

CRYSTALS IN CANNED SALMON

Technical Bulletin CS-10

A crystalline form of magnesium ammonium phosphate ($\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$), commonly known as struvite, occasionally develops in canned salmon. Crystal development is a natural phenomenon and usually occurs slowly over a period of years. However, sizable crystals have been noted as soon as a few months after canning. Struvite crystals are soft enough to be scratched with a fingernail (hardness is about 2 on the Mohs scale), readily soluble in a dilute acid like lemon juice or vinegar, and is usually clear and colorless. The pyramid-shaped crystals have also been found in canned tuna, shrimp, crab, lobster, cod, and sardines.

It has been observed that the development of struvite in canned salmon may be enhanced by any of the following:

- Lengthy storage of the salmon in sea water prior to canning
- Use of salt that contains a magnesium carbonate free flowing agent
- Contamination with ammonia (a refrigeration leak) prior to canning
- Removal of the backbone prior to canning
- Long, still, cold storage of the canned salmon

Struvite development in canned salmon may be retarded by any of the following:

- Avoiding the above listed situations
- Use of acidulants to reduce the pH of the product
- Use of sequestering agents such as polyphosphates

Currently, use of acidulants and polyphosphates in canned salmon is prohibited by the canned salmon standard of identity, 21CFR161.170. In 1988, a petition was filed to change the standard of identity to allow for the use of these additives. To date, FDA has taken no action on this petition. Approval for the use of these additives would require the filing of a request for a Temporary Marketing Permit as detailed in 21 CFR 130.17.

At one time, it was felt that struvite developed only rarely in canned seafoods. Now, it seems likely that the occurrence is quite common. Many years of experience has proven that struvite development is not affected by the method of cooling the cans after retorting, (air cooling vs. water cooling). Neither is it affected by the form of salt used, (granular vs. tablet). Usually, struvite goes unnoticed because the crystals are so small as to be barely visible. Only on relatively rare occasions do the crystals become large enough to be noticed and objected to by consumers.