

pH did not reach 5.8 after 36 hours could mature an additional 24 hours and be retested. If the carcass had not reached a pH of 5.8 or less after 60 hours, the meat from the carcass could not be exported to the United States. Several commenters stated that, based on OIE standards, standards of specific international markets, and cited studies, the minimum maturation time for beef from countries where vaccination is practiced should be 24 hours rather than the 36 hours that we proposed, with an additional 12 hours allowed for beef that had not reached 5.8 or less after 24 hours. The commenters stated that a minimum maturation time of 36 hours is cost prohibitive and logistically difficult to maintain. One of the commenters stated that the pH level in beef tends to rise when maturation time exceeds 24 hours.

We are making no changes based on these comments. The scientific literature available to us does not support the statement that the pH level in beef tends to rise when maturation time exceeds 24 hours. Available literature showed that there is a gradual trend towards lower pH with time and that the pH averages 5.6 to 5.8 after 48 hours of aging, although the pH does tend to rise slightly after 72 to 96 hours of maturation.<sup>3</sup> Other research indicated that, although the FMD virus survived for 24 hours in beef stored at 4 °C, the virus was inactivated by the third day after the pH had declined.<sup>4</sup>

The data used in our risk assessment for the proposed rule change comes from our site visits and from data provided by Uruguay. Because all plants in Uruguay currently operate according to the European Union's (EU) requirement of a minimum of 24 hours of maturation and a pH level of less than 6.0, the only data available to us were for the number of carcasses in Uruguay that failed to meet that level. That rejection rate was used in assessing the proportion of viremic carcasses that could pass undetected through the processing system. However, because the current rejection rate is based on a pH threshold of less than 6.0, APHIS' requirement of pH 5.8 could increase the rejection rate by an unknown amount. Since we are requiring a minimum maturation time of 36 hours, and the literature indicates a gradual trend towards lower pH over time, we considered it unlikely that the rejection

rate will increase significantly. Using that information, we concluded that fresh beef could be imported from Uruguay in accordance with the conditions described in the proposed rule without an unacceptable risk of FMD being present in the beef. Because no data are available to us regarding the rejection rate at pH 5.8 or less after a minimum of 24 hours of maturation, we are retaining the requirement that fresh beef from Uruguay undergo maturation for a minimum of 36 hours and reach a pH of 5.8 or less.

One commenter stated that pH measurements should be taken at the middle of both *longissimus dorsi* muscles. Although we did not specify this requirement in the proposed rule because it is common practice, for clarity's sake we are including it in the final rule.

Because of the importance of proper pH measurements, one commenter asked (1) how we will verify that Uruguayan processing plants use the best available pH testing technology, (2) if we will initiate an approved pH meter standard, (3) if we will require the processing plants to have standard operating procedures for the use of pH meters on file, and (4) if we will require them to record pH meter serial numbers and document their meter standardization. Another commenter requested that a certified U.S. veterinary official oversee all pH testing and verify that conditions at slaughter facilities are equivalent to U.S. standards. One commenter requested that APHIS require the presence of a full-time APHIS or FSIS inspector to ensure that all processing is done in compliance with U.S. standards.

The pH control in Uruguay is regulated under the Government of Uruguay's Procedure 2001/2, "Generic procedure for maturation and pH control in bovine and ovine meat and offal" and Circular 2002/4, "Procedure for official verification of the calibration of pH measuring devices for meat." The former procedure specifies time and temperature for the maturation process and requires that all meat processed for export be pH-tested. The latter procedure requires calibration of pH measuring devices at the beginning of each workday and after every 200 measurements. Other Uruguayan requirements include official control of the preparation and storage of buffer solutions.

As noted in our site visit report, we evaluated pH control procedures at the San Jacinto plant, which exports to the EU and to other countries, during the July 2002 site visit to Uruguay. We verified that the instrument used to

measure pH is calibrated according to the manufacturer's specifications. There is a laboratory in the plant where pH calibration takes place on a daily basis. Calibration and rejection records were examined and verified. All records were found to be adequate. In addition, we verified that pH testing is done by plant personnel under strict supervision by official inspectors. We concluded that adequate pH measuring technologies are available at export plants and that calibration of devices and control of pH inspection is carried out under the control of official authorities. Based on this evidence, we do not believe it is necessary for this rule to require an additional approved pH meter standard or to specifically require every plant keep its standard operating procedures for the use of pH meters on file, to record pH meter serial numbers, and to document their meter standardization, since these measures are already required by the Uruguayan government and all of the necessary documentation and procedures are already on file in each plant. Nor do we consider continuous APHIS supervision of the process necessary. However, this rule provides that APHIS reserves the right to conduct reinspections at any time that we feel it is necessary.

One commenter noted that, according to two studies,<sup>5</sup> pH can change slightly during cold storage. As a result, although beef may have achieved a pH of 5.8 or less in Uruguay, upon arrival in the United States the pH level may have increased slightly. The commenter requested that APHIS develop a project to collect pH data from specific lots of beef destined for export to the United States and then to verify the pH upon departure and arrival in order to establish a baseline of pH changes during transport. This baseline could then be used to verify that the beef had reached a pH of 5.8 during the maturation process in Uruguay.

The variations in pH level fluctuations would make it difficult, if not impossible, to correlate the pH levels of beef arriving in the United States with the pH levels that had been achieved at maturation in Uruguay. We do not believe that a project of this type would offer meaningful data or provide additional protection. Additionally, for the reason discussed previously, we consider the pH readings reported by Uruguayan officials to be sufficient.

One commenter noted that although the risk assessment states that

<sup>3</sup> Cottral *et al.*, "The Survival of Foot-and-Mouth Disease Virus in Cured and Uncured Meat," American Journal of Veterinary Research, 1960, pp 288-297.

<sup>4</sup> Henderson, W. and Brooksby, J., "The Survival of Food-and-Mouth Disease in Meat and Offal," Journal Hyg. Camb., 1948, 46(4):394-402.

<sup>5</sup> Sair, L. and Cook, W.H., Canadian Journal of Research, 16 (section D, No. 9: 255-267), 1938. Wierbicki, E., *et al.*, Food Technology, (8): 506-511, 1954.