In our continued effort to design a quality program by first describing the product and then working back through the process, we must now look at the raw materials that are to be used in the process. This is indeed a situation where the saying “you can’t make a silk purse out of a sow’s ear” applies, for once fish has lost its inherent “freshness,” for example, no amount of processing is able to restore it. Likewise, if the raw material is harvested having certain undesirable intrinsic features, it may be unsuitable for processing or, at least, make processing extremely expensive and restrictive as to the product mix attainable from the raw material.

In this chapter we will discuss a number of the intrinsic features found in various fish species as well as the methods by which fish will spoil and by what means the natural changes can be slowed down. In addition, we shall discuss the methods currently available to quality practitioners in assessing the quality of raw materials and thereby assessing their suitability for the intended process.

**INTRINSIC QUALITY OF SEAFOODS**

Fish, when they are removed from the water, possess various features or attributes that impact upon their perceived quality. Aside from the use of selective fishing methods, the seafood industry has very little control over these features, while significant negative impact can be forthcoming to the industry from these features.

Connell (1980) provides a very extensive description of a wide variety of these features. We will only discuss a much reduced variety of these features that would fall into Connell’s “condition and composition” category.
Jelly

This is a condition found in larger (greater than 19 to 20 in (48 to 50 cm) in length) female flatfish harvested from cold water. While it cannot be detected in the round state, the flesh of such fish exhibits a flabby, jelly-like appearance that, in severe cases, is unsuitable for processing into final products.

The cause of this condition is related to spawning. Just prior to spawning and during it, food reserves in the flesh of the fish are utilized in the development of the gonads. Furthermore, during spawning and for some period after, most fish do not feed. As Connell (1980, 8) notes, “As a consequence of both effects the flesh after spawning becomes severely depleted of protein, carbohydrate and fat and the fish are accordingly ‘run down.’ ” Most fish will eventually return to their normal feeding pattern. However, some living in cold water are unable to replenish the protein lost during spawning such that the moisture level remains high—thus the flabby, jelly-like appearance of the flesh.

Fish considered “normal” will exhibit a moisture content of approximately 80 percent, while those exhibiting a “slight jelly” condition exhibit a moisture content of approximately 84 percent, “medium jelly” approximately 86 percent, and “heavy jelly” approximately 88 percent. It is generally accepted in the marketplace that once the moisture content exceeds approximately 86 percent the fish is unacceptable for processing. It is generally thought that approximately 20 percent of affected fish can recover from this condition, with the remaining either dying of starvation or due to predation, perhaps because of reduced movement ability.

This condition is known to represent a significant cost to the Atlantic Canada seafood industry. Since the condition cannot be determined in the round state, significant wastage of labor costs is incurred by companies that catch, hold, and initiate processing for such fish only to find that a portion, at least, is unacceptable for processing and subsequent sale. Medium and heavy jellied fish, upon cooking, are found to yield very little edible flesh and a great deal of moisture loss.

Chalk

This condition would appear to be the opposite of “jelly”; however, it differs in that there is no change to the compositional characteristics of the fish (i.e., fat, moisture, protein, and ash).

Chalk results from the buildup of lactic acid in the muscle of fish that have undergone an exhausting struggle during harvesting. This condition is particularly prevalent in yellowtail flounder (*Limanda ferriginea*). The reaction that brings about this buildup is as follows: