

Facts on B.t.k.

- **What is B.t.k. and how does it work?**

Bacillus thuringiensis var. *kustaki* (B.t.k.) is a naturally occurring bacterium that can kill larvae (caterpillars) of some lepidopteran insects (butterflies and moths), including the gypsy moth, spruce budworm, and hemlock looper. B.t.k. is commercially available as a biological insecticide and it is used in pest control programs in forestry, agricultural, and urban settings around the world.

B.t.k. is most commonly used to control defoliating caterpillar pests. After being sprayed B.t.k. has to be eaten by the insect to be effective, and therefore must be sprayed when the insects are feeding most actively and when they are most susceptible to the insecticide. Very little of this product is required to be effective. Only two to three litres is required to treat a hectare of forest. However, two applications may be necessary to give the best control because the caterpillars may hatch at different times.

- **How much forest area will be treated with B.t.k. in 2017?**

Approximately 3,000 hectares of forest will be treated with B.t.k. as part of the 2017 hemlock looper control program. Treatments are proposed for 2 treatment blocks on the Northern Peninsula.

- **Has B.t.k. been used in this Province before?**

Yes. B.t.k. has been used to protect forests in Canada for over a quarter century. In this Province, B.t.k. has been used since 1977 to control Eastern Spruce Budworm and Eastern Hemlock Looper. During that time it has helped control insects causing significant damage on over one million hectares of forest.

- **What impact does B.t.k. have on the Environment?**

B.t.k. is naturally occurring and can be found in soil, water and on plants around the world. B.t.k. has been extensively studied; in over 30 years of safe use, no significant environmental problems have been observed.

B.t.k. does not kill other types of insects such as honeybees, helpful insect predators or parasites. B.t.k. has no impact when eaten by fish, earthworms, frogs, birds, mammals or humans; none of these organisms have the alkaline gut necessary to activate B.t.k..

As B.t.k. is sensitive to sunlight, it breaks down quickly in the environment. Several days of sunlight or heavy rain can cause the B.t.k. spray to become in-effective. The exposure level to B.t.k. from an aerial spray program is very low in comparison to the levels applied in safety and health related testing. Even at the higher rates used in tests; B.t.k. has been shown to be safe. That safety has been confirmed again and again over 30 years of use in urban and rural applications.

- **What effect does B.t.k. have on humans?**

B.t.k. is only activated in insects with an alkaline digestive system. Humans have an acid stomach which does not allow B.t.k. to be activated in the body. The B.t.k. spores if ingested by humans are simply excreted out of the body or stay in the body without any infection.

Studies on humans who had eaten B.t.k. have shown no infection or poisoning effects. As well, testing on the human health of the general public during aerial spray of B.t.k. did not find any negative effects related to the spray. Over many years of safe use of B.t.k. Bioinsecticides, there have been no documents that indicate harmful effects on human health.

- **Will B.t.k. spray affect non-target insects?**

The impact of B.t.k. on these non-pest invertebrates is very limited. B.t.k. is specific to Lepidoptera insects. It has no effect on honeybees, spiders, parasitic wasps and flies. Other Lepidoptera insects have to be in the larval stage at the time of spray application to be affected, because B.t.k. is a stomach poison and it must be eaten to be effective.

- **Does B.t.k. affect aquatic organisms?**

No. B.t.k. becomes ineffective after 48 hrs in water. The B.t.k. spores settle down on organic matters and soil, and are rapidly inactivated in soils that have a pH below 5.1. Most soils in Newfoundland forests are very acidic and have pH around 4.0-4.5.

B.t.k. is specific to moth larvae. Studies have shown that B.t.k. was not toxic to fish such as rainbow trout and bluegills or to water fleas. Exposure of a small marine fish, *Anguilla*, at up to 2000 times the level of B.t.k. expected during spray programs, did not show any harmful effect.

- **Is it safe to eat the fish or meat of game animals from B.t.k. treated areas?**

Yes, B.t.k. is naturally present in the environment and human body. Since B.t.k. breaks down quickly in the environment the levels of B.t.k. in the fish or meat of game animals from B.t.k. treated areas would not differ from that of non-treated areas. In addition, humans do not have the alkaline gut necessary to activate B.t.k.. Accordingly, there would be no additional risk by eating fish or meat of game animals from B.t.k. treated areas, compared to non-treated areas.

- **Are the berries from B.t.k.-treated areas safe to eat?**

Yes, B.t.k. breaks down quickly in the environment by sunlight or rain. The amount of B.t.k. on the plants after spray application returns to natural levels quickly.

Depending on the amount of rainfall levels return to normal in approximately two days to one week. By the time of traditional berry picking, the B.t.k. level in treated areas will be similar to that of untreated areas. There will be no difference to people picking and eating berries from treated or non-treated areas. Moreover, B.t.k. is only activated in the alkaline insect gut. The acidic human digestive system does not have the environment for the B.t.k. to become activated.

B.t.k. is registered for use on fruit trees, berries and vegetables and it can be applied up to harvest time. Because of its safety to human health, B.t.k. is used in organic farming where no synthetic chemical pesticides are allowed to be used.

- **What is the Government of Newfoundland and Labrador's position on the use of B.t.k.?**

The Government of Newfoundland and Labrador recognizes the importance of a healthy forest to both the environment and the economy of this province. Accordingly, government supports the responsible and safe efforts that protect our forests from harmful insects.

The decision to use B.t.k. to control insect outbreaks was made only after careful review of the existing information on the health and environmental effects associated with insect control programs using this product. The Department of Health and Community Services supports the position of Health Canada that B.t.k. does not pose a risk to people.

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