Poultry processing

Following slaughter, the muscles of a carcass go into rigor mortis and are contracted. At this point the muscle is extremely tough and the carcass must "age" for 6 to 18 hours for tenderization to occur.

The tenderness of the meat after aging depends on the degree of tension or contraction which develops during rigor mortis. The extent of contraction depends on temperature and the rate of decline of pH. Rigor mortis begins somewhere between pH 6.1 and 6.3. Exposure to either low or high temperatures, beating of the muscle post mortem, and struggling during slaughter all accelerate the rigor mortis contraction and affect the tenderness of the meat product. Commercial processing compromises between efficiency and optimum conditions for tenderness.

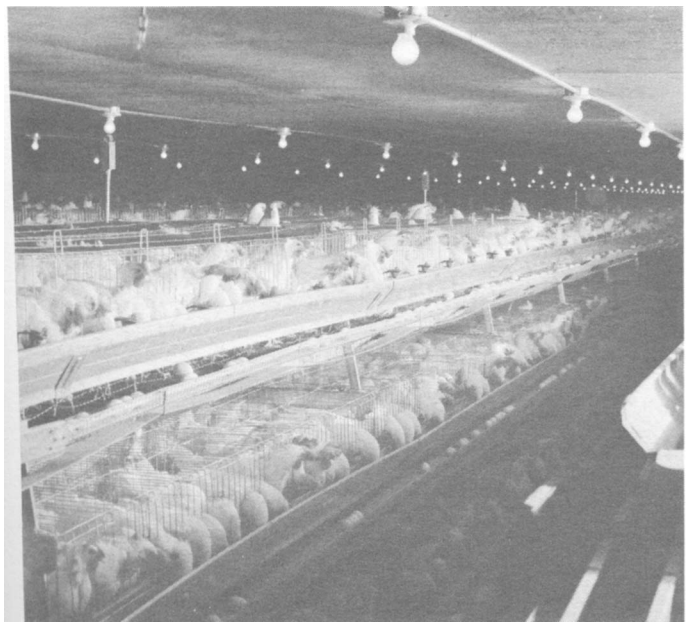
Muscle that is cut off the carcass during the tenderization period is relatively tough compared with the same type of muscle that is allowed to remain on the carcass. Our studies indicate that cutting the muscle accelerates the pH fall, producing tougher meat. If, on the other hand, the muscle (in our studies, breast muscle) is injected with sodium polyphosphates immediately after slaughter and then cut off, it will be as tender after aging as if it had been aged on the carcass. This type of treatment would enable processors to cut up and debone raw carcasses more rapidly and efficiently and with assurance of maximum tenderness.

Current studies are concerned with other types of injections using various salts which may affect rigor mortis and enable the carcass to be cut up immediately after slaughter and still achieve maximum tenderization.

-D. W. Peterson

Controlled lighting

By controlling the environmental lighting it is possible to determine when reproductive activity (egg laying and sperm production) will occur. When either chickens or turkeys are hatched in the fall or winter and subsequently exposed to declining day lengths of normal light, poorer egg production occurs than for poultry hatched in the spring and summer. Previous research at UC Davis has demonstrated how light control during the growing period will improve egg production of these off-season hatched females.



Hens in light-controlled housing.

More recently, we have shown that turkey toms subjected to eight hours of light per day are able to produce semen until they are two years old. The normal period for semen production usually is less than 30 weeks.

We also have found that the time of egg laying is influenced by the subjective "dawn." By giving hens four or six hours of steady light and then giving them 15 or 30 minutes of light at two- or three-hour intervals over 24-hours, it has been possible to get nearly two-thirds of the eggs laid within a three-hour period.

Our lighting work with Japanese quail shows that six hours of light daily increases the reproductive period and may affect longevity when compared with day lengths of 12 and 18 hours.

The use of intermittent light for hens in light-controlled houses reduces the number of kilowatt hours used and could reduce the lighting costs to a tenth of what would be used with a lighting program of 16 hours of light and 8 hours of darkness. Even if intermittent light were not used, a reduction in light intensity or the use of more efficient light sources, such as flourescent, could reduce the expense of lighting layers.

-W. O. Wilson

Layer recycling improves egg producers' income

Before the 1960s, it was common to replace commercial egg-laying flocks at a rate of 100 to 120 percent per year. This meant that the average chicken's productive life was less than twelve months.

A few egg producers during this period were experimenting with a practice developed in the early 1900s which forced a flock into a simultaneous loss of feathers (molt). Along with this loss of feathers, egg production ceased for about four weeks and subsequent production was comparable to the production of a ten- to twelve-month-old pullet. These egg producers were able to almost double the productive life of their flocks.

During the mid 1960s, UC started to take a hard look at the economics of the practice. Initially, data were collected to determine typical responses. Economic analyses looked favorable and better controlled field experiments were soon organized. We screened several dozen molting techniques and settled on one which gave excellent results, was simple to utilize, and was relatively inexpensive.

By the early 1970s, practically all California poultrymen were molting their flocks. California's replacement pullet requirements were reduced by half by 1976, and pullet requirements for the United States as a whole had dropped by an estimated 25 percent.

More recently, we developed a computer analysis program to assist egg producers in determining when to molt and when to sell their chickens. The net effect of this total effort has meant a savings of many millions of dollars to the poultrymen of California and the United States.

-Donald Bell, Farm Advisor
Riverside County