in 2002?

13310  No → Go to Question 21

- Yes → How much do you plan to raise in 2002? →
- 1  Less than \$500,000
  - 2  \$500,000 to \$5,000,000
  - 3  More than \$5,000,000

21. In the past 5 years did your firm apply for the tax benefit for biotechnology related activities under the R&D (SRED) tax program?

13320  No → Why? → 1  Complexity of application process

2  Uncertainty of eligibility

3  Did not meet eligibility requirements

4  Other (please specify) \_\_\_\_\_

Yes

22. Does your firm use the Internet?

13330  No → Go to Question 23

Yes → Indicate for what purposes your firm uses the Internet.  
(Check any that are applicable.)

1  Sharing research & development

2  Marketing/selling

3  Purchasing goods and services

4  Accessing databases/information sources

5  E-commerce

6  Human resource search

7  Public relations

8  General communication

9  Other (please specify) \_\_\_\_\_

23. Which of the following strategies did your firm use in 1999?

(Check any that are applicable)

13400 1  Refocused product development

2  Downsized

3  Increased size

4  Entered product trials

5  Launched new product

6  Acquired a company

7  Out-source production

8  Licensed in technology

9  Licensed out technology

10  Merged with other company

11  Formed a joint venture

12  Expanded into foreign markets

13  No change

14  Other (please specify)

#### Comments

14100

If you have any comments regarding this survey, please provide them in the space below.

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**Thank you for your co-operation**  
**Please return the questionnaire in the return prepaid envelope.**