Public Preferences relating to Plant Molecular Farming
RESEARCH SUMMARY

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This study focuses on an emerging application of biotechnology – Plant Molecular Farming [*PMF*] – which proposes to use genetically modified plant crops as production systems to produce commercially valuable biomolecules, pharmaceuticals, or industrial products, rather than to produce food, feed, and fibre.[1]

The production process underlying PMF products is recombinant DNA technology, as is the case for GM food crops. Using biotechnology, a gene for a medically or industrially useful molecule is placed into a plant, creating a novel plant with new traits to produce the desired biomolecules. The products of PMF are proposed to include health and medical products (vaccines, antibodies, enzymes for cancer, diabetes and HIV), industrial products (bioenergy, biochemicals, bioplastics, personal care items, laundry detergents and cosmetic products), and agriculture and nutritional foods (disease and drought resistant crops, functional foods, nutraceuticals, etc.).[2]

Arcand and Arnison (2004) speculate the potential market size of PMF may be US $10 billion by 2010, noting that there are about 34 research companies conducting PMF research and trial production, mainly located in the US and Canada.[3] Canada has three leading molecular farming research companies that may have potential in a global market[4].

PMF may have many benefits, but at the same time is associated with many risks. Potential benefits include large-scale production of potential new pharmaceuticals and production of these pharmaceuticals at relatively low-cost. These two significant advantages of PMF would help to overcome current pharmaceutical production lags, which are high cost and low quantity .[5] PMF may also give low-cost and large-scale production methods to produce novel industrial products. From an industry aspect, PMF could create more jobs and be an opportunity for economic development, potentially in rural areas. However, PMF technology also raises health, environmental, social, and regulatory challenges. The risks of PMF include possible contamination of the food supply chain by cross-pollination, accidental co-mingling or disposal of waste materials. The disposal of waste materials could also cause possible contamination effects on ecosystems and the environment, as could gene flow.[6]

This study undertakes socio-economic research to assess how people view the introduction and development of PMF techniques. We conducted a nation-wide online survey, drawn from a representative panel from which 1574 individuals were sampled. Among all respondents, 48.8% are male, which is representative of the gender split in Canada. From the total, 80% chose the English version and 20% chose the French version of the survey. The youngest respondent is 18 years old; the oldest respondent is 82 years old. The average age of respondents is 43.5 years old. The average household income before taxes is $50,000.

The data analysis to this point is preliminary. Generally, PMF technology was not familiar to most people. Most people saw the risks overall as moderate or slight. Generally, benefits were seen as high or moderate. Many respondents assessed benefits to equal or outweigh risks. It is expected

that further analysis of the survey data and our findings will be helpful in contributing to a better understanding of public preferences relative to the prospective PMF industry.

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Additional links to relevant websites:

BIO – <http://www.bio.org/healthcare/pmp/>.
CFIA – <http://www.inspection.gc.ca/english/plaveg/bio/mf/molecule.shtml>.
CACR – <http://www.carc-crac.ca/english/biobased%20molecular%20page.htm>.
Genome Canada – <http://www.genomecanada.ca>.
MolecularFarming.com – <http://www.molecularfarming.com>.
Friends of the Earth – <http://www.foe.org/camps/comm/safefood/biopharm/index.html>.

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1. Canadian Food Inspection Agency, "Plant Molecular Farming " online: Canadian Food Inspection Agency <http://www.inspection.gc.ca/english/sci/biotech/reg/pmfamve.shtml>
2. King, J. 2004. "Plant and Animal Molecular Farming: Technologies and the Potential Economic, Social, and Environmental Benefits They can Bring to Canada and Canadians—Overview and Perspectives from Industry Canada." Presented at BMPS Workshop. online: <http://www.carc-crac.ca/common/BMPS%20Federal%20Perspectives/Industry%20Canada%20english.pdf>
3. François Arcand & Paul G. Arnison, "Development of Novel Protein-Production Systems and Economic Opportunities & Regulatory Challenges for Canada: A Discussion Paper" (Paper presented to the Bio-Based Molecular Production Systems Workshop, Ottawa, 26-27 April 2004) at 16, online: Society for Moleculture <http://archives.cpmp2005.org/pdf/NPPS_040412.pdf>.
4. François Arcand & Paul G. Arnison, "Development of Novel Protein-Production Systems and Economic Opportunities & Regulatory Challenges for Canada: A Discussion Paper" (Paper presented to the Bio-Based Molecular Production Systems Workshop, Ottawa, 26-27 April 2004) at 16, online: Society for Moleculture <http://archives.cpmp2005.org/pdf/NPPS_040412.pdf>.
5. Robert N. Miller, "Stewardship in the production of Plant-Made Pharmaceuticals", online: Grain Elevator and Processing Society <http://geaps.org/proceedings/2004/Miller.cfm>.
6. Pat Byrne, Sarah Ward & Judy Harrington, "Bio-pharming", online: Transgenic Crops: An Introduction and Resource Guide <http://www.colostate.edu/programs/lifesciences/TransgenicCrops/hotbiopharm.html>.