

Advice 02-2017 of the Scientific Committee of the FASFC on the risks related to the use of hydrogen peroxide in the rinsing water of sprouted seeds and of 4th range vegetables

Background & Terms of reference

Washing sprouted seeds and 4th range vegetables is an important step, among others, to reduce the microbial load. The use of solutions of some chemicals, as processing aids, aim to reduce the microbiological load in the wash water without compromising the product quality. However, these solutions can leave residues in food. Therefore, the risks associated with the use of processing aids should be evaluated.

The following two questions are addressed to the Scientific Committee in order to have an opinion on the specific use of hydrogen peroxide in the wash water of sprouted seeds and 4th range vegetables.

- What are the food safety risks related to the use of hydrogen peroxide as a processing aid in the rinsing water of sprouted seeds?
- What are the food safety risks related to the use of hydrogen peroxide as a processing aid in the rinsing water of 4th range vegetables?

Methodology

The Scientific Committee has very little information on the washing/rinsing process of sprouted seeds and 4th range vegetables as well as on the nature of the solutions of hydrogen peroxide generally used in this process.

In absence of data, the Scientific Committee has conducted an exposure scenario based on hypothetical concentrations in order to assess the risks associated with the use of hydrogen peroxide as a processing aid in wash water of sprouted seed and 4th range vegetables. The margin of safety (MOS) was used to characterize the risks associated with the intake of hydrogen peroxide. A MOS less than 1.000 gives an indication of a risk for the consumer.

Results

Hydrogen peroxide has a low toxicity and is considered as not harmful for the environment due to its rapid degradation. The use of hydrogen peroxide for decontamination is considered to be less toxic than the use of chlorine-based solutions that can form halogenated by-products among which some are carcinogenic. Hydrogen peroxide is rapidly decomposed into oxygen and water. However, as a strong oxidant, it generates free hydroxyl radicals which can react with organic molecules such as proteins, nucleic acids and lipids.

Since hydrogen peroxide is an unstable reactive substance that degrades rapidly into oxygen and water, the probability is negligible that hydrogen peroxide is present in sprouted seeds or 4th range vegetables following rinsing with a solution of 2% hydrogen peroxide. Therefore, in absence of data on the presence of hydrogen peroxide residues in the concerned products the limit of detection of an analytical method for the determination of hydrogen peroxide was used to calculate consumer exposure. Based on the Belgian consumption data on vegetables, consumption of sprouted seeds or 4th range vegetables should not generate a risk to the consumer when the residual concentration of hydrogen peroxide after treatment is ≤ 1.5 mg/kg (detection limit). In fact, the margin of safety (MOS) values are well above 1.000 (between 1.238 and 50.980).

However, the hydrogen peroxide solutions present on the market are likely to contain additives/stabilizing agents and impurities. Although some of these additives/stabilizing agents and impurities are known, there is still a big lack of information concerning both their complete composition and concentration in hydrogen peroxide solutions (potentially) used by the operators. It is therefore not possible to estimate the risk of the residual presence of these additives/stabilizing agents and of these impurities.

Similarly, it is not possible to assess the risk linked to the possible formation of reaction products with food components because there is insufficient knowledge of this subject.

Conclusions

Due to its instability in water and high chemical reactivity, it is unlikely that hydrogen peroxide remains intact in sprouted seeds or in 4th range vegetables.

The Scientific Committee estimates that the consumption of sprouted seeds or 4th range vegetables does not represent a risk to the consumer when the residual concentration of hydrogen peroxide is ≤ 1.5 mg/kg (detection limit).

However, given the insufficient knowledge in regard to additives and impurities present in the hydrogen peroxide solutions and of the reaction products formed with foods, the manner in which these are formed and their toxic properties, a more extensive risk assessment linked to the use of hydrogen peroxide is necessary based on these elements. In addition, to ensure the absence of hydrogen peroxide residues in sprouted seeds and 4th range vegetables, the Scientific Committee recommends that analyzes are carried out.

The full text is available on this website in dutch and in french.