

## Facts on B.t.k.

- **What is Btk and how does it work?**

*Bacillus thuringiensis* var. *kustaki* (Btk) 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. Btk is commercially available as a biological insecticide and it is used in pest control programs in forestry, agricultural, and urban settings around the world.

Btk is most commonly used to control defoliating caterpillar pests. After being sprayed Btk 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 Btk in 2007?**

Up to approximately 5,000 hectares of forest will be treated with Btk as part of the 2007 hemlock looper control program. Treatment is proposed in several locations on the Northern Peninsula.

- **Has Btk been used in this Province before?**

Yes. Btk has been used to protect forests in Canada for over a quarter century. In this Province, Btk 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 one million hectares of forest.

- **What impact does Btk have on the Environment?**

Btk is naturally occurring and can be found in the soil, water and on plants around the world. Btk has been extensively studied; in over 25 years of safe use, no significant environmental problems have been observed.

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

As Btk is sensitive to sunlight, it breaks down quickly in the environment. Several days of sunlight or heavy rain can cause the Btk spray to become non-effective.

The exposure level to Btk 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, Btk has been shown to be safe. That safety has been confirmed again and again over 25 years of use in urban and rural applications.

- **What effect does Btk have on humans?**

Btk is only activated in insects with an alkaline digestive system. Humans have an acid stomach which does not allow Btk to be activated in the body. The Btk 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 Btk have shown no infection or poisoning effects. As well, testing on the human health of the general public during aerial spray of Btk did not find any negative effects related to the spray. Over many years of safe use of Btk bioinsecticides, there have been no documents that indicate harmful effects on human health.

- **Will Btk spray affect non-target insects?**

The impact of Btk on these non-pest invertebrates is very limited. Btk 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 Btk is a stomach poison and it must be eaten to be effective.

- **Does Btk affect aquatic organisms?**

No. Btk becomes ineffective after 48 hrs in water. The Btk 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.

Btk is specific to moth larvae. Studies have shown that Btk 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 Btk expected during spray programs, did not show any harmful effect.

- **Is it safe to eat the fish or meat of game animals from Btk treated areas?**

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

- **Are the berries from Btk-treated areas safe to eat?**

Yes, Btk breaks down quickly in the environment by sunlight or rain. The amount of Btk 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 Btk 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, Btk is only activated in the alkaline insect gut.

The acidic human digestive system does not have the environment for the Btk to become activated.

Btk 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, Btk 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 Btk?**

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 Btk 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 Btk does not pose a risk to people.

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