

# REPORT OF "JELLIED" FLOUNDER FROM GULF OF MEXICO

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## ABSTRACT

The jellied meat of flounder was examined chemically and microscopically for abnormalities. None was found other than the disappearance of separate muscle fiber.

## INTRODUCTION

Other investigators have reported the occurrence of a "jellied" condition of the muscle tissue in certain species of commercial food fish. Templeman and Andrews (1956) reported a "jellied" condition in American plaice (Hippoglossoides platessoides) from the Grand Banks area characterized by normal odor, low protein, extremely high moisture, and extremely high drip losses. These investigators surmised that the condition might be due to protein impoverishment following spawning in the food-poor cold waters of the Grand Banks. A report of the Food Fish Investigation Board (1952) listed "milky" hake with a white pasty meat, yet normal otherwise, occurring during a catch from Mauretanean waters in 1950. Microscopic examination showed numerous yeast-like bodies believed to be the spores of the parasite Chloromyxum thiyrsites. This paper states that Australian investigators report a strong proteolytic enzyme secreted by the parasite which is capable of producing the "milky" or "pasty" condition. Tsuchiya and Kudo (1957) report the "jellied" condition in swordfish with the parasite Chloromyxum noted in the muscle tissues. They report that low volatile basic nitrogen indicates that the meat is not to be considered spoiled. These investigators found that freezing causes a diminution of the numbers of the parasites in the meat. Between 1,100-1,400 parasites per 0.01 milliliter of muscle juice were noted after 2 weeks of frozen storage and only 200-300 remained after 15 weeks at 0° F. Fletcher and Shewan (1951) reported milkiness of Mauretanean hake and that its probable cause was the parasite Chloromyxum sp. found in the jellied meat. They also noted the fish to be organoleptically normal with respect to flavor and odor. A. Mayer (1952) reported the fillets of Icelandic catfish to show white patches near the bones and to contain a sporozoa believed to be a myxo-sporidium.

Bullis (1958) in an unpublished observation noted that Gulf of Mexico flounder, Paralichthys squamulentus, caught in the North Central Gulf in 20-50 fathoms of water and frozen immediately after catch exhibited a soft jelly-like consistency on thawing and cleaning even though the fish were normal with respect to odor and flavor. The purpose of this paper is to report chemical and microscopic examinations made of other samples of this species.

## OBSERVATIONS

In 1960 the M/V Oregon, exploratory fishing vessel of the U. S. Bureau of Commercial Fisheries, fishing off the mouth of the Mississippi River in 20-30 fathoms of water for shrimp, took 75-100 pounds of mixed sizes of flounder, P. squamulentus, which appeared normal in all respects. These fish were frozen in the round within an hour and, a few days later, were transferred to the 0° F. storage freezer at the Pascagoula Technological Laboratory. Thirty days afterward these fish were thawed overnight in the controlled thawing room of the laboratory at 37° F. On examination the fish were of mushy consistency. The cut surface of the muscle tissue was opaque, milky, and jelly-like with a thick slimy exudate appearing on standing. A careful organoleptic examination by several trained members of the Technological staff was made, and all members of the panel judged the odor normal.

A careful microscopic examination of the jellied meat was made using both widefield and bacteriological microscopes at several magnifications. Tissue preparations, stained by the

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Gram's method, and unstained slides revealed a smooth homogenous jelly-like mass with complete absence of all tissue structures. No spores, cysts, or parasites of any type were noted. It is suggested by other researchers in the field that sporulation of the vegetative forms may have been prevented by the short time elapse between catch and freezing aboard ship.

Tissue slides from two of the fish that appeared to be firmer than others showed some faint "ghost" appearance of muscle fibers which soon disappeared on standing near the warm microscope lamp. Several members of the staff definitely noted that this autolysis was rapidly progressing in the muscle tissue while the fish were being cut and examined in a warm room. Firmer fish that showed faint muscle fiber arrangement on cutting soon degenerated into a wet slimy jelly-like mass unaccompanied by any abnormal odors.

Sample Analyzed	Protein	Moisture
	. . . (Percent) . . .	
Softest flounder (avg. of 6 samples) . . .	21.20	76.9
Firmer flounder (avg. of 2 samples) . . .	21.25	77.2
Normal flounder from other sources . . .	21.00	78.0

Protein (Nx 6.25) and moisture determinations (A.O.A.C. 1960) were made on two samples of the fish. Sample A consisted of six 4-ounce fillets from the softest fish and B consisted of two 8-ounce fillets from two of the firmest fish. Results are shown in table 1.

### DISCUSSION

The protein and moisture appear normal for flounder fillets of this type. The question arises as to the low protein reported by other investigators. Should the enzyme autolyze the tissues to jelly-like consistency we would expect the same nitrogen values by the Kjeldahl method unless considerable ammonical-type decomposition occurred. The "jellied" flounder examined in this laboratory suffered very little drip loss prior to the cutting of fillets for samples.

### SUMMARY

"Jellied" flounder having normal protein and moisture are reported from the Gulf of Mexico. No parasites could be detected on microscopic examination.

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