

Minute statement (Point 16): Food Microbiology and Hygiene - Papain from papaya fruit (*carica papaya*) used as a meat tenderising agent - (examination of additional information)

Papain has been previously evaluated and found to be acceptable for chill proofing of beer on the basis that it is a constituent of a part of a plant (papaya fruit) commonly consumed as a food source. (80th meeting of the Scientific Committee for Food, October 1991).

In its Opinion on Papain from Papaya Fruit (*Carica papaya*) used as a Meat Tenderising Agent, expressed in June 1995, the SCF considered that the use of papain as a meat tenderiser, administered to stunned and pithed animals before bleeding, was acceptable from the point of view of the safety of papain *per se*, provided the general provisions of the guidelines on enzymes (CEC, 1992) were followed.

In this Opinion, the SCF also considered that the bacteriological safety of meat, where papain is injected into beef as a meat tenderiser should be confirmed by pilot testing under different conditions, representative of actual hygiene conditions in slaughterhouses in different Member States of the EU.

In its 1995 Opinion, the Committee raised the question of whether the use of papain-treated meat in fermented sausages might affect the levels of biogenic amines in the final product. The petitioner subsequently submitted further information for evaluation by the SCF to address the concerns raised in the 1995 Opinion. The Committee concluded as follows.

Microbiological safety

The Committee remains concerned that any process involving the physical introduction of material into the deep tissue layers of the animal prior to bleeding, under slaughterhouse conditions, increases the risk of contamination and propagation of micro-organisms into other parts of the body/meat, whether this is through injection of papain or other substances, or through the pithing process.

Further the Committee remains concerned that the delay in bleeding necessary to facilitate the spread of papain throughout the body, may increase the opportunity for micro-organisms introduced in the way outlined above or in the papain solution itself, to be disseminated.

The committee is also concerned about the relationship between the delay in bleeding and pH-values in the tissues.

Formation of biogenic amines

The Committee notes the following in relation to the potential levels of biogenic amines in fermented sausages made from meat treated in this way:

In its 1995 Opinion, the Committee raised the question of whether the use of papain-treated meat in fermented sausages might affect the levels of biogenic amines in the final product. In a report submitted by the applicant, it was shown that there was no difference in amine production in sausages prepared from meat from animals treated with papain compared with ones prepared from untreated meat. However, the Committee is aware of one recently published study in which papain was added at two different levels to experimentally prepared, fermented, dried sausages. The study showed an increase in the levels of free amino acids and biogenic amines, such as histamine and putrescine, in sausages with added papain compared with controls.

However, it is not clear how the amounts of papain added to the experimental sausages might relate to residues of papain which may be present in meat if it were used during the slaughtering process and furthermore, although there was a clear dose-related effect in the release of free amino acids, this was not the case for the amines.

The Committee was therefore not able to draw a firm conclusion on the likelihood of an increase in amine production after papain treatment, but such an effect cannot be excluded.

Summary and Conclusion

The Committee remains concerned about the microbiological safety of the meat injected with papain under slaughterhouse conditions, particularly in relation to the increased risk of contamination through the injection site and the subsequent risk of propagation of micro-organisms into other parts of the body. The Committee is also concerned that the delay in bleeding necessary to facilitate the spread of papain throughout the body, may increase the opportunity for micro-organisms introduced in the way outlined above or in the papain solution itself, to be disseminated. The Committee recommends that the issues raised relating to veterinary hygiene in slaughterhouses and in particular to the pithing and other processes involving the introduction of materials into deep tissue layers are examined by the Scientific Veterinary Committee.

In its 1995 opinion, the Committee raised the question of whether the use of papain-treated meat in fermented sausages might affect the levels of bio-genic amines in the final product. After consideration of the information provided in the report submitted by the applicant, the Committee was not able to draw a firm conclusion on the likelihood of an increase in amine production after papain treatment, but such an effect could not be excluded.

In these circumstances, the Committee is unable to give a favourable opinion on the use of papain as a meat tenderiser, injected after stunning and before bleeding under slaughterhouse conditions .