

<p style="text-align: center;">SECTION IV</p> <p style="text-align: center;">PRECOOKING</p>

GMP 4.1 The precooking units, cooking racks, pre-cookers, etc. shall be of sanitary design and be kept clean at all times. All precooking surfaces and materials coming into contact with the fish shall be clean and sanitary. No copper alloys or brass shall be used in any surface which comes into contact with the fish.

REASON

This is necessary to ensure that equipment and utensils do not become a source of bacteriological or other contamination of the product, and to prevent the greening and other discoloration of the fish flesh caused by contact with copper alloys or brass.

GMP 4.2 Cooking times and temperatures shall be adequate to remove excess fish oils and body fluids and to make the loins easy to separate from the backbone.

REASON

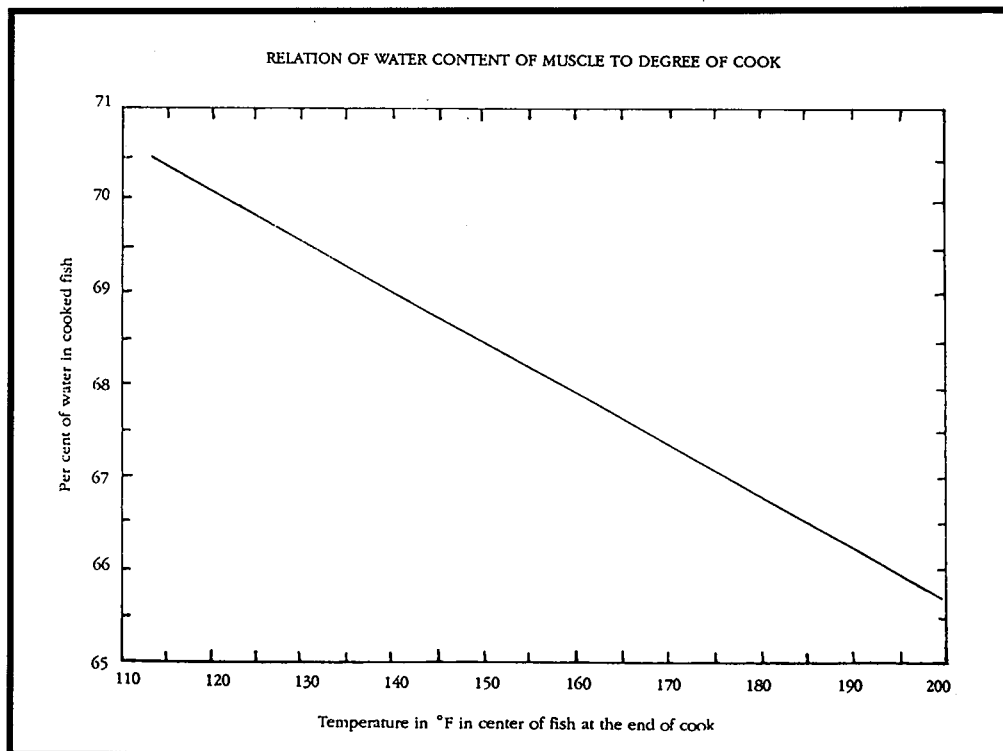
The following excerpt from *Fish as Food*, Vol. IV, Academic Press Inc., 1965, p. 226 is instructive. "As the cooking proceeds, water, and water-soluble proteinaceous material such as gelatin, nitrogen-containing extractives, and other substances are leached out of the fish and accumulate in the condensed steam which flows from the cooker continuously during the cooking operation. This condensate also contains a certain amount of oil. The steam which, during the cooking, escapes through the steam vents contains certain volatile substances that are characteristic of raw fish odour (amines). Under the influence of heat, the protein in the tuna muscle will coagulate and shrink away from the bony structure, thereby making easier the subsequent cleaning and separation of the dorsal and ventral loins which are used for canning. The precooking of tuna is,

therefore, a very important step in the over-all canning operation, as this step, perhaps more than any other, influences not only yield but quality.

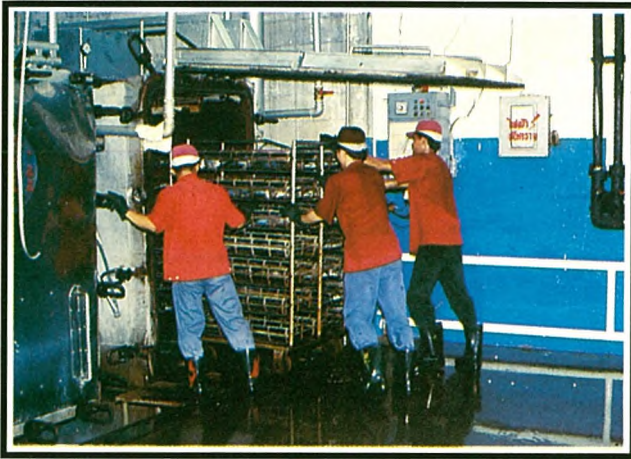
"It is known, however, that in order to obtain a good cook, the temperature of the tuna, as measured along the upper part of the spinal column, in the thickest part of the fish, must be brought up to approximately 140-150°F. Further cooking beyond this point is not only unnecessary but actually reduces both yield and flavor of the tuna meat.

"In as much as the temperature attained in the centre of the tuna is directly related to the time of pre-cook, the moisture content cooking time relationship may be expressed by a graph of similar slope.

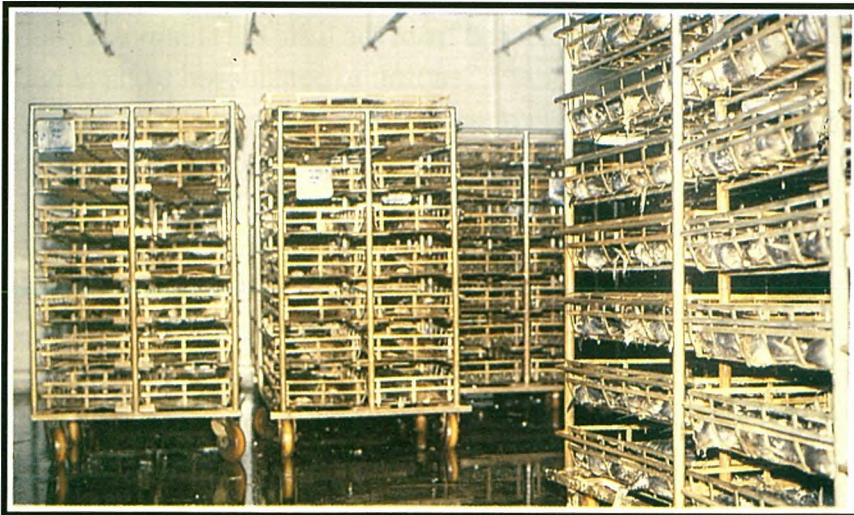
"To obtain a good cook, it is also important that the tuna be graded for uniform size, within very narrow limits. This sometimes proves difficult when the size distribution in a load of tuna is wide. Another important point to observe in connection with pre-cooking of tuna is that all the tuna must have the same temperature when entering the cooker. Tuna which has not been fully thawed will need much more heat before a temperature rise takes place in the tuna than will a fully thawed fish."



Tuna canning and Preservation of Raw Material



Cooling of fish should be under temperature and time control



After end of pre-cooking, fish should be cleaned within 6 hours

Cooking of fish, a stage of the art

