Proposal P1019
CARBON MONOXIDE AS A PROCESSING AID FOR FISH

General Procedure

Summary

While the NSW Food Authority supports the intent of the proposal, to clarify the requirements for carbon monoxide in the Code, the Authority is of the view that the proposal does not adequately make the case as to why carbon monoxide should be prohibited for this purpose in fish. Furthermore the Authority considers that the proposal, as is, will not address the issues of enforcement around this matter and that it could potentially lead to confusion and inconsistent application by regulators and industry alike. Therefore the Authority requests that FSANZ:

- Clarifies if the intent applies to both carbon monoxide in an industrial gas mix and carbon monoxide in filtered smoke for treating fish;
- Includes a more robust review of food safety issues associated with treated fish; and
- Considers the use of carbon monoxide in other foods to ensure a consistent approach is taken in respect to the use of carbon monoxide.

Specific Issues

The NSW Food Authority agrees that there is the need to clarify the intent of the permission for carbon monoxide as a processing aid in Standard 1.3.1 but believes that the proposed changes do not address all issues concerning the use of carbon monoxide.

<u>Use of carbon monoxide in fish processing</u>

The use of carbon monoxide in fish processing has attracted considerable interest in recent years. As mentioned in the P1019 paper, fish treated with carbon monoxide retains the bright red colour, making it visually appeasing to consumers. As thawing can effect the colour of fish, the colour retention is especially relevant to the marketing of frozen fish, which allows consumers greater access to fish, especially in non-fishing regions/areas or during seasons when certain species may not be available. Despite this there are concerns that the use of carbon monoxide in fish may deceive consumers, thinking they have purchased “fresh fish” when in fact it is treated and in most cases thawed. Given that fish is highly perishable, the Authority considers that CoOL requirements also contribute towards informing consumers of the freshness of fish. Schubring (2008) provides an overview of the processing of fish with carbon monoxide, and while some of the information may be out dated, it is a useful reference when considering the use of carbon monoxide in fish.

In Schubring (2008) and some of the references quoted in the P1019 paper (Anderson and Wu 2005, Pivarnik et al 2001 and Ludlow et al 2004) it is noted that

the practice of using carbon monoxide to stabilise the red colour of fish can occur by two processes:

- The use of carbon monoxide gas; and
- The use of filtered smoke (also referred to as tasteless or odourless smoke), which contains a mixture of gases, including nitrogen, oxygen, carbon dioxide and carbon monoxide as a consequence of burning wood and filtering the smoke and collecting the resulting odourless smoke in containers (gas cylinders or sealed tanks are commonly used).

The NSW Food Authority believes that any review of the use of carbon monoxide in fish should discuss and consider both processes as they both achieve the same outcome due to the presence of carbon monoxide.

Safety of treated fish

The NSW Food Authority notes that within the P1019 paper justification for prohibiting the use of carbon monoxide in fish includes food safety concerns, in particular the potential for histamine poisoning. Over the last ten years in NSW there were 8 confirmed or suspected outbreaks of histamine poisoning. The NSW Food Authority reviewed the outbreaks and could not attribute any increase in occurrence or severity due to treated fish, be it carbon monoxide or filtered smoke. Further, the reference quoted in P1019 appears to be based on a poster presented at an annual meeting of a professional association and detailed information on the study does not appear to be available.

The NSW Food Authority would like to see a more detailed examination of food safety issues, including a review of outbreaks of histamine poisoning (where possibly linking back to fish source) and a more thorough literature review on the safety of treated fish.

It must be acknowledged that this potential food safety risk can be mitigated by management of the cold chain. The NSW Food Authority notes that Standard 4.2.1 requires fish from pre-harvesting production up to, but not including manufacturing operations to be maintained at or below 5ºC if this is necessary to minimise the growth of infectious or toxigenic microorganisms in the food so that the microbiological safety of the food will not be adversely affected for the time the food is at that temperature. In addition, Standard 3.2.2 applies to products after manufacture and requires a food business to store and display potentially hazardous food under temperature control.

Use of carbon monoxide in red meats and other foods

The NSW Food Authority understands that in practice carbon monoxide can be used in modified atmosphere packaging (MAP) systems used for red meat. Its use in the MAP of red meat serves the same purpose as treated fish (i.e. stabilising of the red colour). While its purpose may be the same, it is acknowledge that the amount of carbon monoxide used in the MAP of red meats is much lower than that used in treated tuna and that once exposed to the atmosphere, the red colour retention is less stable in the MAP meat compare to treated tuna. Despite this, as they both appear to serve the same purpose (colour retention), the NSW Food Authority would like to see some discussion on the use of carbon monoxide in MAP of red meat to ensure a consistent approach is taken to all foods.

General comments

While the NSW Food Authority believes that further work is required before deciding risk management strategy, the NSW Food Authority has the following comments on the approach proposed in P1019.

Definition of carbon monoxide

The P1019 paper includes various references relating to the use of carbon monoxide in fish, including *Anderson and Wu 2005*, *Pivarnik et al 2001* and *Ludlow et al 2004*. In these publications, it is noted that stabilising the colour of fish to a bright red colour can be achieved by using carbon monoxide or filtered smoke. Further, the P1019 paper includes the following statement

"*The context of these views relates to the use of carbon monoxide gas directly. It is recognised that wood smoke naturally contains some carbon monoxide; however Australian and New Zealand regulators have considered that smoking tuna is effectively regulated by the Code"* (pg 4, Summary of the assessment).

Given that the use of carbon monoxide in fish is being interpreted as a food additive (i.e. it stabilises the red colour of certain fish) and that this can be achieved by either carbon monoxide gas or filtered smoke, it would be expected that the paper includes some discussion on both of these processes. Further, as the paper makes reference to smoking tuna, it could be expected that the paper also includes some discussion on smoking, both filtered smoke and traditional seafood smoking as understood by the consumer. On this note, the NSW Food Authority would like to see a definition for carbon monoxide treatment to allow a complete assessment of this proposal.

Methods of analysis

The P1019 paper refers to two methods of analysis (*Anderson and Wu, 2005* and *Bernardi et al, 2008*) that will assist with compliance and enforcement of the proposed change. The NSW Food Authority has reviewed both methods.

Anderson and Wu (2005) describe a GC/MS method for the quantitative determination of carbon monoxide in tuna and mahi-mahi. The paper includes results for retail packs of carbon monoxide treated tuna or mahi-mahi. *Barnardi et al* (2008) describe a method for analysis of carbon monoxide in tuna using a portable gas chromotograph. In this study, retail packs of carbon monoxide treated tuna were also analysed. For both of these papers the method of treatment (ie. carbon monoxide gas or filtered smoke) is not detailed.

Should the definition of carbon monoxide not encompass both treatments, the NSW Food Authority understands from P1019 that there is no method of analysis that can differentiate between the treatments for the proposed change to be enforceable.

Use of carbon monoxide in other products

As the proposal looks to remove fish from the permission to use carbon monoxide, the NSW Food Authority requests that FSANZ provide information on where carbon monoxide can continue to be used as a processing aid.

International status of carbon monoxide

The NSW Food Authority would like clarification on the international status of CO, in particular carbon monoxide gas and filtered smoked. For example, after reading Statement of FDA Import Protection Plan (*Acheson, 2007*), the NSW Food Authority understands that within the US:

- Carbon monoxide has GRAS status for red meat and possibly tuna except where it has been used to mask adulteration; and
- Filtered smoked has GRAS status for fish.

The NSW Food Authority also understands that within US, overseas processors of fish treated with either carbon monoxide gas or filtered smoke can import into the US if the processor is 'verified' by the US Department of Commerce's Seafood Inspection Program (USDC, 2003). This seems to contradict the information in the P1019 paper.

Further, the legal status of carbon monoxide and filtered smoke in other countries differs to the US, with some countries allow one and not the other (e.g. Singapore) and others not allow either (e.g. Europe appears not to allow either).

NSW Food Authority requests further information to understand the international status of carbon monoxide and filtered smoke.

References

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