

## THE GENETICALLY MODIFIED “NON-BROWNING” APPLE

A small BC company called Okanagan Specialty Fruits (OSF) has asked Health Canada and the Canadian Food Inspection Agency to approve a genetically engineered (also called genetically modified or GM) “non-browning” apple. The company has also asked for approval in the United States.

### WHAT IS THE GM APPLE?

The “non-browning” apple is genetically engineered to keep from going brown after being cut. The apple is primarily designed for fast food companies and food processing companies, so they can put sliced apples in packaged foods.

When apple flesh is cut and exposed to oxygen, it begins to brown. But the GM apple or “Arctic Apple,” as the company calls it, “will decay naturally just like any other apple, but it will not turn brown from bruising, cutting or biting – not in minutes, hours or days.”(1) In fact, the company says the GM apple will not brown for 15 to 18 days. (2)

But browning in apples is not a problem, it’s helpful information. The “non-browning” GM apples are designed to look fresh when they’re not.

The company wants approval for GM Golden Delicious and Granny Smith apples but it also wants to engineer Gala and Fuji apples in the future.

### SUMMARY

#### WHAT’S THE PROBLEM?

- » Consumers don’t want the GM apple.
- » The GM “non-browning” apple will be misleading to consumers because it will look fresh when it’s not.
- » BC apple growers have already rejected the GM apple.
- » Contamination from GM apples is a risk to organic apples and to the market for all Canadian apple producers.
- » Health Canada and the Canadian Food Inspection Agency are using public funds to review a GM apple that no one wants.
- » The federal government has not consulted with farmers and consumers and federal regulators do not consider economic or social concerns before they approve any new GM crop.

### WHEN COULD THE GM APPLE BE APPROVED?

The GM apple could be approved in the U.S. in 2012 or 2013. The company says the apple could be approved in Canada in 2014 but there’s no timeframe for a decision because the entire process will happen in secret. The company asked for approval in the U.S. in March 2010 and sent its request to the Canadian government in December 2011.

No GM apples have been approved anywhere in the world.

## HOW DID THE COMPANY ENGINEER THE APPLE?

The company silenced a gene in the apple (that controls browning) by inserting modified apple DNA along with genetic sequences from three different species:

- 1 A regulatory gene switch from a plant virus (Cauliflower Mosaic virus promoter: CaMV 35S);
- 2 A terminator sequence from a bacterium (*Agrobacterium tumefaciens* taken from its Nopaline synthase gene: nos); and
- 3 An antibiotic resistance marker gene from a bacterium (*Streptomyces kanamyceticus*) here the nptII gene (which confers resistance to the antibiotic kanamycin).

The technology was developed in Australia and licensed by Okanagan Specialty Fruits.

## WHAT IS THE CONTAMINATION RISK?

We cannot control where apple seeds and pollen from GM apple trees will go.

### Bees and Pollen

Apples are pollinated by bees. The company, OSF, says that bees will stay very close to their hive when there is enough food (such as when an orchard is in bloom) and that the risk of contamination from bees is small. However, there are approximately 450 native bee species in BC and the Yukon and there are many small orchards that support a great variety of these wild/native bee species.

OSF also says that “dense orchard plantings and buffer rows make it very difficult for bees to maneuver far, so the risk of bees carrying pollen far enough to be an issue is almost nonexistent.” (3) But many orchardists disagree, especially when they consider the behaviour and diversity of native bees.

To limit the risk of contamination the company also says it will implement “grower stewardship standards” to define buffer distances between GM apple orchards and other apple orchards. However, the cost and set-up of buffer zones has so far been the burden of organic farmers and other growers who want to protect their non-GM crops from GM contamination, rather than farmers planting GM crops. Buffer zones will add to the cost of production and would likely be a disincentive to grow the GM apples. There is no guarantee that the company will set up such standards or that they will be able to enforce them.

### Apple Seeds

Apple seeds do not breed true (they may retain some traits of their parents but the resulting trees are not an exact copy of their parent) so grafting is used to propagate apple trees rather than seeds. However if apple seeds pollinated with GM pollen germinate they will result in GM apple trees (trees expressing the GM trait or carrying the new gene sequence).

There are many ways that GM apple seeds can spread in our environment such as by humans discarding apple cores, cores in compost piles, seeds scattered by animals, and deliberate plantings.

## WHAT HAPPENS TO OUR APPLES IF GM POLLEN SPREADS?

If an apple tree is pollinated with GM pollen, the genes would be present in the resulting apple seeds, not the apple flesh. If pollen from GM apple trees moves into a non-GM apple orchard, some seeds from the non-GM trees that were pollinated will carry the new gene sequence and could express the new GM trait.

## CONSUMERS OPPOSE THE GM APPLE

- » 69% of Canadians don't want to eat the GM apple, according to a 2012 poll commissioned by the B.C. Fruit Growers' Association and the Quebec Federation of Apple Producers.(4)
- » The U.S. Apple Association says, "consumers like their apples and are not calling for these new "nonbrowning" cultivars." (5)

## APPLE GROWERS OPPOSE THE GM APPLE

Contamination from GM apples threatens the future of our apples, and the farmers who grow them.

- » The BC Fruit Growers Association opposes the GM apple.
- » The U.S. Apple Association "does not support the approval of this product." (6)
- » The Washington-based Northwest Horticultural Council has asked the U.S. Department of Agriculture to stop the GM apple.

## THE GM APPLE IS NOT NECESSARY

The GM technology is unnecessary as there are already techniques that slow browning in apples - in our kitchens we use lemon juice, and the food service industry uses ascorbic acid (vitamin C).

There are also varieties of naturally slow-browning apples, such as Ambrosia which is grown in BC.

## TAKE ACTION

- 1 In BC: Sign the petition and collect signatures [www.okanagangreens.ca](http://www.okanagangreens.ca)
- 2 Write to your provincial Minister of Agriculture
- 3 Write to the federal Minister of Agriculture
- 4 Check [www.cban.ca/apple](http://www.cban.ca/apple) for actions and updates

**DONATE TODAY!**  
[www.cban.ca/donate](http://www.cban.ca/donate)



For more information: [www.cban.ca/apple](http://www.cban.ca/apple)

### CANADIAN BIOTECHNOLOGY ACTION NETWORK

Suite 206, 180 Metcalfe Street, Ottawa, Ontario, Canada K2P 1P5 • Tel: 613 241 2267 ext.25 • [coordinator@cban.ca](mailto:coordinator@cban.ca) • [www.cban.ca](http://www.cban.ca)

## BC GROWERS REJECTED THE GM APPLE OVER TEN YEARS AGO

In 2001, BC apple growers stopped the GM apple from being field tested in Canada. The federal government agricultural station in Summerland in the Okanagan valley, an important fruit growing area, was preparing to start field trials but growers who were concerned about contamination stopped these field trials from happening. As a consequence, the company has tested all their apple trees in the U.S.

*“Apples are healthy and nutritious the way they are. Browning is a natural process that results from exposure to oxygen. There are already naturally low-browning apples in the marketplace. In addition if you just put some vitamin C fortified apple juice on sliced or cut apples it will also prevent browning.”*

—Mark Gedris, Director of Membership & Communications for U.S. Apple Association (Fruit Grower Report, June 16, 2012 [www.agrinfo.net](http://www.agrinfo.net))

## Notes

- 1 Okanagan Specialty Fruits, <http://www.okspecialtyfruits.com/arctic-apples/about-our-nonbrowning-apples>
- 2 "Okanagan GM apple doesn't go brown when sliced," by Sam Redding, Kelowna Daily Courier, May 18, 2012.
- 3 Okanagan Specialty Fruits, <http://www.arcticapples.com/blog/joel/cross-pollination-concerns-don%E2%80%99t-bee-lieve-it#.UCLi6mNSSQY>
- 4 B.C. Fruit Growers' Association and La Fédération des Producteurs de Pomme du Québec, Canadian Public Opinion Poll, Leger Marketing, July 3, 2012.
- 5 US Apple, Consumer Updates and Information: Genetically Engineered <http://www.usapple.org/consumers/all-about-apples/consumer-updates-information>
- 6 Ibid.