High microbial load in sprouts and ready-to-eat salad mixtures

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Fresh sprouts and ready-to-eat salad mixtures sold in bags which were cut, washed and packaged days earlier are considered as perishable products. Though they are stored under refrigerated conditions, there is a danger of microbial deterioration and contamination with bacteria such as *Listeria*, *Salmonella*, *E. coli* bacteria or viruses such as norovirus or hepatitis A virus. These microorganisms can cause a range of foodborne infections of varying severity with symptoms such as nausea, indigestion, bloody diarrhoea or kidney dysfunction. Fresh sprouts as well as ready-to-eat mixtures of leaf lettuce and uncooked vegetables such as white or red cabbage and carrots can thus become a health hazard for humans.

The Federal Institute for Risk Assessment (BfR) has completed studies on the microbial load of sprouts and ready-to-eat salads mixtures. In 2009, 59 samples of fresh, packaged sprouts and shoots from retail shops were analysed. The results showed that the number of bacteria in packaged sprouts increases considerably within a few days, and that the microbial load is very high when they reach the best before date.

In 2008 BfR analysed ready-to-eat salads mixtures from retail shops with regard to *Listeria* bacteria. Out of 133 salad mixtures, 5% of samples contained the disease-causing bacteria *Listeria monocytogenes,* especially mixed salads that contained white cabbage.

Whole lettuce and cabbage leaves provide certain natural protection against bacteria. This protection is broken once they are cut. Cell sap is released at the cut surface and promotes the growth of bacteria. In addition, the humidity inside plastic packaging provides the ideal climate for accelerated growth of microorganisms. Research literature lists a variety of causes for the high microbial load of sprouts and ready-to-eat salads. Contamination with bacteria can already occur during the growth and harvesting phase of plants, for example when vegetables or sprouts are irrigated with contaminated water. In addition, a lack of hygiene during processing such as contaminated washing water or a lack of refrigeration can promote the growth of bacteria in sprouts and salads. Some bacteria are carried over into the food chain by farm animals, others simply occur everywhere in the environment. Bacteria sometimes stick fast to the surface of plants, especially to that of white cabbage or they can even enter the plant material. The extent to which bacteria can multiply within the cells of plants has not been determined conclusively by sciences. However, it is certain that bacteria multiply much slower in plant cells than in animal cells. Furthermore, the cultivation of sprouts in special containers promotes the growth of bacteria. Regular intermediate cleaning should thus be adhered to.

Though in Germany, foodborne infections are only rarely the result of the consumption of vegetables or shoots (i.e. “germ buds”), as a precaution individuals with a weakened immune response should refrain from the consumption of raw sprouts and packaged pre-cut salads. BfR recommends that all other consumers wash these foods thoroughly before consumption and to consume them as soon as possible in order to reduce the microbial load.

The full version of this BfR Information is available in German on http://www.bfr.bund.de/cm/208/hohe_keimbelastung_in_sprossen_und_kuechenfertigen_salatmischungen.pdf

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