



Health Canada Advisory **concerning the** **Packaging of Fresh Mushrooms***

There have been concerns over the years about the safety of fresh mushrooms sold in trays completely wrapped with non-perforated plastic film. The following information is provided as guidance to both domestic and foreign producers, as well as to importers and retailers, to clarify how and why fresh-packaged mushrooms need to be handled safely.

Nature of the Hazard

Mushrooms Packaged in Hermetically-Sealed Containers

Mushrooms can contain spores of *Clostridium botulinum* bacteria. Since the product is fresh, both the mushroom tissue and any native microflora would continue to respire; and it is expected that sealed packages would become anaerobic within a few days of packaging. In the absence of oxygen, *C. botulinum* can grow and produce toxin before visible signs of spoilage appear. Botulism is a neuroparalytic disease with an incubation period of 12 to 36 hours. Vomiting, diarrhea, nausea, fatigue and muscular weakness are the first symptoms. They are soon followed by optical effects, such as droopy eyelids, sluggish response of pupils to light, blurred and double vision. Effects in the mouth include dryness with difficulty in speech and swallowing. Muscles controlling the limbs and respiration become progressively paralysed. If not treated, death from respiratory failure may occur within 3 to 5 days.

Mushrooms displayed in unrefrigerated trays wrapped in a non-perforated plastic film provide an environment in which *C. botulinum* may grow and produce toxin. Since mushrooms are often consumed fresh, without cooking, there is a risk of acquiring botulism poisoning by consuming fresh mushrooms in trays wrapped in non perforated plastic. Studies with sealed trays of mushrooms inoculated with *C. botulinum* spores have shown that toxin can be produced in three or four days at room temperature, before the mushrooms become unsightly or organoleptically objectionable.

Regulatory Obligations/Requirements for Mushrooms Packaged in Hermetically-Sealed Containers

When mushrooms are packaged in a hermetically sealed container, such as when it is vacuum packaged, manufacturers/marketers should be aware of their legal obligation to ensure that the product satisfies the requirements of the *Food and Drugs Act and its Regulations*, particularly *Section B.27*. When mushrooms are stored in a hermetically sealed package and are not processed to commercial sterility, the product must be maintained refrigerated at 4°C or less from the time of packaging and a clear “Best Before” date must be affixed to the outside of the package indicating the end of the expected shelf-life. Production, packaging, transit, storage parameters and any data from challenge studies, must be assessed by Health Canada before the



stated shelf-life of the product can be accepted and the commodity offered for sale. In the case of packaged fresh mushrooms that have been imported, the onus is on the importer to obtain the above information and provide it to Health Canada for their assessment.

Health Canada Advice

Because of the potential risk of botulism in fresh mushrooms packaged in hermetically sealed containers, the Food Directorate of Health Canada is currently recommending to the food industry that plastic film used to package fresh mushrooms be visibly perforated to allow free access of air to the mushrooms. Studies have shown that this can be accomplished with a minimum of two 3.0 mm (approximately 1/8 inch) holes situated over the top of the tray. Alternatively, lines of perforations which provide an air exchange equivalent to the 3.0 mm holes are acceptable.

**For the purpose of this document, fresh mushrooms are defined as any mushrooms (in whole or in part) sold in Canada excluding those that have been canned, dried or processed to commercial sterility. Such mushrooms would be in their original, unspoiled and unaltered state.*

Health Products and Food Branch
Health Canada

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Note: The Advisory issued on June 20, 2005 included the recommendation that mushrooms in perforated packaging be refrigerated. Recent review of the risks related to botulism indicates that this is not necessary.