

IICA-Canada Short Term Action
"Networking Canada and LAC Biotechnology Research Centres and Industries"

(IICA's Letter of Agreement NRC/CA-244)



**REPORT OF THE
EXPERT MISSION TO BIOLATINA '98**

October 20 to 23, 1998

**Presented to the Inter-American Institute for Cooperation in Agriculture,
Bureau of Canada (IICA-Canada)**

By BIOTECCanada (formerly the Canadian Institute of Biotechnology)

Ottawa, February 1999

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1. Background

On July 31, 1998, the Canadian Bureau of the Inter-American Institute for Cooperation in Agriculture-IICA, sent a letter of agreement to BIOTECCanada to sponsor the organization of a Canadian Expert Mission to participate in BIOLATINA '98, the 3rd Latin American Meeting on Industrial Biotechnology, which took place in Rio de Janeiro, Brazil, on October 20-23, 1998. BIOLATINA '98 was conceived as an international meeting focusing on science-industry bi-linkages in Latin American markets, with particular emphasis on the promotion of business and strategic alliances. The event was jointly organized by the Latin American Federation of Bio-Industry Associations (FELAEB), and the Brazilian Association of Biotechnology Enterprises (ABRABI).

The mission members were Ms. Joyce Groote, President of BIOTECCanada, Dr. Murray McLaughlin, President of Ontario Agri-Food Technologies-OAFT, and Dr. Javier Verastegui, Coordinator Latin America at BIOTECCanada. The mission's objectives and sponsorship of IICA-Canada was widely disseminated in Canada through our BIOTECCanada Fax of August 6, 1998 (see copy attached).

2. The Conference

Under the general coordination of Dr. Antonio Paes de Carvalho, President of ABRABI, BIOLATINA '98 was held at the São Conrado Intercontinental Hotel in Rio de Janeiro, from October 20th to 23rd. Plenary sessions, simultaneous sectoral symposia (Health Care, Agriculture, Environment), sessions on business opportunities, and a permanent exhibition were developed during the week (see attached latest version of the program). More than 200 persons attended the whole event.

Dr. Luis Antonio Barreto de Castro, President of CTNBio (National Biosafety Technical Commission of Brazil) chaired the Opening Session, with the participation of representatives of the Chamber of Deputies of Brazil, FELAEB, Foundation FIOCRUZ, Foro Argentino de Biotecnologia, ABRABI and BIOTECCanada (Ms. Joyce Groote). Mr. Aroldo de Oliveira, President of the S&T Commission at the Chamber of Deputies, represented Senator Marco Maciel, Vice-President of Brazil, who could not participate as expected. Ms. Joyce Groote thanked IICA-Canada for financially supporting the Canadian Expert Mission (each mission member did the same when they introduced their presentations).

Dr. Barreto's Opening Conference on "Biotechnology, Bioethics and Biosafety: Brazilian and International Experience", focused on the agricultural sector. For instance, the reasons why Brazil did not make any progress on the development and commercialization of transgenic crops have been: lack of patents & biosafety legislation & regulations; 2 decades of high inflation with the high cost of money and venture capital; and insufficient effort in S&T and insufficient number of qualified scientists. Dr. Barreto mentioned that this situation has recently changed: (a) new modern laws and regulations for patents, cultivars, biosafety; (b) research on genome sequencing (citrus bug, sugarcane); and (c) creation & development of CNTBio as a unique commission for all bioproduct sectors. Two bioproducts have already been authorized for

commercial use, including Monsanto's RoundReady herbicide-resistant soybean. Some of the current issues at CNTBio include: labelling transgenic crops; imports and illegal entry of transgenic soybean in Brazil; involving the local industry in the effort of creating awareness about the benefits of duly bio-regulated transgenic plants. Both Joyce Groote and Javier Verastegui have established solid relationships with Dr. Barreto for future common endeavours.

3. Canadian Presentations

Ms. Joyce Groote made a presentation on "*Canadian Biotechnology: A Success Story*", at the Agricultural Session "Genetically modified organisms in nature and food: regulation and management of perceived risks and benefits", on Thursday, October 22nd. Joyce presented an overview of the community infrastructure put in place and the key issues for the development of biotechnology industry in Canada. She discussed the status and role of government, industry, academia, the financial community and industry associations; as well as regulatory policy, communications, human resources and social/ethical issues. Regarding the biosafety issue, Joyce outlined the negotiations at the International Biosafety Protocol under the U.N. Biodiversity Convention, and recommended steps forward for government and industry alike. She also stressed the need for an international industry position at Biosafety Protocol regarding the future trade of all living modified organisms, especially agri-food bioproducts, that is both reasonable and achievable. Finally, Joyce discussed the strategy for public awareness and information involving the participation of all stakeholders in the biotechnology community. An animated debate followed with the participation of Dr. Luis Antonio Barreto de Castro (CNTBio), and 4 Brazilian panelists from the government (EMBRAPA), research (FIOCRUZ), industry (AgrEvo) and NGOs (ASTB). The summary and overheads of Joyce's presentation are attached in Annex.

Dr. Murray McLaughlin presented the paper "*Agricultural Biotechnology: the Canadian Experience*", at the Agricultural Session "Impact of transgenesis on the crop culture and commercialization of agricultural commodities", on Thursday, October 22nd. Murray presented an overview of the Canadian agriculture and biotechnology applications in the agriculture and agri-food sector, including animal husbandry, forestry and aquaculture. Besides biosafety and IPR regulations, he highlighted the important role of governments (federal and provincial) in technology transfer, information dissemination, networking and partnering promotion. A number of Canadian agri-biotechnology initiatives were briefed, with particular emphasis on the experience of Saskatchewan (Ag-West Biotech) and Ontario (OAFT) provinces. Finally, he described the farm scene in Canada and the key factors for competitiveness and success in the global market place, which open wide opportunities for agri-biotechnology. A general debate followed (no panelists). A copy of Murray's paper is attached in Annex.

Dr. Javier Verastegui made a presentation on "*Building Strategic Alliances in Biotechnology: CamBioTec*", at the Business Opportunities session of Friday, October 23rd. Javier explained how Canada has become a world leader in biotechnology, and why strategic alliances have been an important issue for the development of biotechnology industries. He described the motivation and processes involved in their development. Based on the rapid penetration of transgenic crops in Canada and Argentina, Javier outlined the excellent opportunities and potential benefits derived from strategic alliances between Canadian and Latin American biotechnology firms.

Then he described BIOTECCanada's international activities, the mission and structure of the CamBioTec network, and the tools CamBioTec use to promote strategic alliances. An analysis of the types and sectors where CamBioTec has brokered alliances was presented, together with the outline of some cases of successful Canadian-Latin American alliances. An animated debate followed with the participation of Brazilian entrepreneurs and researchers. The summary and overheads of Javier's presentation is attached.

Furthermore, Joyce, Groote and Javier Verástegui participated in a general presentation about BIOTECCanada and CamBioTec activities, within the "Business Opportunities" session of Wednesday, October 21st. An informal discussion with interested participants followed on what type of mechanisms are in place to promote partnerships between Brazilian and Canadian biotechnology firms (such as joint research, technology transfer, training, commercialization, joint marketing, trade missions, information exchange, etc). BIOLATINA '98 has indeed facilitated the partnering contacts meetings for the Canadian mission.

4. Partnering Contacts

Taking advantage of the high profile assigned to the Canadian mission and of the permanent exhibition, the three members of the Canadian mission performed intense partnering activities with representatives of 26 Brazilian and Latin American institutions and firms (see list of contacts in Annex). A summary of contacts and potential collaboration areas is shown below:

- a) Several Brazilian institutions were most interested in the Canadian expertise on biosafety regulations for agri-food bioproducts: ABRABI, FIOCRUZ, UFRJ, BIOMINAS, EMBRAPA. Other CENARGEN-EMBRAPA representatives in Brasilia could not attend the meeting because of last-minute budget restrictions; however they are quite interested to collaborate with Canada in the biosafety issue. We had the opportunity to discuss briefly this issue with Dr. Luis A. Barreto de Castro, Secretary of CNTBio, and he was open to consider any proposal on this issue. A biosafety capacity building program may be one possibility to join efforts of BIOTECCanada, CIDA (through its Technology Transfer Fund for Brazil), IICA-Canada, IICA-Brazil, as well as those of CTNBio (Brazil) and the Canadian biosafety regulation agencies, especially the Canadian Food Inspection Agency-CFIA. A long negotiation with CIDA should be expected (1 year). A separate IICA-Canada mini-project may help to start exchanges, for example, the visit of a Canadian mission of biosafety experts to the above indicated institutions, in order to identify specific needs for the design of a long term collaboration program. This area is of capital importance for BIOTECCanada, as it responds to the export strategies of the Canadian bio-industry.
- b) A second area of interest was Canadian tree biotechnology expertise. Representatives from TECNOPLANT(Argentina) and the University of Viçosa (MG, Brazil) requested contacts with transgenic tree experts from the Canadian Forest Service (CFS) and with firms producing biofertilizers and biological control products. CamBioTec and BIOTECCanada has developed strong working relationships with CFS experts. A specific training event in Brazil could be a possible mini-project for IICA-Canada, with the collaboration of BIOTECCanada to coordinate and organize the event.

- c) A third area of potential interest would be genomics. FAPESP, a funding agency of the government of Sao Paulo State, has funded the biggest scientific project ever developed in Brazil (US\$12M): Projeto Genoma-FAPESP. The goal of the project is to determine the complete genetic sequence of *Xylella fastidiosa*, a bacteria causing Chlorose in citrus, a pest responsible for the most important losses in the state citrus production, and which is now propagating into coffee cultures. Since November 1997, scientists from 30 Brazilian laboratories are working in the project and expect to complete the genetic sequence by May 2000. The exchange of some key Canadian and Brazilian scientists currently involved in genomics would be desirable, with the eventual support of IICA-Canada.
- d) Finally, some firms showed interest on the Canadian enzyme technology. Requests from BIOBRAS and ENZITEC (private Brazilian firms) to access technical and commercial information about Canadian developments on trypsin, chemotrypsin and other enzymes. These requests have been channelled to Canadian INOVATECH a specialized firm in B.C. In this area, IICA-Canada may consider a mini-project to organize a Canadian business & expert mission to Brazil.

5. Highlights of the Exhibition

The mission members visited almost all booths (18). Those firms and institutions which showed interest for potential collaboration with Canadians have been browsed in point 4, and are listed in the annex. The mission members consider that some of them are the most promising partners in Brazil:

- **ABRABI:** it is the national association of biotechnology firms; strong links have been established with Canada.
- **BIOMINAS:** a promotional foundation for biotechnology development in Minas Gerais state. Its members include BIOBRAS and other important agri-biotech firms.
- **BIO RIO:** an incubator biotechnology park at the campus of Federal University of Rio de Janeiro, hosts several SME agri-biotech enterprises.
- **CTNBio:** the national technical committee for biosafety regulations in Brazil; key institution to consider in any biosafety collaboration with Canada.
- **Foundation Andre Tosello:** a foundation to promote biodiversity research and conservation in Campinas, state of Sao Paulo.
- **FAPESP:** a foundation sponsored by the state of Sao Paulo to promote innovation and high technology development, they are funding the Genoma-FAPESP project, the biggest scientific effort ever in Brazil.

- **FIOCRUZ:** a foundation in Rio de Janeiro promoting modern biotechnology applications to human and animal health care (animal vaccines and diagnostics). It is strongly involved in biosafety issues having developed a databases and a CD on "Biosafety at the Laboratory" in Portuguese (a copy was donated to BIOTECCanada to explore interest in translation & dissemination to other countries).

6. Conclusions & Recommendations

- a) The BIOLATINA'98 conference was a successful one. The most important Brazilian enterprises, foundations, research institutions and agencies have participated. There was a limited number of foreign participants, with the exception of Argentineans. Overall, the number of attendants was not as many as expected because of the economic crisis of Brazil and Latin America.
- b) The Canadian Expert Mission sponsored by IICA-Canada has been able to achieve its objectives:
 - i. to disseminate the Canadian experience in biotechnology development, with emphasis in the agricultural sector, and in international partnerships with Latin American firms;
 - ii. to establish institutional/personal links with key institutions and firms of Brazil; and
 - iii. to identify potential areas for Canada-Brazil collaboration in agricultural biotechnology.
- c) The nature and level of contacts established in Brazil (ABRABI, CTNBio) has already been fruitful for BIOTECCanada for its international campaign to promote a common bio-industry position at the International Biosafety Protocol, the final version of which should be approved in Cartagena (Colombia) in February 1999.
- d) The knowledge of the Brazilian biotechnology status, and their main companies and institutions will certainly be of tremendous utility in the future to support BIOTECCanada's activities in the promotion of partnerships between Canadian and Brazilian firms.
- e) Based on the contacts available at BIOLATINA'98, the most suitable areas of Canada-Brazil collaboration are:
 - i. Capacity building on biosafety regulations and risk assessment & management.
 - ii. Scientific training on tree biotechnology.
 - iii. Scientific exchanges on genomics.
 - iv. Business and expert exchanges on enzyme technology.
- f) BIOTECCanada would be glad to participate in the development of some of the potential areas of Brazil-Canada collaboration, working together with IICA-Canada.

BIOTECCanada FAX

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General Interest

Our staff has changed

Jason Flint, previously the Special Projects Manager at BIOTECCanada, has left BIOTECCanada to start his own consulting business called BioIntel. The BIOTECCanada staff wishes Jason every success. New to BIOTECCanada is Sharon Dunn, a Research Assistant. Sharon is involved in preparing the State of the Industry Report and will provide secretariat support to BIOTECCanada's Ethics Committee.

Advertising in the State of the Industry Report

BIOTECCanada is preparing a report on the Canadian biotechnology industry based on the results of its 1998 Industry Survey, conducted by Statistics Canada in conjunction with Industry Canada, Agriculture & Agri-Food Canada, Ernst & Young, KPMG and Contact Canada. Advertising opportunities are available for interested organizations. The advertising close date is September 5th, 1998. For more information, contact Kathleen Vollrath at BIOTECCanada.

CBS Roundtable Summary

The Canadian Biotechnology Strategy (CBS) Task Force has released a summary report of the roundtable consultations that it held in March and April 1998. The report presents common themes which emerged from the consultations and summarizes the responses of participants to questions related to three key areas: Policy Framework, Proposed Advisory Body for Biotechnology, and Public Awareness and Participation. The report is available at the Task Force's website: <http://strategis.ic.gc.ca/cbs>.

UNEP's Regional Biosafety

Meeting

BIOTECCanada has been invited to help develop the Latin American Biosafety Training Workshop organized by UNEP. The workshop will take place in La Havana, Cuba, on October 26-30, 1998. Joyce Groot, BIOTECCanada President, and Dr. Murray McLaughlin, President of Ontario Agri-Food Technologies, will be presenting aspects of the interactions between the Protocol and the international trade of living organisms. For more information, please contact Javier Verastegui at BIOTECCanada.

Sharing Biosafety Expertise

As part of a CIDA Project, BIOTECCanada is coordinating one-month training internships in Canada for researchers, government regulators and administrators from Chile and Argentina. Four Chilean and four Argentinean trainees will visit Canadian regulatory agencies, agri-biotech firms and research centres for training in biosafety and risk assessment & management of transgenic plants and genetically modified organisms. Internships will begin in late September. Trainees will spend at least two weeks at CFIA, Health Canada and Environment Canada regulatory offices in Ottawa. In addition, Ag-West Biotech, AgrEvo Canada and the University of Guelph have agreed to host or place the trainees for 2 to 3 days each. If your company or institution is interested in being a host (1-2 days) for some trainees, please contact Javier Verastegui.

Mission to BIOLATINA '98

As a CamBioTec activity, and with the financial sponsorship from the Interamerican Institute for Cooperation in Agriculture-IICA (Canadian bureau), BIOTECCanada has organized an Expert Mission to BIOLATINA '98 in Rio de Janeiro, Brazil on October 20-23, 1998

(<http://alias1.abrabi.org.br/biolatina98/>).

The mission members (Joyce Groot, BIOTECCanada President; Murray McLaughlin, OAFT President; and Javier Verastegui, CamBioTec Coordinator at BIOTECCanada) will present an overview of agricultural biotechnology issues and will participate in a series of individual partnering meetings with Brazilian and Latin American reps from biotech associations, firms and R&D centres. Any Canadian organizations interested in participating, and for more information, please contact Javier Verastegui at BIOTECCanada.

Agriculture

"Take Note" Hearings

The World Trade Organization countries have committed to continuing the reform process in agricultural trade before the end of 1999. In preparation for these negotiations, the Canadian Standing Committee on Agriculture and Agri-Food will be holding "take note" hearings starting in October 1998, where industry stakeholders will be given an opportunity to express their views. Interested parties are invited to submit a brief to the Committee for consideration. Witness selection will be made in September. For more information, contact Room 822 Confederation Bldg, House of Commons, Ottawa, Ontario K1A 0A6, Tel: (613) 992-9223.

New ABIC Foundation

An international foundation has been established to ensure the ongoing success of the Agricultural Biotechnology International Conference (ABIC) series. The ABIC Foundation will be a non-profit corporation based in Saskatoon, Saskatchewan and headed by a Board of Directors with representation from seven countries. Profits from ABIC '98 will be used by the Foundation to seed future ABIC events and additional functions.



For more information, contact Mr. Peter McCann at Ag-West Biotech Inc. (Tel: 306-975-1939) or the ABIC website: www.lights.com/abic.

Health Care

New framework for HPB

The Health Protection Branch (HPB) will be revising the health protection laws in each of the core areas- legislation, science, surveillance, risk management, and program development. Two discussion papers for the consultations, *Health Protection For The 21st Century* and *Shared Responsibility, Shared Vision*, are now available from the HPB. The former document and more information is available on HPB's website: <http://www.hc-sc.gc.ca/hpb/transitn/index.html>. Six multi-stakeholder workshops are planned across the country in September and October. BIOTECANADA is participating in the first meeting to explain the objectives and consultation process.

New TPP Committee member

BIOTECANADA is pleased to announce that Dr. Luis Barreto has been appointed to the Therapeutic Products Program (TPP) Advisory Committee on Management. The next committee meeting will take place in Ottawa on August 23, 1998.

Regulatory Cooperation

The TPP and the U.S. FDA are negotiating a collaborative process for a cooperative agreement covering drug Good Manufacturing Practices. This agreement could potentially lead to the development of a more formal Mutual Recognition Agreement (MRA). On May 14, 1998, Canada and the European Community signed a MRA at the Canada-European Union Summit in London. The MRA should become active within the next 60 days.

Next APETI Meeting

The next meeting of the Advisory Panel on Electronic Transmission of

Information (APETI) is scheduled for September 15, 1998. The three main areas to be covered include: re-designing the website, the ESTRITest and TPSS Prototype user acceptability testing.

BIOTECANADA Presentation to TPP

On July 15, 1998, Joyce Groote presented the results of the BIOTECANADA/PMAC joint Biologics Working Group (BWG) report to different Bureaus at the Therapeutic Products Programme (TPP). The report analyzed the operations of the Bureau of Biologics and Radiopharmaceuticals and provided suggestions for meeting the current and future assessment demands for products of biological and biotechnological origin for the next 5 years. The following recommendations were presented:

1. Effective use of human resources for ongoing reviews such as: the use of the team approach for product reviews, "Submission fee rebate", target IND process;
2. Monitor pipeline products for planning the future workload: partner with other government departments/industry;
3. Canadian Biotechnology Strategy for increased resources: ensure sufficient regulatory resources, match expertise with new product requirements, train where gaps exist, communications-proactive approach for new products and technologies.

Ethics

International Code of Ethics

BIOTECANADA is leading a project to develop an International Code of Ethics for the biotech industry. Collaborating on its development are representatives from BIOTECANADA, Biotechnology Industry Organization (United States), EuropaBio (Europe), and the Japan Biotechnology Association. The working group hopes to broaden industry support to other countries in the future. For more information, contact Carole Bélanger at BIOTECANADA.

Environment

CamBioTec Workshops

As a CamBioTec activity, BIOTECANADA is co-organizing a series of two workshops on "Environmental Biotechnology and Clean Technology", to be held successively in Buenos Aires (Argentina) and Santiago (Chile) from September 28 to October 1, 1998. The event is sponsored by Environment Canada's Biotechnology Advancement Organization (the main financial sponsor), as well as UIA, SECYT, and FAB in Argentina, and CONAMA, COMCYT, and SOFOFA in Chile. Participation in these events offers excellent opportunities for business development in the Southern Cone. For more information, contact Javier Verastegui at BIOTECANADA.

New Substances Workshop

On September 23-24, 1998 the Industry Coordinating Group (ICG) for CEPA is holding a workshop in Toronto on "Notification of New Substances for the Canadian Marketplace". Industry experts and regulators from federal departments will guide the participants, step-by-step, through the process and pitfalls of filing a notification. Current issues and future trends will also be discussed, including forthcoming changes in CEPA and Cost-Recovery. The workshop is a great opportunity for company personnel training. The deadline for early registration is August 20th. For more information, contact PM Event Planning (Tel: 905-712-4869, Email: mmccall@istar.ca).



Annex 2: Contacted Institutions and Firms

ABRABI – Brazilian Association of Biotechnology Enterprises

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VILMAX S.A.
Dr. Leopoldo J. Orsay, President
Santiago del Estero 366, (1075) Buenos Aires, Argentina
Tel: 54-1-0327-55700/07. Fax: 54-1-0327-55709

REGISTRATION DESK AND BIOLATINA 98 SECRETARIAT

TUESDAY, OCTOBER 20: FROM 12:00 TO 18:00 HOURS

OCTOBER 21 - 22 - 23: FROM 8:00 TO 18:00 HOURS

TUESDAY OCTOBER 20th 1998

18:00

OPENING SESSION

**WITH THE PRESENCE OF THE VICE-PRESIDENT OF BRAZIL
SENATOR MARCO MACIEL**

(AUDIENCE SHOULD BE SEATED 17:45 AT THE LATEST)

OPENING CONFERENCE

**“BIOTECHNOLOGY, BIOETHICS AND BIOSAFETY:
BRAZILIAN AND INTERNATIONAL EXPERIENCE”**

Luis Antonio Barreto de Castro

President, CTNBio – Biosafety National Technical Committee

Ministry of Science and Technology / Brazil

19:00 - 20:30

WELCOMING RECEPTION

WEDNESDAY OCTOBER 21st, 1998

08:15 [Bold Italics: Chairman. Bold: Session Sponsor and Main Speaker. normal type: discussants]

<p>HEALTH FIOCRUZ Round Table - Room A <i>Ikira Homma, M.D., Ph.D. - Fiocruz</i></p> <p>IMMUNOBIOLOGICALS IN HUMAN AND ANIMAL HEALTH</p> <p>Wilson Savino - FIOCRUZ / Brazil Jorge E. Kalil - USP - Brazil Americo Craveiro - Vallée S.A. Brazil Isabel Kinney Santos - EMBRAPA CENARGEN</p>	<p>AGRICULTURE AND AGRIBUSINESS FELAFEB Round Table - Room B <i>Alfredo Gallegos - Biogenetica Mexicana</i></p> <p>THE ROLE OF TISSUE AND ORGAN CULTURE IN DEVELOPMENT OF PLANT SCIENCE AND OF INNOVATIVE AGRICULTURAL TECHNOLOGIES</p> <p>Daniel Moriconi, Tecnoplant/Argentina William Burnquist - COPERSUCAR/Brazil Oscar Arias - Agribiotechnology de Costa Rica Marcia Margis - Genética UFRJ</p>	<p>ENVIRONMENT PETROBRAS Round Table - Room C <i>Elisabete G.C. Rodrigues - Petrubras</i></p> <p>BIOTECHNOLOGY IN WASTE MANAGEMENT AND REMEDIATION</p> <p>Eduardo Ercoli, U.N. Cuyo, Arg. Antonia G. T. Volpon, CENPES PETROBRAS Mônica F. Linhares, CENPES PETROBRAS Lucy Seldin, Inst. Microbiol., UFRJ</p>
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09:45 Coffee Break

10:00 MONSANTO CONFERENCE - Room D
 Joaquim A. Machado - CTNBio

PLANT BIOTECHNOLOGY: FROM SCIENTIFIC RESEARCH TO TECHNOLOGICAL REVOLUTION

Gustavo Leite, Director, Agri Sector, MONSANTO/Canada

11:00 Minicourse - Room A
 WHAT YOU MUST KNOW ABOUT PATENTS BEFORE YOU TALK TO A SPECIALIST - part one
 Visit to Exhibits and Posters
 Room E - Business Rounds
 Room F - Investment Rounds

12:15 Luncheon Meeting with Special Guest Speakers - Room D

National Confederation of Industry
 "DOING BUSINESS IN MERCOSUL"

Otto Kneubuehler, President, NOVARTIS / Brazil
 "OPPORTUNITIES FOR COOPERATIVE R&D IN LATIN AMERICA"

13:15 Minicourse - Room A
 WHAT YOU MUST KNOW ABOUT PATENTS BEFORE YOU TALK TO A SPECIALIST - part two
 Visit to Exhibits and Posters
 Room E - Business Rounds
 Room F - Investment Rounds

14:45

<p>HEALTH BIOBRÁS Conference - Room A <i>Guilherme Emerich - Biobrás S.A.</i></p> <p>LATIN AMERICAN PHARMACEUTICAL INDUSTRY: THE CHALLENGE OF TECHNOLOGICAL DEVELOPMENT</p> <p>Marcos L. Mares Guia - Biobrás Brazil and USA</p>	<p>AGRICULTURE AND AGRIBUSINESS CABBIO Conference - Room B <i>Juan Dellacha - RedBio and Cambiotec Argentina</i></p> <p>THE REQUIREMENT OF BASIC SCIENCES FOR THE DEVELOPMENT AND IMPLEMENTATION OF BIOTECHNOLOGIES IN LATIN AMERICA</p> <p>Oscar Grau - ULP & INTA</p>	<p>ENVIRONMENT MMA Conference - Room C <i>José Seixas Lourenço - Secretary for Amazon Coordination, Ministry of Environment, Water Resources and Legal Amazonia</i></p> <p>ACCESS TO BIODIVERSITY IN BRAZIL</p> <p>Bráulio Dias - COBBI/MMA</p>
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15:45 Coffee Break

16:00

<p>HEALTH ROCHE Round Table - Room A <i>Andrew J. George Simpson - Inst. Ludwig</i></p> <p>PCR-BASED MEDICAL TECHNOLOGIES IN HUMAN DIAGNOSIS AND GENETICS</p> <p>Jorge E. Kalil - USP/Brazil Ricardo W. de Almeida - Lab. Sérgio Franco/Br. Ricardo Dias - USP/Brazil</p>	<p>AGRICULTURE AND AGRIBUSINESS NOVARTIS Round Table - Room B <i>Wilhelmus Uudewilligen</i></p> <p>IMPACT OF BIOTECHNOLOGY ON THE PRODUCTIVE SECTOR</p> <p>Gloverson Moro - NOVARTIS (Brazil) Walter Jallé - CONICYT/Venezuela Joaquim A. Machado - UNICAMP / Brazil</p>	<p>ENVIRONMENT PROBEM Round Table - Room C <i>José Seixas Lourenço - MMA</i></p> <p>BIOTECHNOLOGY INNOVATION IN THE PRODUCTION OF CELLULOSE</p> <p>Spartaco Astolfi - PROBEM/Un. Amazonas Manoel Schirmer - PROBEM Lauro Barata - UNICAMP Vanderley Messias da Costa - MMA</p>
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<p>17:30 FORUM ON BIOTECHNOLOGY IN HEALTH - I Room A</p> <p>Dimension, Supply and Modern Technology Needs of Latin America Markets in Human and Animal Health</p>	<p>FORUM ON BIOTECHNOLOGY IN AGRICULTURE AND AGRIBUSINESS - I Room B</p> <p>Dimension, Supply and Needs of Agriculture Technology Markets in Latin America</p>	<p>FORUM ON BIOTECHNOLOGY IN ENVIRONMENT - I Room C</p> <p>The Management of Urban, Industrial and Mining wastes: economic contour, technology barriers, prospects for joint development of innovative technologies, potential markets and barriers to development</p>
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19:00 JOINT MEETING OF THE GENERALS ASSEMBLIES - ABRABI / SSBIOTEC ROOM A

08:15 **[Bold Italics: Chairman: Bold: Session Sponsor and Main Speaker: normal type: discussants]**

<p>HEALTH BIO-RIO Round Table - Room A <i>Antonio Carlos Campos Carvalho - Federal University of Rio de Janeiro</i> SCIENTIFIC AND COMMERCIAL IMPORTANCE OF ANIMAL CLONING Marcelo Rubinstein - UBA / Argentina Ethana F. Abdelhay - UFRJ - Brazil</p>	<p>AGRICULTURE AND AGRIBUSINESS CTNBio Round Table - Room B <i>Luiz Antonio Barreto de Castro - CTNBio, Brazilian National Committee on Biosafety</i> GENETICALLY MODIFIED ORGANISMS IN NATURE AND FOOD: REGULATION AND MANAGEMENT OF PERCEIVED RISKS AND BENEFITS Joyce Groote - BioteCanada Leila Oda - FIOCRUZ and CTNBio Marília Nutti - EMBRAPA C.T.A.A. Abramides do Val - Monsanto David Hathaway - AS-PTA - Brazil</p>	<p>ENVIRONMENT EXTRACTA Round Table - Room C <i>Prof. Otto Gottlieb - Brazilian Academy of Science</i> THE SUSTAINABLE USE OF BIODIVERSITY IN THE SEARCH FOR NOVEL MOLECULES Inês Chicarelli - EXTRACTA (Brazil) Lauro Barata - UNICAMP (Brazil) Maria Auxiliadora Kaplan - NPPN - UFRJ (Brazil) Joaquim Bayma - Federal Univ of Pará, Brazil Benjamin Gilbert - Fiocruz/Farmang</p>	<p>FORUM ON THE FINANCING OF BIOTECHNOLOGY - I Room D National, Regional and Global Strategies of financing technological development: present scenario, organizational fiscal incentives and limits to grant contracts to private R&D</p>
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09:45 **Coffee Break**

10:00 **GLAXOWELLCOME Conference - Room D**
Oswaldo Podhajcer, Fundación Campomar, Argentina
THE HUMAN GENOME AND THE FUTURE OF DIAGNOSTICS AND THERAPY OF HUMAN DISEASES
Michael Wagner - Dept. of Human Genetics, GlaxoWellcome Inc., USA

11:00 **Minicourse - Room A**
INTRODUCTION TO BUSINESS PLANNING FOR TECHNOLOGY-BASED SMALL COMPANIES - part one
 Visit to Exhibits and Posters
 Room E - Business Rounds
 Room F - Investment Rounds

12:15 **Luncheon Meeting with Special Guests Speakers - Room D**
Luiz Paulo Conde, Mayor of Rio de Janeiro
"RIO DE JANEIRO WELCOMES TECHNOLOGY BASED INDUSTRIES"
Antonio Paes de Carvalho, President of ABRABI
"FINANCING OF ADVANCED BIOTECH R&D IN BRAZIL"

13:15 **Minicourse - Room A**
INTRODUCTION TO BUSINESS PLANNING FOR TECHNOLOGY-BASED SMALL COMPANIES - part two
 Visit to Exhibits and Posters
 Room E - Business Rounds
 Room F - Investment Rounds

<p>HEALTH BRAZSAT Conference - Room A <i>Jorge Almeida Guimarães - CABBIO</i> PHARMACEUTICAL DEVELOPMENT AT THE CENTER FOR MACROMOLECULAR CRYSTALLOGRAPHY Lawrence DeLucas - Center for Macromolecular Crystallography, UA/USA</p>	<p>AGRO BIOTECANADA Conference - Room B <i>Joyce Groote - BioteCanada</i> IMPACT OF TRANSGENESIS ON THE CROP CULTURE AND COMMERCIALIZATION OF AGRICULTURAL COMMODITIES Murray McLaughlin - Ontario Agri-Food Technologies</p>	<p>ENVIRONMENT BIO SIDUS Conference - Room C <i>Antonio Paes de Carvalho - ABRABI</i> THE BIO SIDUS EXPERIENCE OF BIOTECHNOLOGICAL ENTERPRENEURING IN ARGENTINA Marcelo Criscuolo - Scientific Director Bio Sidus</p>
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15:45 **Coffee Break**

16:00 **ABPI - Brazilian Association of Intellectual Property Round Table - Room D**
Dr. José Antonio Faria Correa - Dannemann, Biggler, Siemsen & Ipanema Moreira / Brazil and Vice-President of ABPI
INTELLECTUAL PROPERTY ENVIRONMENT FOR INVESTMENT IN BIOTECHNOLOGY IN LATIN AMERICA
Maria Tereza Wolff - Dannemann, Biggler, Siemsen & Ipanema Moreira / Brazil
Dr. Luiz Lara - Monsanto, Legal Dept. / Brazil
Robert Sherwood - Consultant, Washington DC / USA
Gabriel Di Blasi - Di Blasi, Parente, Sorensen Garcia & Associates / Brazil
Ing. Luis Nogués, Comisario de Patentes del Instituto Nacional de Propriedad Industrial (INPI/Argentina)

<p>17:30 FORUM ON BIOTECHNOLOGY IN HEALTH - II Room A Market and Regulatory Ambiance for Growth of Modern R&D Companies in the Health Sector in Latin America: internal, regional and global demand; intellectual property; quality standards; environmental and sanitary regulation</p>	<p>FORUM ON BIOTECHNOLOGY IN AGRICULTURE AND AGRIBUSINESS - II Room B Ambiance for the start up of R&D Companies: internal, regional and global demand in large industry outsourcing market: intellectual property; quality; environmental and public health regulation</p>	<p>FORUM ON BIOTECHNOLOGY IN ENVIRONMENT - II Room C Sustainable Economic Exploitation of Biodiversity: economic contour, technology barriers, prospects for joint development of innovative technologies, potencial markets and barriers to development</p>	<p>FORUM ON THE FINANCING OF BIOTECHNOLOGY - II Room D Scenario for technology investment in Latin America: Structural and environmental barriers. Venture capital: opportunities, availability, incentives and barriers to be removed. Partnership and vital cycle of interaction between large enterprises and small high tech companies. Expectations of return from industrial Biotechnology</p>
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FRYDAY OCTOBER 23rd, 1998

08:15 [*Bold Italics: Chairman:* **Bold: Session Sponsor and Main Speaker:** normal type: discussants]

HEALTH	AGRICULTURE AND AGRIBUSINESS	ENVIRONMENT	ENVIRONMENT
<p>ABIFARMA Round Table - Room A</p> <p><i>José Eduardo Bandeira de Mello - ABIFARMA</i></p> <p>STRATEGY FOR DEVELOPMENT OF PROPRIETARY PIPELINES BY LATIN AMERICAN PHARMACEUTICAL INDUSTRY</p> <p>Marcos Mares Guã - BIOBRÁS / Brazil & USA</p> <p>Victor Syaulis - ACHÉ S.A. Brazil</p> <p>Valentina Carricane - GADOR Arg.</p> <p>Michael Moore - NENOVA, England</p> <p>Juan Carlos Bidegaray - BIO SIDUS Arg.</p>	<p>FAPESP Round Table - Room B</p> <p><i>José Fernando Perez - FAPESP</i></p> <p>THE FAPESP GENOME PROGRAM: PROJECTS AND PERSPECTIVES</p> <p>Andrew Simpson - Inst. Ludwig</p> <p>Discussants</p>	<p>FELAEF Round Table - Room C</p> <p><i>Antonio Paes de Carvalho - BIO-RIO FOUNDATION</i></p> <p>BIOTECHNOLOGY IN MONITORING ENVIRONMENTAL POLLUTION IMPACTS</p> <p>Lionel Gil - Univ. de Chile</p> <p>Olaf Malm - Inst. of Biophysics UFRJ Brazil</p> <p>Paulo Hilario N. Saldiva - USP</p>	<p>THE BRAZILIAN FOUNDATION FOR SUSTAINABLE DEVELOPMENT Round Table - Room D</p> <p><i>Israel Klabin - Foundation for Sustainable Development, Brazil</i></p> <p>MODELING THE DISTRIBUTION OF BENEFITS UNDER THE CONVENTION ON BIOLOGICAL DIVERSITY</p> <p>Luiz Antonio Barreto de Castro MCT/Brazil</p> <p>Armando Mendes - UFPara Brazil</p> <p>Marc Van Montagu - VIB e Univ. Gent, Bélgica</p> <p>Maria Cecilia Wey de Brito - Sec. do Meio Ambiente SP Brazil</p> <p><i>Special Guests: Deputados Federais Fabio Feldman (SP) e Socorro Gomes (Pará) e Reitor Cristovam Diniz (UFPará)</i></p>

09:45 Coffee Break

10:00

HOECHST-SCHERING-AGREVO Conference - Room D

Chirstovam W. P. Diniz, Rector, Federal University of Pará

THE BIOTECHNOLOGY OF BIODIVERSITY: HIGH TECHNOLOGY OF CONSERVATION AND OF THE SUSTAINABLE USE OF ECOSYSTEMS

Prof. Marc Van Montagu - Univ. of Gent and VIB

11:00

Minicouse - Room A

FUNDAMENTALS OF BIOSAFETY - part one

Visit to Exhibits and Posters

Room E - Business Rounds

Room F - Investment Rounds

12:15

Luncheon Meeting with Special Guests Speakers - Room D

Jorge Raimundo Filho, President of GlaxoWellcome LA

"PHARMA COMPANIES AND REGIONAL R&D: A POSSIBLE PARTNERSHIP"

Javier Verastegui, LA Coordinator, BioteCanada

"BUILDING STRATEGIC ALLIANCES IN BIOTECHNOLOGY: CAMBIOTEC"

13:15

Minicouse - Room A

FUNDAMENTALS OF BIOSAFETY - part two

Visit to Exhibits and Posters

Room E - Business Rounds

Room F - Investment Rounds

14:45

FINEP/FAPESP Conference - Room D

Lourival Carmo Mônaco - FINEP

NEW PATTERNS OF GOVERNAMENTAL FINANCING OF TECHNOLOGY DEVELOPMENT IN BRAZIL

José Fernando Perez - FAPESP

15:45

Coffee Break

16:00

AVFS Round Table - Room D

Antonio Paes de Carvalho, AVFS

VENTURE CAPITAL AND PUBLIC MARKETS: THEIR ROLES IN TECHNOLOGICAL DEVELOPMENTS

Miguel Sanchez, Banco de la Provincia de Buenos Aires

Luis Paulo C. Bardy, FINEP

Sidney Chameh, Banco Fator

Guilherme Emrich - Venture

17:30

RAPOTEUR'S PLENARY PRESENTATION OF SECTOR FORUM DISCUSSIONS

ROOM D

Lindolpho de Carvalho Dias - Minister of Science and Technology, Brazil (In charge)

18:00

CLOSING OF BIOLATNA 98

ROOM D

BIOLATINA 200 AND THE PERSPECTIVES OF BIOTECHNOLOGY IN LATIN AMERICAN INDUSTRIAL DEVELOPMENT

Marcelo Argüelles - President, BIO SIDUS/Argentina

THREE-HOUR MINICOURSE PROGRAM
(ROOM ALLOCATION TO BE ANNOUNCED)

LIMITED ENROLLMENT PER COURSE (30 ATTENDANTS)
REGISTER IN ADVANCE !
COMPATIBLE TIME TABLE ALLOWS YOU TO PICK MORE THAN ONE MINI-COURSE !

ENROLLMENT FEE PER COURSE: R\$ 50,00
(NOT INCLUDED IN BIOLATINA 98 REGISTRATION)

Teaching Staff formed by highly qualified, experienced professionals

SUBJECTS OFFERED:

- **WHAT YOU MUST KNOW ABOUT PATENTS
BEFORE YOU TALK TO A SPECIALIST**
Maria Celeste Emerick, FIOCRUZ
- **INTRODUCTION TO BUSINESS PLANNING
FOR TECHNOLOGY-BASED SMALL COMPANIES**
Affonso José Duarte Guerreiro, Consultant
- **FUNDAMENTALS OF BIOSAFETY**
Silvio Valle, FIOCRUZ

BIOLATINA 8

APRESENTAÇÕES GERAIS DE OPORTUNIDADES DE NEGÓCIOS

AGENDA

ATENÇÃO

As apresentações de Oportunidades de Negócios são abertas a todos os participantes da BIOLATINA 98.
Não é necessária inscrição específica, basta o comparecimento no local, data e horário indicados.

DIA 23 DE OUTUBRO	SEXTA-FEIRA
10 horas	SALA C
FUNDAÇÃO BIOMINAS <i>Incubação e Desenvolvimento de Empresas Tecnológicas em Minas Gerais</i>	
Apoio às empresas de base tecnológica operando em Biotecnologia e Química Fina no Estado de Minas Gerais. Financiamento, infra-estrutura, incentivos, etc.	
10 horas	SALA C
FUNDAÇÃO BIO-RIO <i>PÓLO DE BIOTECNOLOGIA DO RIO DE JANEIRO</i> <i>Incubação e Desenvolvimento de Empresas Tecnológicas no Rio de Janeiro</i> <i>Base Física:</i>	
Incubadeira de Empresas e Loteamento Industrial <i>Serviços de Apoio:</i> Laboratório de Controle de Qualidade Consultoria em Gestão de Qualidade Promoção e Gerenciamento de Projetos com a participação de Empresas e Centros de Pesquisa (UFRJ, FIOCRUZ, UFRRJ, UERJ, outros) Terceirização Tecnológica (P&D, Serviços e Produtos tecnológicos) <i>Financiamentos, Investimentos e Incentivos Fiscais</i>	
10 horas	SALA C
EMBRAPA / CTAÁ (TECNOLOGIA DE ALIMENTOS) <i>Atividades e serviços disponíveis para a área de alimentos com ênfase em processos biotecnológicos (equipamentos, análises e corpo técnico).</i>	
OFERTA DE TECNOLOGIA BEBIDA FERMENTADA DE SOJA (iogurte de soja). Tecnologia para a produção de bebida fermentada de soja com qualidade sensorial e nutricional adequadas, obtida a partir da fermentação do extrato resolúvel da soja com bactérias ácido lácticas. Esta tecnologia encontra-se em escala de bancada, apresentando resultados positivos no estudo de viabilidade técnica e econômica elaborados. No momento busca-se parceria para escalonamento e implementação em escala industrial.	
10 horas	SALA C
DI BLASI, PARENTE, SOERENSEN GARCIA & ASSOCIADOS Prestação de serviços técnicos e jurídicos em Propriedade Industrial: marcas, patentes, contratos de transferência de tecnologia, dentre outros.	

DIA 21 DE OUTUBRO**QUARTA-FEIRA**

11:00 horas

SALA C

TRIANEL CONSULTORIA CIENTÍFICA

(Uma Empresa de Pesquisas Clínicas e de Consultoria em Saúde)

- Elaboração e execução de protocolos de pesquisa clínica, utilizando rede credenciada de especialistas e instituições
- Ensaaios clínicos randômicos, estudos de coorte e estudos de casos, com avaliação crítica dos resultados e revisão bibliográfica.
- Treinamento de pessoal para realização de pesquisas clínicas.
- Programas de educação continuada e retreinamento de equipes.
 - Avaliação tecnológica em saúde.

11:30 horas

SALA C

LABORATÓRIO DE TECNOLOGIA FARMACÉUTICA DA UFMG

- Desenvolvimento de adjuvantes em vacinas.
- Encapsulamento de fármacos, antígenos e corantes de alimentos.
- Desenvolvimento de medicamentos de liberação controlada.
 - Escalonamento. Formação de recursos humanos.

13:30 horas

SALA C

**CANADÁ E AMÉRICA LATINA
BIOTECANADÁ E CAMBIOTECH**

Cooperação Científica e Tecnológica

Desenvolvimento de Negócios em Biotecnologias Clássicas e Modernas
 Acesso a Mecanismos Internacionais e Privados de Financiamento e
 Capitalização para "Joint Ventures" no Mercado Latino-Americano

14:00 horas

SALA C

KOREA

Young Hoon Park (KIST) e Ji-Yong Song (LG Biotech)

Cooperação Científica e Tecnológica com o KIST e outros Institutos
 Parcerias Empresariais em Biotecnologias Clássicas e Modernas

DIA 22 DE OUTUBRO**QUINTA-FEIRA**

11:00 horas

SALA

FIOCRUZ

Samuel Goldberg

Kit para o Diagnóstico Imunológico da Doença de Chagas, com
 antígenos recombinantes conjugados a uma atividade enzimática.

11:20 horas

SALA

FIOCRUZ

Mauro Marzochi

Dispositivo de dupla via de inoculação, coleta, preservação,
 transporte e cultivo de material biológico.

11:40 horas

SALA

FIOCRUZ

João Soares Moreira

Sonda Nasofaríngea

13:30 horas

SALA

FIOCRUZ / FAR-MANGUINHOS (Instituto de Tecnologia em Fármacos):

David Tabac

Ofertas de Serviços e Desenvolvimento Tecnológico

- Controle Analítico;
 - Controle de Qualidade Químico e Microbiológico;
 - Serviços de Farmacotecnia;
 - Produção de Medicamentos;
 - Rejuvenescimento de Fármacos;
 - Desenvolvimento de Fitoterápicos;
 - Ensaaios Farmacológicos;
 - Marketing para Indústria Farmacêutica.

Formas de transferência de tecnologia sugeridas:

- Compra de patente;
- Joint-venture;
- Licença de Distribuição;
- Consultoria e Marketing.

*BIOLATINA '98 Third Latin American Meeting on Industrial Biotechnology
(Rio de Janeiro, October 20-23, 1998)*

"CANADIAN BIOTECHNOLOGY: A SUCCESS STORY"

By Joyce Groote, President of BIOTECCanada

SUMMARY

Canada is just beginning to realize the benefits of 20 years of heavy investment in biotechnology. This presentation attempts to provide an overview of the infrastructure in place and issues requiring resolution throughout its development. The community infrastructure involves government, industry, academia, the financial community, and industry associations. The issues encompass regulatory policy, communications, human resources, and social/ethical issues.

The government's primary role is to develop the necessary framework in which to operate. In 1980, a task force was established whose needs analysis of the field resulted in the establishment of the National Biotech Strategy (NBS) in 1983. NBS has been responsible for initially hiring scientists with the necessary skills, and for developing the regulatory framework. The regulatory framework takes a "risk-based regulatory approach" based on concepts such as experience, familiarity and substantial equivalence, while trying to maintain harmony with other countries' regulations wherever possible. Based on the Canadian experience, the framework should not only outline the approaches, but also clearly delineate the roles and responsibilities of each government department.

BIOTECCanada will present a benchmark study conducted in partnership with a number of government departments and consulting firms by Statistics Canada. This will give an overview of the size, number of employees, revenues and sales of the Canadian biotechnology industry. It will also compare the Canadian industry to other nations. Most of the companies are small and medium-sized. As a result, the biotech industry is based on knowledge, innovation, and research. This places a high priority on intellectual property protection, as these are the key assets of a knowledge-based economy.

The research community has evolved over the years to best suit the changing requirements of both government and industry. The focus has been changed from industry developing products arising from universities' basic research to strategic alliances and collaborative research. As the line between the scientist and the entrepreneur continues to blur, new training programs are required to provide the skills required for the new business-oriented breed of scientists. Government research has also become a part of the partnerships. So, through this networking of various organizations cohesion has been created and maintained throughout the community and Canada is now positioned to enter international markets.

The activities of the financial community have also helped to guide the development of the industry. Major sources of funding (venture capital and pension funds, government contributions, government and private loans, stock exchange placements, strategic alliances) exist for all the stages of the innovation cycle: from proof of principle to the initial public offering. Canadian federal tax rules and some provincial governments offer competitive tax credits and other incentive programs to assist in R&D investment in Canada.

A number of both technology-based and trade-based industry organizations exist throughout Canada at both the national and regional or provincial levels to coordinate the industry's development. BIOTECCanada is a technology-based organization and together with the various regional biotechnology organizations form the Biotech Accord. This Accord recognizes the strengths of each organization and

has established principles for increasing their overall effectiveness. The success of biotechnology development in Canada can be attributed to: the development of science and innovation; human resources; regulations; R&D tax credits; high standards of living, health care, and education; and intellectual property protection.

When designing and implementing the infrastructure and strategic direction, it was important to deal with certain issues and challenges. Some of these issues include scientific research challenges, ongoing regulations and policy development, human resources shortages, and end-user and environmental needs. The scientific research challenges are inherent to work in the biotechnology field. Since the science is only in its infancy, many questions must be answered before all applications of the science are possible. For the remaining challenges, there is a constant need to ensure that issues are addressed in both a national and international manner.

Industry, government and other stakeholders are working in a number of regulatory areas such as food labeling, biosafety, and intellectual property protection. Labeling of genetically engineered foods has been a difficult area where no consensus has yet been reached. In the interim, Canada has adopted a policy to label items where changes affect allergenicity, nutritional or compositional value. Regulations concerning intellectual property protection are vital since small and medium-sized businesses are dependent on outside financing to cover the high cost of seeing an idea through to fruition. Patent protection also affords the exchange of scientific information. All these issues are faced by all nations to varying degrees. But perhaps the most current issue with immediate impact crossing all sectors is the Biosafety Protocol under the U.N. Biodiversity Convention. This Protocol will govern the transboundary movement of all living modified organisms. The first serious negotiation started August 17th 1998 in Montreal, Canada. This presentation will outline the results of these negotiations and recommend steps forward for government and industry alike. If the Protocol is reasonable it will help harmonization efforts world-wide. However, the threats to trade are serious if requirements are out of line with what is reasonable and implementable.

As consumers become exposed to biotechnology products, providing them with safety information is a major issue. The biotech community's strategy has been targeted to opinion leaders such as consumer groups, nutritionists, heads of various associations, and the media. Some consumers are not interested, but for those that are, it has allowed them to turn to those they trust for factual information. Currently, the strategy is looking at ways to provide information directly to those consumers that are looking for answers.

The most difficult issues for Canada to resolve involve social values and ethics. Government, industry and advocacy groups each have a different view of the correct solution. While there is no consensus as to how to handle the issues, the various groups have learned what approaches will not work.

There have been many other lessons learned. First, there is the need to establish a comprehensive strategic framework where all players have discreet, well-defined roles and a strong sense of community. Human resource needs and the various issues need to be addressed early. A strong level of financial commitment, support and leadership is required from both the government and industry. As the entire process takes a long time before returns are visible, the commitment requires patience. Finally, the strategies should be targeted both nationally and internationally as they can impact us all.

CANADIAN BIOTECHNOLOGY: A SUCCESS STORY

JOYCE GROOTE
PRESIDENT
INDUSTRIAL BIOTECHNOLOGY ASSOCIATION
OF CANADA

XXX XXXX IBAC/ACIB

Overview of the Status of Biotechnology in Canada

July 15th, 1998

XXX XXXX IBAC/ACIB

INDUSTRY

- 558 companies, \$4.1B revenues
- employ 27,000
- \$1.7B invested in R&D
- Small and medium-sized companies
- Multi-sectoral approach
- Product developers, users, service industry

XXX XXXX IBAC/ACIB

International Comparisons Biotechnology Industry -1997

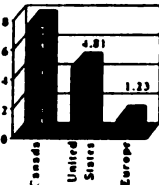
	US	Europe	Canada
Revenue	\$11.680M	\$2.151M	\$845.2M
R&D	\$6,320M	\$1.885M	\$298.5M
Biotech Companies	1,287	716	224

Source: Ethical & Young '97 reports

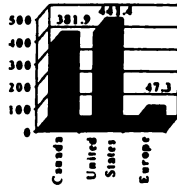
XXX XXXX IBAC/ACIB

International Comparisons Biotechnology Industry -1997

Companies per
Million Population



Employees per Million
Population



XXX XXXX IBAC/ACIB

Type of Bio-Organization

- Biotechnology Organizations 746
 - Companies 558
 - University owned 99
 - Government owned 48
 - Hospital owned 25
 - Not-profit 16
- Product Developers
- Bioservice Industry

XXX XXXX IBAC/ACIB

Biotechnology Sectors '96

- Human Health Care 30%
- Agriculture, Aquaculture, Horticulture, Forestry, Veterinary 27%
- Environment, Mining, Industry 17%
- Food, Beverage, Fermentation 5%
- CRO/CMO 14%

XXX XXXX IBAC/ACIB

Agricultural Biotechnology Products on the Market

- Veterinary biologicals: 9
- Veterinary diagnostics: 26
- Plants with novel traits: 36
 - Canola - 13 Corn - 13 Tomato - 3
 - Cotton - 3 Potato - 2 Flax - 1
 - Soybean - 1
- Food additives: 4

XXX XXXX IBAC/ACIB

THE COMMUNITY

- Government (National, Provincial)
- Industry (National, Regional Assoc)
- Research Scientists
- Educators
- Activist Groups (Consumer, Environmental)
- Individual Consumers

XXX XXXX IBAC/ACIB

COMMUNITY INFRASTRUCTURE

- Government
- Academia
- Industry
 - Industry Associations
- Financial community

XXX XXXX IBAC/ACIB

GOVERNMENT

- National Biotechnology Strategy - NBS (established in 1983)
- NBS successful in establishing:
 - Canadian R&D capability
 - Federal Regulatory Framework
 - Research in support to regulations

XXX XXXX IBAC/ACIB

Federal Regulatory Framework

- 6 Guiding principles:
 - Regulate product (not process)
 - Use existing legislation
 - Develop guidelines, standards, codes
 - Develop scientific database
 - Harmonize nationally, internationally
 - Open consultation

XXX XXXX IBAC/ACIB

ACADEMIA

- Evolution from basic to applied research
- Strategic Alliances / partnerships
- Increased skills
- Financial support
- Communicating to the public

XXX XXXX IBAC/ACIB

INDUSTRY ASSOCIATIONS

- National Association
 - consolidation into a single organization
- Regional Associations
- Biotechnology Accord

XXX XXXX IBAC/ACIB

FINANCIAL COMMUNITY

- Venture capital and pension funds
- Government contributions
- Government and private loans
- Stock exchange placements
- Strategic Alliances

XXX XXXX IBAC/ACIB

Canadian Venture Capital

- Biotechnology has become key target
- Steady increase in available funds
 - \$58M ('95) to \$383M ('97), 660% increase!
- New funds being established
- Investment consortia
- Smarter investors / smarter entrepreneurs

XXX XXXX IBAC/ACIB

ISSUES

- Science
- Regulations/Policy
 - labelling
 - IP
 - biosafety
- Communications
- Human Resources
- Social/Ethical Issues

XXX XXXX IBAC/ACIB

Biosafety

- Definition
- Scope of the Biosafety Protocol
- Implicit vs. Explicit Consent
- Trading with Non-parties
- Importer vs. Exporter
- Who will pay?

XXX XXXX IBAC/ACIB

Communications

- Multiple stakeholders working together
- Develop consistent message and share responsibility
- Farm groups have credibility, but not fully engaged
- Joint responsibility of stakeholders
- Information sources

XXX XXXX IBAC/ACIB

What has been learned?

- Strong leadership at high levels
- Strong commitment
- Strategic framework at all levels
 - Community - establish networks
 - Evolving needs (R&D to Products)
- Deal with issues (HR)
- Patience!

XXX XXXX IBAC/ACIB

BIOLATINA ' 98

***Third Latin American Meeting on Industrial Biotechnology
Rio de Janeiro, October 20 – 23, 1998***

“Agriculture Biotechnology: the Canadian Experience”

By

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October 1998

Agricultural Biotechnology: The Canadian Experience

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1. Canadian Agriculture

I thought it appropriate to give you a perspective on Canadian Agriculture and the research base from a geographic perspective. Canada is made up of many different regions geographically and climatically.

There are five main types of agriculture in Canada:

- Livestock - specialized in beef, swine, poultry and dairy.
- Game farming - Deer, Elk, Bison, Emu and Ostrich.
- Grain and Oilseeds - wheat, barley, oats, canola, corn and soybean.
- Pulse Crops - peas, lentils, mustards, sunflower, dry beans.
- Special Crops - potatoes, tobacco, ginseng, vegetables and fruit, forestry.
- Mixed Farms - produce grains and livestock.

Each of these farm types creates a broad range of diversity from large feedlots to rangeland in cattle to intensive crop production. Of course once you have this type of agriculture it leads to extensive value adding of the industry through food processing, slaughter facilities, and other activities.

Of course having this broad agricultural base and being a major exporter of agricultural production does not just happen. It takes a major effort on the part of our Research and Education communities to ensure we stay on the leading edge of the science.

2. Biotechnology: A Brief Overview

Before providing detail on the agricultural sector, I thought you might be interested in a brief overview of Canadian biotechnology.

Biotechnology has been used in science for several decades. However, scientists took biotechnology a great leap forward with the discovery of recombinant DNA techniques in the 1970s. Since then the term "biotechnology" has been attached to a variety of techniques, based on molecular genetics for rapidly and precisely changing the genetic make-up of organisms ("genetic engineering").

Biotechnology, old and new is used in established industries and in those created in the last quarter of the 20th century. In Canada, applications of biotech are being pursued in four main areas.

- Health Care
- Aquaculture/Marine
- Industrial Processes
- Agriculture/Forestry

These four areas are all being actively pursued in Canadian research facilities. The following provides some indication of activities being developed in these areas.

Health Care

- Pharmaceuticals
 - Vaccine
 - Therapeutic drugs
 - Drug delivery: lysosomes, transdermal systems, delayed release.
- Diagnostics
 - Agents to improve diagnostics imaging

- Monoclonal antibody - based test for rapid identification
- Medical tests using techniques such as genetic probes.
- Medical devices for use in Diagnostics and surgery.
- Cell and gene therapies.
- Laboratory Instrumentation - New Tools of Support.

Aquaculture/Marine

- Improved Production Practices - Industry Health
- Growth Promoting Research
- Marine Biotech: Novel Pharmaceuticals and Chemicals

Industrial Processes

- Mineral Recovery
- Waste stream reduction
- Energy production
- Organic chemicals production
- Bio-re-mediation (Environmental Clean-up)
- Diagnostics

Agriculture/Forestry

- New plant varieties - improved quality, herbicide tolerant, etc.
- Plant disease diagnostics.
- Safer post controls, such as bio pesticides and pathogen resistant crops.
- Development of improved crop production, such as biofertilizers.
- Improved insect, disease and stress tolerance in plants.
- Plants and animals as factories to produce pharmaceuticals, chemicals, nutraceuticals and energy.
- Veterinary disease diagnostics, therapeutics and vaccines.
- Improved and better managed livestock and poultry for food production.
- Food processing improvements, such as enhanced cultures and contaminate detection systems.
- Non-food user for crops - cosmetics; industrial oils; fiberboard, etc.

Biotechnology is continually expanding in new technical and scientific directions. Therefore, we can expect exciting new developments in bio-electronics, drug delivery, bio-remediation, and protein engineering over the next few years. Throughout the twenty-first century we will see a continuation of unanticipated scientific discoveries and yet undeveloped technologies that will accelerate Canada's biotechnology growth.

Based on this impressive list of applications for biotechnology, some would wonder what the issues or concerns are with the public. We will discuss agricultural biotechnology and the agri-food sector during the rest of this paper.

3. The Agriculture and Agri-Food Sector

Agricultural biotechnology applications have been developed and we are seeing some entry into the market place, even though it has lagged behind the medical sector. There have been some key areas to deal with such regulations and public awareness that were different for agriculture. Some sample of products introduced in Canada is:

Herbicide tolerant flax from the University of Saskatchewan; edible oil flax; herbicide tolerant canola varieties from several companies; hybrid canola from AgrEvo; insect tolerant potatoes (Nature Mark) and corn; Flavr-Savr tomatoes; and chymazin, an enzyme used for cheese making.

The development of agricultural biotechnology offers the opportunity to increase crop production, lower farming costs, improve food quality and safety, and enhance environmental quality. There are concerns expressed by some, having that the negative effects of biotechnology may outweigh the potential benefits. Like any new technology there are social, economic, and political factors, which will influence the development, consumer acceptance, and producer adoption of agricultural biotechnology.

Biotechnology and change is not something new to agriculture. When we look at the history of agriculture we find it has continually been impacted by change from new technologies. For example, in the era of mechanization there was the introduction of the steam engine and then the tractor, and mechanized equipment; this was followed by the chemical era where pesticides and fertilizers were introduced, hybrid varieties of crops became standard in some areas and feed additives for livestock. These technologies and others are still being introduced, from what we today call conventional science, and will continue to impact production for the foreseeable future in many parts of the world. All of these revolutionary changes had a fundamental impact on agriculture as well as significant social and economic impacts. Biotechnology is said to be the beginning of the next revolution in agriculture.

There are many factors that will impact the adoption of biotechnology into agriculture, some of which are:

- Relative benefits and costs of the technology compared to alternative inputs
- Producers seek ways to increase profits by:
 - reducing production costs
 - satisfying changes in consumer demand
- An expanded set of public interests:
 - Some are interested in food quality and safety.
 - Environmentalists are concerned about environmental quality.
 - Concerns about the impact on rural communities.
 - Public confidence in the regulatory system.
- Government programs and policies and their effect on adoption.

Economic assessments of ag-biotech reveal the type and direction of expected change and which groups (farmers, industry, consumers, regions, and countries) may be affected. A review of the studies on the economic impact of agricultural biotech provided two major conclusions:

- a) The economic impact of agricultural biotechnology is likely to be incremental rather than dramatic.
- b) A significant amount of the economic benefit will be broadly distributed to consumers in supplies, stable prices, and higher valued products.

Like any new technology, there are issues and benefits around agricultural biotechnology. Therefore, this needs to be acknowledged and addressed to make this paper complete. The issues surrounding ag-biotechnology in Canada are:

- Regulatory - Ensuring we have a scientifically sound regulatory process that meets our needs and is compatible with our major trading partners.
- Public awareness - At present this is an area that is receiving a lot of attention as products enter the market.
- Finance - This is always an issue with emerging technologies. Financial support for Research and Development and also for new business start-ups.
- Research support - Ensuring the infrastructure is there to support new product development.
- Intellectual property - Two areas of concern are ownership and compatible systems globally for patents.

- **Human resources** - As the industry expands there is an increasing pressure on the educational system to meet the demand.

Some of the benefits surrounding ag-biotechnology in Canada are:

- **Improved production** - Better weed and pest control; improved fertility; improved stress tolerance.
- **Healthier animals** - Improved disease control (vaccines); improved nutrition of feed; diagnostics; better genetics.
- **Improved quality** - Quality is already good, but we will be able to tailor more to customers' needs in the future.
- **Managed exports** - Guarantee quality of our exports by working with the customers to determine their needs.
- **Viable agriculture industries** - By the 21st century biotechnology will be a key component of all agriculture globally, therefore to be viable our industry needs to be using the products of biotechnology.

In summarizing this section on agriculture biotechnology there is one conclusion. As a tool for agricultural science, biotechnology is here and will be used globally in this industry. Those countries that adopt the technology early will help ensure that their agricultural industry remains viable. Adoption of the technology includes the creation of a level of understanding by consumers within the country.

4. The Role of Government in Technology Transfer

With respect to technology transfer the government needs to play a significant role in four areas.

- a) Support for research and development of new technology.
- b) Dissemination of information to producers.
- c) Ensure appropriate regulations and intellectual property guidelines are in place to maintain a sustainable agriculture industry.
- d) Develop creative systems to finance startups - venture funds, etc.

In the area of support for research and development all governments have systems in place to accomplish this. Within Canada we have national and provincial systems to provide support for research. As the technology moves to the development phase industry and producer organizations will provide research support, depending on the technology. These arrangements tend to lead to licensing to industry for patentable technologies. Non-patented technologies may be disseminated to producers through government extension agencies in conjunction with producer organizations.

Another key concept is to learn how to access technology globally. This is done through networking and partnering. Today no one has the resources to do everything themselves.

An important aspect of any technology development is the transfer of the information to producers, either directly from the research institute or from the company commercializing a technology. Therefore, a good extension agency is important to the adoption of the technology.

The third component is regulations and intellectual property aspects of commercialization. This is probably the most important role that government has. The regulating process needs to be world class, based on sound science and responsive to needs of the agricultural industry.

Intellectual property protection through patents is crucial to giving access to technology from corporations or other countries. This is important so farmers can be provided with the most up to date technologies that

will improve their efficiency. Efficiencies can include yield, quality, or other benefits that allow agriculture to be sustainable.

Canada has one of the best science based regulatory processes in the world for agriculture, including biotechnology. It is managed by Agriculture and Agri-Food Canada and Health Canada. Canada also has a good system for dealing with protection of intellectual property.

Government plays a very important role in ensuring the right systems are in place to have technology developed and implemented.

The government, however, does need to continually assess their role and direction. The statement made by Michael Porter needs to always be a point of focus, "*Competition will eventually and inevitably overtake any (nation) that stops improving and innovating.*"

5. Initiatives on Agri-biotechnology in Canada

In Canada there are a number of initiatives that focus on agricultural biotechnology - regulations; research; public awareness; industry support. I will not provide details in this section, but give you a concept of the breadth of activity. Organizations involved with awareness of biotechnology:

IBAC - Industrial Biotechnology Association of Canada
Address: Suite 420 - 130 Albert Street
OTTAWA, Ontario, Canada K1P 5G4
Phone: (613) 233-5586. Fax: (613) 233-7541
Contact: Joyce Groote, President

IBAC is an industry organization that deals with issues, regulations, etc. on behalf of industry.

CIB - Canadian Institute of Biotechnology
Address: Suite 420 - 130 Albert Street
OTTAWA, Ontario, Canada K1P 5G4
Phone: (613) 563-8849. Fax: (613) 563-8850
Contact: Rick Walters, Executive Director

CIB is an institutional organization that provides its members with project support, awareness of issues, etc., on all aspects of biotechnology.

FBCN - Food Biotechnology Communication Network
Address: 1 Stone Road West
GUELPH, Ontario, Canada N1G 4Y2
Phone: (519) 826-3440
Contact: Diane Wetherall, Executive Director

FBCN is a centre that deals specifically with public awareness of biotechnology and food.

GABA - Global Agricultural Biotechnology Association
Address: 201 - 407 Downey Road
SASKATOON, Saskatchewan, Canada S7N 4L8
Phone: (306) 668-6639. Fax: (306) 668-5564.
Contact: Bob Morgan, Chair

GABA is an international organization that uses the internet to communicate about ag-biotechnology and international issues.

TBI - Toronto Biotech Initiative
Address: 51 Hillside Drive
AURORA, Ontario, Canada L4G 6E1
Phone: (905) 727-3492. Fax: (905) 713-0768.
Contact: Dr. John Clement, President

TBI is a public forum organization dealing with a broad base of awareness issues.

BioAtlantech Inc. - New Brunswick Biotechnology Centre of Excellence
Address: P.O. Box 600
FREDERICTON, New Brunswick, Canada E3B 5H1.
Phone: (506) 453-2366. Fax: (506) 453-7170.
Contact: Roger Bernier, Executive Director

BioAtlantech is just getting established and will deal with agriculture, forestry and aquaculture.

OAFT - Ontario Agri-Food Technologies
Address: 1 Stone Road West
GUELPH, Ontario, Canada N1G 4Y2
Phone: (519) 826-4195. Fax: (519) 767-6300.
Contact: Dr. Murray McLaughlin, President

OAFT is a new organization designed to focus on the biotech aspect of the agri-food sector with a primary focus on research and commercialization.

BCBA - British Columbia Biotechnology Alliance
Address: Suite 450 - 1122 Mainland Street
VANCOUVER, British Columbia, Canada V6B 5L1
Phone: (604) 689-5602. Fax: (604) 689-4198.
Contact: Theresa McCurry, Executive Director

BCBA is an industry organization for British Columbia that focuses on commercial development and awareness of all aspects of biotech.

AWB - Ag-West Biotech Inc.
Address: Suite 230 - 111 Research Drive
SASKATOON, Saskatchewan, Canada S7N 3R2
Phone: (306) 975-1939. Fax: (306) 975-1966.
Contact: Peter McCann, President

AWB's mandate is to facilitate commercial development of ag-biotechnology in Saskatchewan.

Besides these organizations Canada has a strong research infrastructure that is primarily made up of Agriculture and Agri-Food Canada (AAFC); National Research Council (NRC); and several universities across the country. AAFC has 18 Centres of Excellence located in various parts of Canada. NRC primarily has the Plant Biotechnology Institute (PBI) in Saskatchewan that focuses on agriculture. Two of the key agricultural universities are the University of Guelph in Ontario and the University of Saskatchewan.

6. Saskatchewan's Agri-biotech Initiative

The Saskatchewan agri-biotech community is the best established in Canada and is an example of where working together can create dividends. The community has a very strong research base that is made up of a broad base of independent institutions. That combined with Innovation Place, a research park centered in the research community, created the catalyst for Saskatoon to become a leading centre in ag-biotechnology.

Over the last eight years the agri-biotech industry has grown from a base of five companies to over thirty businesses today. The companies are a mixture of multinational and local start-up businesses, many of which are located at Innovation Place.

Ag-West Biotech Inc. (AWB) is a facilitator that has created the interface between industry, government and research/academic communities.

The Saskatchewan Community

The agri-biotech community has come together to create the leading ag-biotech community in Canada, and a world leader in the field. AWB was the catalyst that brought all the players together. Having the research, business and government all working together is what has made Saskatchewan recognized globally.

The Saskatchewan Community is made up of over 700 people involved in public sector research and over 400 in the private sector. The private sector is the one that is growing today. Annually, there is well over 100 million dollars spent on research related to agriculture and biotechnology in Saskatoon. Working together became more exemplified when the City of Saskatoon established a Regional Economic Development Authority three years ago. When they developed their business plan their two main priorities for new business was agri-biotechnology and value-added food production. In Canada, Saskatoon has been one of the only cities with agriculture biotechnology as a priority.

7. Ontario's Agri-Biotech Initiative

Ontario was a little slow in establishing an actual biotech initiative in agriculture, but the research went on regardless. Today there is well over 150 million dollars spent on agriculture and agri-biotech related research. This is a necessary ingredient to create commercial ventures - a good solid research base.

Agriculture and agri-food is the second largest industry in Ontario - valued at close to 20 billion dollars. This is a very diverse industry including products from primary production to table ready products.

Recently, several producer groups, industry and research institutes got together to form Ontario Agri-Food Technologies (OAFT). Its mandate is *"To provide leadership and coordination through research, development and commercialization of new technologies to generate wealth for the agriculture and food sector of Ontario"*.

OAFT has more than 30 members and growing. The objectives of OAFT are:

1. to develop, support and co-ordinate research programs amongst Ontario's institutions
2. to assist in the commercialization of biotechnology products
3. to assist in stimulating the awareness, acceptance and use of biotechnologies by the agri-food industries
4. to assist in educating industry, government and the public about the value, benefits and issues concerning biotechnology
5. to assist in the creation of visibility and awareness for the agricultural biotechnology industries of Ontario in the rest of Canada and internationally

The Ontario Community

The agri-biotech community is like a spider web - strong but delicate; strong communication from all intersects; and an ability to capture new ideas. There are well over 1000 researchers in the public/academic sector of Ontario agriculture with annual budgets of over 150 million dollars.

The major centre is in Guelph with additional research centres in Ottawa, Kingston, Kemptville, Toronto, St. Catherines, London, Ridgetown and Harrow. There are several other areas with commercial activity. The value of the farm gate is about 6 billion dollars and the value-added industry is 18 billion. It is the second largest industry in Ontario.

8. The Farm Scene in Canada

Agriculture is a primary business in Saskatchewan. In this area we have seen major changes over the years. During this century we have seen major changes in mechanization and chemical use, with biotechnology leading the charge as we approach the next century. Farm sizes are growing, diversification is critical, and

new technology is important for farming today and tomorrow as the business of farming truly becomes a business.

Today, we have less than two per cent of our Canadian population on the farm. In 1950 it was more than 25 per cent. This has created larger farms, improved production and changes in technology. This trend is expected to continue for the foreseeable future. However, I expect that biotechnology will also help maintain smaller farms as well.

To ensure that Canadian agriculture continues to be viable in a global environment, it will need to continue to adapt new technologies and to diversify. The industry is starting to actively diversify and value-add the agricultural sector.

Because of Canada's large agriculture production, we have a very strong research community. This research is focused on improved production, value-added processing and new technologies. Linked with this production is the fact that Canada is a major exporter of agricultural products, therefore, we are constantly looking for opportunities to diversify and value-add to meet the needs of existing and new clients. To accomplish this we work in partnership with the client to ensure we are doing things right to meet their needs.

Keys to Success

The success of the Canadian biotech community has been attributed to three things:

- Flexibility;
- Knowing your business;
- Knowing your customer.

I believe that these three keys have been critical in our success in creating a viable agricultural biotech industry in Canada. If you combine those with the eight qualities identified in the book, *"In Search of Excellence"*, by Tom Peters, you will end up with a competitive position in the global market place.

The eight qualities identified are:

- a) A bias for action: Excellent companies do not spend years planning new strategies. They are devotees of the "do it, try it, fix it" approach.
- b) Close to the customer: Excellent companies stay in touch with their customers and learn from them.
- c) Autonomy and leadership: Excellent companies foster leaders and innovators throughout the organization.
- d) Productivity through people: Top firms treat the rank and file as the root of quality and productivity gains.
- e) Hands on, value-driven: The most successful firms are driven by sense of values they insist employees share.
- f) Stick to the knitting: All the excellent firms analyzed restricted themselves to fields they knew well.
- g) Simple form, lean staff: Most of the excellent companies, although big, have simple forms with minimal layers of bureaucracy.
- h) Simultaneous loose-tight properties: Excellent companies know when to centralize and when to discourage conformity.

9. Opportunities in Canada: Agri-biotechnology

Agri-biotech in Canada is focused primarily in eight areas from a commercialization perspective:

- Animal Production - including health and quality
- Crop Production - yield enhancement, quality improvements
- Microbial Products - bio-fertilizers, bio-pesticides, etc.

- Value-added Processing
- Ornamentals - tissue culture/micropropagation
- Environmental
- Feed Biotechnology
- Food and Non-food Uses (includes nutraceuticals)

International opportunities from my perspective are a two-way street - possibilities for both countries to have win-win situations. With respect to other countries, I believe there are a number of potential areas of compatibility for collaboration. These are in the following areas:

- Education - training at Canadian agricultural colleges;
- Research Institutes - collaboration between the two countries;
- Business Opportunities:
 - Non-food uses
 - Animal vaccines
 - Swine production
 - Ornamental/seed business
 - Value-added foods
 - Animal feed
 - Environmental opportunities on farms.
 - Diagnostics

This is not meant to be an exhaustive nor specific list of opportunities. However, it is a list where specific opportunities should exist.

10. Summary

Twenty-six per cent of Canada's core biotech companies are Agri-biotechnology, compared with five per cent in the United States. Activities include the use of micro-organisms, plant cells to create commercially viable products, and transformation of plants to improve specific qualities. Goals are to increase the world's food supply, enable crops and animals to resist pests and diseases, increase the nutritional content of food, and improve production efficiency.

I believe that there are business opportunities in the agricultural sector for Canada and other countries to collaborate. These are research to research; institute to institute; business to business; and combinations of these areas.

However, for these opportunities to become a reality we need to increase our awareness of each other's activities and needs. My presentation today was not designed with specifics, but to encourage some strategic thinking by both countries on how we can do business together in agriculture and biotechnology.

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Building Strategic Alliances in Biotechnology: CamBioTec

By Dr. Javier Verástegui
Coordinator, Latin America at BIOTECCanada

Abstract

The Canadian biotechnology industry has become the world's second largest, particularly in agricultural biotechnology, and has comparative advantages vis-à-vis other developed countries to gather, package and transfer expertise to developing countries. The Canadian availability of venture capital for biotech projects is also discussed. On the other hand, the paper discusses how the Latin American region is becoming the hottest emerging market for agri-food biotech products and biotechnologies: relatively well developed human resources; industrial infrastructure; important agricultural markets; and stable economic policies.

The need, motivations, types, and steps of the partnering process are then discussed as a tool to build successful strategic alliances in biotechnology. Some specific advantages offered by strategic alliances to Canadian and Latin American firms are then reviewed; and collaborative opportunities are discussed vis-à-vis the status of Latin American national priorities, R&D, policy regulations, industry, venture capital and markets. Some strengths and gaps are also identified.

The paper focuses then on the role of CamBioTec, a Canadian funded international cooperation network, and its efforts to foster strategic alliances between Canadian and Latin American firms and institutions. The strategy of CamBioTec and its experience in fostering more than 30 alliances between Canadian and Latin American biotech firms is presented duly classified by country, sector, product area, type of partnership, level of success and failure. Some successful cases are briefly discussed in the fields of microbial products for agriculture, aquaculture, biotechnology services, human health care and the transfer of biosafety expertise on agri-food bioproducts.

Case analysis and program evaluation have shown the utility of the CamBioTec network and the need to strengthen national biotech community associations in Latin America, as the sustainable path to deal with the promotion of R&D, regulations, public awareness, human resources, financial issues and international alliances. As a corollary, CamBioTec has also shown a remarkable level of success in the design and development of binational or multinational bio-partnering and technology transfer projects.

“Promoción de Alianzas Estratégicas en Biotecnología: CamBioTec”

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Presentacion

- Alianzas estratégicas en biotecnología
- La bio-industria en Canadá
- CamBioTec
- Promoción de alianzas en A. L.
- Casos



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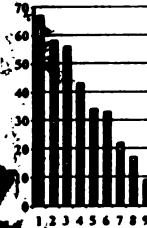
¿Porqué alianzas estratégicas en biotecnología?

- Desarrollar nuevas ideas, productos, negocios
- Acelerar y reducir costos de I&D
- Añadir valor a I&D de pequeñas biofirmas
- Compartir riesgos y recursos
- Acceder a mercados nuevos/globales
- Acceder a tecnologías complementarias



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Motivaciones para alianzas estratégicas en bioempresas (Coopers & Lybrand Survey, 1997)



- 1 - Acceso a producto/proceso
- 2 - Comparte recursos & riesgos
- 3 - Acceso a fuerza de ventas
- 4 - Acceso a mercados externos
- 5 - Acceso a recursos financieros
- 6 - Añade valor a producto
- 7 - Reduce tiempo para mercado
- 8 - Asociarse con "ganador"
- 9 - Sin respuesta



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Formas de alianzas estratégicas

- **Desarrollo producto** Investigación por contrato - Investigación conjunta
- **Compras** Compras conjuntas
- **Producción** Contrato de ingeniería - Fabricación conjunta - Subcontratación - Know-how - Licencia de patente
- **Mercadeo** Licencia de marca - Co-mercadeo - Co-promoción
- **Distribución** Acuerdos de distribución - Representación



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El proceso de asociación

- Razonamiento estratégico
- Selección de un socio *
- Negociación
- Implementación

* Nicho de CamBioTec




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La bioindustria en Canadá

- 530 compañías, \$3.5B en ingresos
- emplea 23,000
- \$1.7B invertidos en I&D
- Compañías pequeñas y medianas
- Enfoque multi-sectorial
- Desarrollan y utilizan bioproductos, dan servicio a la industria




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Bioproductos canadienses en el mercado

- 27 Farmacos
- 28 Plantas
- 41 Productos biológicos veterinarios
 - 8 vacunes
 - 33 diagnosticos
- 4 Enzimas (queso, alcohol)
- 26 Ingredientes de alimento animal




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Cultivos transgénicos en Canadá (acres)

	1996	1997	1998
Colza	350,000	4 Mil.	6.5 Mil.
Maiz	21,000	300,000	400,000
Lino	440	6,000	250,000
Papa	1,000	7,000	



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Mercado Agri-Biotec en América Latina

- Consumo de semillas* (1990) 4.2M TM
- Mercado de protección cultivos (1996) 3,700 MS
- Mercado de salud animal (1995) 1,700 MS
- Mercado veterinario en Mexico (1995) 255 MS
- Cultivos GM en Argentina (1997) 3.2 M Acres

América del Sur

FUENTE: J. Clive ISAAA (1997)
y C. Ambrósio (1995)



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Alianzas en América Latina: Ventajas

- Economías en rápido crecimiento
- Baja inflación y costo mano de obra
- Estructura institucional estable
- Mercado de más de 450 Millones
- Puerta hacia MERCOSUR & otros
- Firmas canadienses son muy bien recibidas



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Alianzas en Canadá: Ventajas

- Industria basada en ciencia
- Apoyo gubernamental
- Fondos de capital de riesgo
- Marco regulatorio para innovaciones
- Puerta hacia USA y mercados globales
- Políticas justas en desarrollo internacional



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CamBioTec



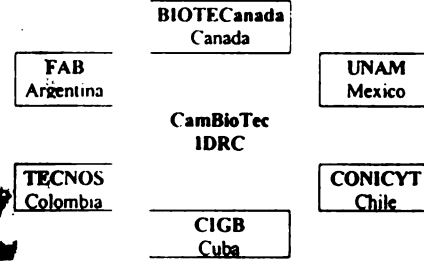
Biotechnología para el Cambio

- Iniciativa Canadá-América Latina para el desarrollo sostenible de la biotecnología, a través de la promoción de políticas nacionales y aplicaciones comerciales en el sector agropecuario y en el medio ambiente



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Red principal de CamBioTec



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Red amplia de CamBioTec



- Argentina: ASA, UIA, INTA, SAGPYA, SECYT
- Canada: Ag-West Biotech, OAFT, AAFC, EC, IC, CIDA
- Chile: SNA, Fund.Chile, IIB, INIA, SAG, CONAMA
- Colombia: Corp.BIOTEC, CORDIB, Corp.ICA, IBUN
- Cuba: C.Bioplantas, IBP, CIM, Biomundi, U.of Havana
- Mexico: ASEMBI, NAFIN, CONACYT, UACH, UAS
- Brazil: ABRABI, BIO-RIO, CENARGEN-EMBRAPA
- Other: REDBIO-FAO, IBS-ISNAR, IICA



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Objetivos de CamBioTec



- Reforzar políticas nacionales en biotecnología
- Identificar oportunidades para I&D y comercialización
- Promover una mejor gestión de la innovación
- Promover alianzas estratégicas

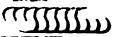


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Medios de CamBioTec para promover alianzas estratégicas



- Inteligencia de negocios
- Base de datos de contactos
- Misiones de negocios
- Seminarios ejecutivos
- Ruedas de negocios
- Intermediación vía Internet

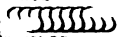


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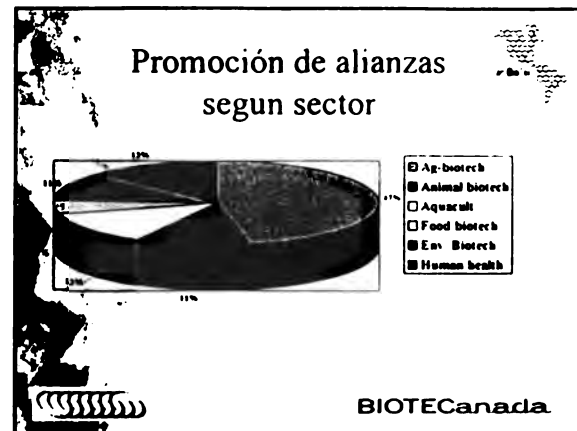
CamBioTec: Area Negocios



- Seminarios "Opportunities in México" (Canada, Oct. 1995)
- Rueda de Negocios-Biotecnología (Mexico, Julio 1996)
- Rueda de Negocios-Acuicultura (Chile, Nov. 1996)
- Rueda de Negocios-Agribiotech (Cuba, Abril 1997)
- Mision canadiense a Chile & Argentina (Agosto 1997)
- Rueda de Negocios-Biotecnología (Bogota, Sept. 1997)
- Rueda de Negocios en Agro-biotecnología (Cuba, June 1998)
- Taller y Rueda de Negocios en Biotecnología Ambiental (Argentina & Chile, Octubre 1998)



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Promoción de alianzas: Caso 1

- Ag-West Biotech (Saskatoon)
- Asistencia para encontrar socios potenciales en Mexico, Brazil, Chile & Argentina.
- M. de E. firmado con INTA (Argentina).

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Promoción de alianzas: Caso 2

- BIOTECanada, CFIA, HC and EC
- SAGPYA-INTA (Argentina)
- MINAGRI-INIA (Chile)
- Proyecto financiado por ACIDI
- Transferencia de experiencia canadiense en regulaciones de bioseguridad

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Promoción de alianzas: Caso 3

- Philom-Bios' (Saskatoon)
- PROQUISA's (Chi., Mexico)
- I&D conjunta para nuevo producto (inoculante de suelo y promotor de crecimiento de plantas)
- Tests de compatibilidad/estabilidad
- Mercados norteamericano y de A.L.

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Promoción de alianzas: Caso 4

- POS Corporation (Saskatoon)
- Gattavara-NORPOL (Iquique, Chile)
- Contrato para servicios analiticos
- Certificación de B-caroteno en alga *Dunalliella* para exportación
- Mercados norteamericano y globales

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Promoción de alianzas:

Caso 5

- QUELAB (Montreal) & LINSAN (Chile):
 - joint venture para fabricación de medios de cultivo en Chile, para mercado A.L.
- QUELAB & empresa Rusa:
 - suministro de medios de cultivo y componentes



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Promoción de alianzas:

Caso 6

- Canadian INOVATECH (Abbotsford, BC) & IASA (Puebla, Mexico):
 - transferencia de tecnología para producción de lisozima
- Canadian INOVATECH & firma francesa de comercialización:
 - suministro de Tripsina/Quimotripsina



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“Tips” de CamBioTec para promover alianzas

- Desarrollar contactos personales
- Trabajar en equipo con socios locales
- Comprender la cultura del país/firmas
- Estar preparado a discutir sobre ciencia
- Acuerdo de confidencialidad!
- Maximizar las comunicaciones!
- Ser paciente, doblar el tiempo esperado!



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