



Arctic Apples

Arctic® Granny and Arctic® Golden apples

What?

Arctic® apples do not turn brown when bitten, cut, or bruised.

How?

A very small number of genes (four) are responsible for making an apple turn brown when cut. An enzyme called polyphenol oxidases (PPO) is responsible for this “oxidative” browning. In the Arctic® apple, the gene for browning is essentially switched off.

Why?

Besides making it easier to use in salads and fruit trays, or to use as a healthy snack, the nonbrowning trait can help reduce food waste from farm to table. As much as 40% of all apples grown are wasted, in part because of browning. (Read article: Tesco says almost 30,000 tonnes of food 'wasted' <http://www.bbc.com/news/uk-24603008>).

Lowering the level of the PPO enzyme that causes browning may also boost nutrition in sliced apples, as these enzymes can reduce levels of certain nutrients, such as vitamin C or antioxidants.

In the food service industry, regular apples can be treated with an antioxidant to prevent browning. However, the treatment is expensive and tends to create an unpleasant flavor. Arctic® apples don't require this treatment.

Original Research

Okanagan Specialty Fruits (OSF), based in Summerland, BC, with research labs in Saskatoon, SK.

Registration

Canada 2017 - Arctic® apple required three separate assessments. Health Canada assessed the safety and nutrition of Arctic® apple for use as food, while the Canadian Food Inspection Agency (CFIA) assessed the safety and nutrition of Arctic® apple for use as a livestock feed and suitability for release into the environment.

USA 2016

Commented [JB1]: Arctic(R) Fuji apples are also fully approved in Canada

Commented [JB2]: Arctic Golden and Arctic Granny approved in 2015, Arctic Fuji approved in 2018

Commented [JB3]: Arctic Golden and Arctic Granny approved in 2015, Arctic Fuji approved by USDA in 2016

Consumer concerns and answers

If the apples don't turn brown how will I know if they have decayed and may not be fit to eat?

The nonbrowning trait has no effect on decay caused by bacteria or fungi – in fact it may be easier to see the rotten apples!

Are Arctic apples as nutritious as 'regular' apples?

Arctic® apples have the same nutrient composition as non-GMO apples.

Commercialization challenges

Commodity groups like the US Apple Association and BC Growers Association urged US and Canadian governments not to approve deregulated status for Arctic® apples, primarily due to concerns about negative impact on industry image, propagated by anti-GMO groups.

The company thinks that consumers might be more open to accepting Arctic® apples than other foods developed through genetic engineering, since no foreign genes have been introduced, just certain genes turned off. Arctic® apples look, taste and grow like any other apples; they just don't turn brown.

Commented [JB4]: US Apple has since changed their position on Arctic apples, and are now supportive

References

CFIA 2017. Questions and answers: Arctic® apple <http://www.inspection.gc.ca/plants/plants-with-novel-traits/general-public/questions-and-answers-arctic-apple/eng/1426884802194/1426884861294>

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Tanuja, P. and Kumar, A.P. 2017 Transgenic fruit crops – A review. Int J Curr Microbiol. App 6: 2030-2037

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Xu Kenong 2014, Precision genome editing may ease debate and regulatory burden on genetically modified fruit New York Fruit Quarterly 22: 29-32

Non Browning Apples to reduce food waste and increase consumption <http://supportprecisionagriculture.org/gmo-apple.html>

