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# Researchers Look For Better Hams

From the deli's ham-on-rye to the smell of that succulent country-style ham in the oven, ham is high on the culinary Hit Parade. Food technologists hope to make it even better and more plentiful by finding ways to improve lower grade pork and to increase the final ham yield in pork processing.

Porcine stress syndrome, called PSS, is responsible for a prevalent type of low quality pork - pale, soft, exudative-known in the industry as PSE. Hot weather, poor ventilation, crowding, rough handling, and environmental conditions occurring during marketing all cause stress in the hog. Although PSS has a genetic origin as well, the environment is an obvious and immediate cause of both disease and frequent fatality. High body temperature, staggering gait, abnormal muscle acidity, and muscle tremors are observable symptoms.

At USDA's Richard B. Russell Agricultural Research Center in Athens, Ga., characteristics of hams quality-graded on the pork cutting line in the meat packing plant prior to processing were studied by Agricultural Research Service scientists. The quality grades were (1) pale, soft, exudative (PSE) (2) normal (3) dark, firm, and dry (DFD). The pH of the ham muscles was determined on hams which had been "pumped" or injected with a standard commercial curing pickle. In all the tests, PSE hams had the most acidic muscles. The normal group was intermediate and the DFD group was the highest or most alkaline. The research indicated that pH is a factor which may be used in the selection of hams with different yield characteristics.

During two trials, hams were hung to drain for 5 hours, smoked and cooked overnight to an internal temperature of about 65 degrees C., and then chilled for 24 hours at 2 degrees to 4 degrees C. However, in the second of the trials the hams were held overnight in a brine solution before smoking and cooking. In both trials and within each quality group, shrinkage was highest during the smoking and cooking stage of processing. The PSE quality group lost the greatest amount of weight during this stage.

"We concluded that the ability of muscle tissue to bind and retain meat juices during smoking and cooking is critical," said food technologist Carl E. Davis. "PSE hams lose up to one and a half times more weight than normal or DFD hams." The final yield of the PSE hams was 2.76 and 5.54 percentage points less than yields of normal and DFD groups, respectively.

Researchers improved the final yield in PSE hams by injecting more curing pickle within regulatory limits, to compensate for the additional losses that occurred

amount; normal, and intermediate amount; and the DFD the least amount of fluid loss.

With pale, soft, exudative ham, soft does not mean tender. PSE cooked ham slices had the highest shear values (a measure of ease of cutting), which indicated less tender meat.

The study showed that processing hams according to a uniform curing, smoking, and chilling cycle without first evaluating the fresh muscle quality would result in a wide and wasteful variation of final ham yield

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