Erratum

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A few months ago, a genetic reexamination of all Salmonella serotypes used in the authors’ past experiments was initiated. Unfortunately, it was discovered that one serotype out of the several used was misidentified. The misidentified serotype was Salmonella Enteritidis PT30, which was in fact Salmonella Reading.

All of the studies in question were challenge studies in design, where the survival of Salmonella was assessed under different environmental conditions (temperature and RH) in different food materials (nuts or spices). The National Advisory Committee on Microbiological Criteria for Foods (NACMCF). 2010. Parameters for determining inoculated pack/challenge study protocols. J. Food Prot. 73:140–202) recommends use of a cocktail of three to five Salmonella serovars chosen from among those isolated from food sources similar to foods under examination or showing desired characteristics, or from related outbreaks for such studies.

There are literally thousands of Salmonella serovars to choose from for such studies. The U.S. Food and Drug Administration draft spice risk assessment (2013) lists approximately 150 serovars associated with spices alone. In this case, four such serovars were chosen, based on their presence in low-moisture foods. Of the four that were chosen, one serovar was misidentified in the culture collection. The misidentified serovar was Salmonella Reading, which has been found in spices (cumin) and is desiccation resistant. It was not a different genus, only a different serovar. It was misidentified as Salmonella Enteritidis from almonds. Upon testing, it was found that the other serovars used in these studies were correctly identified.

Each serovar was grown individually and then mixed with the others in equal amounts prior to use in any experiment. The reasoning behind this type of usage is that it is not known, nor can it be predicted, which of the serovars will be most resistant. As there is no way to test hundreds of serovars to determine the most resistant, the NACMCF recommendation to use a multi-strain cocktail was followed. All experiments described in the challenge studies published by the research group involved the use of a multi-strain cocktail. Consequently, the misidentification of one of the four Salmonella serovars used should have had no impact on the results.

Conclusions made in all articles did not read “for Salmonella Enteritidis . . .”; conclusions were simply “for Salmonella.” Although all the serotypes used are resistant to desiccation and have been found in low-water-activity products, more testing would have been required to compare their individual survival dynamics under dry conditions. Even with the additional testing, there would be no guarantee that the most resistant serovar of Salmonella was chosen out of the hundreds that are available. The authors were analyzing samples from a 2-year survival study, which allowed this error to be discovered. The old samples were reexamined in order to identify which of the four Salmonella serovars used in the cocktail survived the longest. The misidentified serovar, Salmonella Reading, was among the most plentiful present, followed by Tennessee and Anatum. Salmonella Oranienburg, the fourth serovar used, originally isolated from raw pecans, was not re-isolated. This last finding simply reinforces NACMCF’s recommendation that multiple serovars should be used in challenge studies, and that results and conclusions from the authors’ studies are correctly noted. In truth, Salmonella Reading could have legitimately been chosen for these tests rather than Salmonella Enteritidis, or only three different serovars could have been used from the onset, which would have resulted in the same results and conclusions.

In summary, the described error does not affect the results and conclusions noted in the articles published in the Journal of Food Protection. Nonetheless, a correction is required for the articles in which this serotype was listed. The affected articles are as follows:


The correction should read:

In this article, Salmonella enterica Reading was misidentified as Salmonella Enteritidis PT30. Other serovars used are correct as indicated. As a mixture (cocktail) of multiple serovars was used in this study, the misidentification does not impact results or conclusions.