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January 10, 2011

FSIS Docket Clerk
U.S. Department of Agriculture
Food Safety and Inspection Service
Room 2534 South Building
1400 Independence Avenue, S.W.
Washington, D.C. 20250

Re: Kemin Food Technologies, Inc.'s "Petition for Rulemaking to Allow Liquid Sodium Benzoate, Sodium Propionate, Benzoic Acid and Propionic Acid as Antimicrobial Agents in Meat and Poultry Products" (submitted Apr. 23, 2010)

To Whom It May Concern:

We submit these comments on the above-entitled petition submitted by Kemin Food Technologies, Inc. ("Kemin") on April 23, 2010 ("Petition"). Substantively, Kemin is "proposing to expand the list of antimicrobial agents allowed in meat and poultry products to include a) a liquid sodium propionate and b) a liquid sodium propionate and benzoate blend." Petition at 1. Procedurally, Kemin "requests an expedited review of [its] petition by FSIS and an interim or final rule in response to it." Petition at 3.

These comments address only the Petition's advocacy of the use of sodium benzoate. As Kemin itself acknowledges, FSIS regulations prohibit such use in or on any product—except as authorized by regulation in 9 C.F.R. Chapter III. *See* Petition at 2 (citing 9 C.F.R. § 424.23(a)(3)). Currently, there is no such authorizing regulation. Accordingly, the Petition asks FSIS "to amend 9 CFR § 424.21(c) to list . . . the blend of sodium propionate and sodium benzoate as acceptable antimicrobial agents." Petition at 2.

As elaborated below, the use of sodium benzoate proposed by the Petition raises serious, unresolved questions of safety. Although Kemin asserts that such proposed use is safe, that assertion is unreasonably based on a 35-year-old FDA regulation that does not reflect current patterns of consumption. To the contrary, even a cursory review of the literature shows that Kemin's proposed use of sodium benzoate would contribute to already high levels of intake that raise serious questions of safety. Moreover, Kemin's assertion that additional consumption of sodium benzoate would "enhance public health" by helping to *reduce* sodium intake is unsupported by data or any other useful information and is legally irrelevant. Finally, as to procedure, Kemin offers no

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justification for seeking expedited issuance of an “interim or final rule” and thereby circumventing the normal rulemaking process that is especially appropriate for a serious matter of public safety like this one. For these reasons, the Petition should be denied.

I. The Proposed Use of Sodium Benzoate Raises Serious, Unresolved Safety Questions.

Quite naturally, Kemin undertakes to demonstrate the “Safety of . . . Sodium benzoate.” Petition at 5. In this effort, Kemin relies principally on the asserted fact that “FDA affirmed the GRAS [‘generally recognized as safe’] status of . . . sodium benzoate in 1984.” Petition at 6. But in fact, FDA issued the regulation that affirmed certain uses of sodium benzoate as GRAS nearly a decade earlier. *See* 41 Fed. Reg. 53607, 53608 (1976) (adding 21 C.F.R. § 121.104(g)(7), now codified at 21 C.F.R. § 184.1733). As Kemin acknowledges, FDA’s 1976 regulation was in turn “based on the evaluation of [certain] ingredients by the Select Committee on GRAS Substances (SCOGS) *in 1973*,” i.e., nearly four decades ago. Petition at 6 (emphasis added).

More importantly, the Select Committee’s conclusion and FDA’s consequent affirmation—now decades old—were based on levels of intake *as of that time*. To quote the Petition:

The Select Committee on GRAS substances concluded that there is no evidence in the available information on benzoic acid and sodium benzoate as food ingredients [that these substances] constitute a hazard to the general public when used at levels *that are now current or that might be reasonably be expected in the future*.

Id. (emphasis added) (paraphrasing Benzoic Acid and Sodium Benzoate: Proposed Affirmation of GRAS Status as Direct Human Food Ingredients, 39 Fed. Reg. 34197, 34198 (1974)). Kemin concedes that since the 1970’s, “benzoic acid and its salts have become one of the most widely used preservatives in the world.” *Id.* Yet the Petition offers no evidence to support a conclusion that the Select Committee foresaw, and took into account, the massive increase in the use of sodium benzoate in food products that has occurred since that time.

In addition to being tied to decades-old use levels, FDA’s GRAS affirmation for sodium benzoate is necessarily tied to the specific food categories that were the subject of the affirmation. *See, e.g.*, 21 C.F.R. § 184.1(b)(2) (“If the ingredient is affirmed as GRAS with specific limitation(s), it shall be used in food only within such limitation(s), including the category of food(s) . . .”). The cited affirmation could not have taken into account Kemin’s proposed uses in *meat and poultry products* because those uses were expressly prohibited at the time of the Select Committee’s review and FDA’s affirmation. *See* Revision Pursuant to Wholesome Meat Act, 35 Fed. Reg. 15552, 15592 (1970) (revising 9 C.F.R. § 318.7(d)(2)); Poultry Products Inspection Regulations, 37 Fed. Reg. 9706, 9733-35 (1972) (revising 9 C.F.R. § 381.47). Therefore, the GRAS affirmation on which Kemin so heavily relies actually provides no serious support for the safety of the proposed use of sodium benzoate in meat and poultry products.

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The petition's reliance on an nearly 40-year-old GRAS determination is all the more inappropriate in light of recent scientific evidence of the potential risks posed by sodium benzoate. It is axiomatic that a GRAS affirmation ought to be reconsidered if new information becomes available that raises questions either about the safety of the use of the substance or about the general recognition of that safety.¹ Recent studies have shed additional light on possible neurotoxic effects of sodium benzoate on early embryonic development,² and suggest that sodium benzoate might induce toxic changes in liver cells.³ This is in addition to evidence regarding the potential contribution of sodium benzoate to the development of diseases or conditions as diverse as hyperactivity, allergy, and Parkinson's disease.⁴

Finally, the use of sodium benzoate proposed by Kemin would further increase consumption to levels that raise questions of safety. As noted by the Petition, the FAO/WHO Joint Expert Committee on Food Additives ("JECFA") in 1996 "assigned an 'acceptable daily intake' (ADI) of '0-5 mg/kg of body weight' to . . . sodium benzoate." Petition at 6. This assignment was rendered

¹ See, e.g., 21 C.F.R. § 170.30(l) ("New information may at any time require reconsideration of the GRAS status of a food ingredient."). In fact, a recent oversight report was critical of FDA's failure to systematically and promptly reconsider GRAS status in response to the emergence of new information that raises questions of safety. See United States Government Accountability Office, *FDA Should Strengthen Its Oversight of Food Ingredients Determined to Be Generally Recognized as Safe (GRAS)* (Feb. 2010).

² Qian Chen, Nan-nan Huang, Jin-tao Huang, Shen Chen, Jinjin Fan, Chaohong Li, and Fu-kang Xie, *Sodium benzoate exposure downregulates the expression of tyrosine hydroxylase and dopamine transporter in dopaminergic neurons in developing zebrafish*, Birth Defects Research (Part B), Vol. 86, pp. 85-91 (2009).

³ Reshma Sinha and Doris D'Souza, *Liver cell damage caused due to sodium benzoate toxicity in mice*, International Journal of Biotechnology and Biochemistry, Vol. 6, No. 4, pp. 549-54 (2010).

⁴ Donna McCann, Angelina Barrett, Alison Cooper, Debbie Crumpler, Lindy Dalen, Kate Grimshaw, Elizabeth Kitchin, Kris Lok, Lucy Porteous, Emily Prince, Edmund Sonuga-Barke, John O. Warner, Jim Stevenson, *Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial*, The Lancet, Vol. 370, No. 9598, pp. 1560-67 (Nov. 3, 2007); World Health Organization, *Concise International Chemical Assessment Document 26: Benzoic Acid and Sodium Benzoate* (2000); Peter Piper, *Yeast superoxide dismutase mutants reveal a pro-oxidant action of weak organic acid food preservatives*, Free Radical Biology & Medicine, Vol. 27, Nos. 11/12, pp. 1219-27 (1999).

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necessary by findings of fetal toxicity in animal studies.⁵ Yet as far back as 1999, or more than a decade ago, the JECFA's ADI for sodium benzoate was already being exceeded in the United States: consumers were then estimated to have an intake of 7.3 mg/kg body weight per day—that is, 150% of ADI—at the 90th percentile.⁶ Based upon dietary patterns in the United States today, the estimated dietary intake of sodium benzoate for all proposed food uses combined, including those petitioned by Kemin, exceeds the ADI even further.⁷

Given the serious questions that have recently been raised regarding the safety of sodium benzoate, the fact that human exposure to the chemical has increased dramatically since its much more limited use was affirmed as GRAS in the 1970's, and the fact that the Petition's proposed use would result in intake levels that further exceed JECFA's ADI for the chemical, the Petition should be denied.

II. Kemin's Unsupported Claims of Public Health and Other Benefits Are Irrelevant.

In support of the Petition, Kemin asserts that its proposed use of sodium benzoate would “enhance public health . . . by contributing lower sodium to the consumer diet,” Petition at 3, and would yield meat and poultry products that are “more cost-effective” than the industry standard, *id.* at 12. Under governing law, neither of these factors should have any bearing on FSIS's consideration of the Petition.

In 1995, FSIS set out to “to harmonize and improve the efficiency of the procedures used by FSIS and [FDA] for reviewing and approving the use of substances in meat and poultry products.” Substances Approved for Use in the Preparation of Meat and Poultry Products, 60 Fed. Reg. 67459, 67459 (1995). In so doing, FSIS explained that in considering whether to allow the addition of ingredients to meat and poultry products, it “will assess the safety and suitability” of the proposed ingredient. *Id.* at 67462. We have already discussed the safety vel non of sodium

⁵ JECFA, *Toxicological evaluation of certain food additives: Benzyl acetate, benzyl alcohol, benzaldehyde, and benzoic acid and its salts*, in World Health Organization, WHO Food Additives Series, No. 37, pp. 31-79, at 72 (1996).

⁶ JECFA, *Safety evaluation of certain food additives: valuation of national assessments of intake of benzoates* ¶ 5.2 (June 9-18, 1998), in World Health Organization, WHO Food Additives Series, No. 42, pp. 403-14 (1999). The mean intake for the entire U.S. population was estimated at 2.3 mg/kg of body weight per day. *Ibid.*

⁷ *Estimated Daily Intake of Sodium Benzoate by the U.S. Population Resulting from the Proposed Use in Processed Meat and Poultry Products* (Sept. 8, 2010) (attached).

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benzoate in the previous section. With respect to suitability, FSIS considers the “functionality” of the substance (including the “amounts needed to achieve the intended technical effect”), “whether the proposed use is consistent with applicable standards of identity,” and “whether the substance might be misused in some way to make [the] product adulterated or misbranded.” *Id.* Not one of these suitability factors—functionality, identity, and misuse—has any relation to the reduced cost and lower sodium benefits claimed by Kemin. Those benefits are therefore legally irrelevant. In any event, the Petition offers no data to support Kemin’s claims in this regard.

III. Kemin Offers No Basis for Circumventing Notice-and-Comment Requirements.

Kemin “requests an expedited review of [its] petition by FSIS and an interim or final rule in response to it.” Petition at 3. Kemin does not explain this request, but it is apparent that the request should be denied.

First, if Kemin’s request is intended to invoke FSIS’s “direct final rulemaking” process, it is self-evident that such invocation is manifestly unwarranted. In the cited process, “[r]ules that FSIS judges to be noncontroversial and unlikely to generate adverse comments will be published as direct final rules.” Use of Direct Final Rulemaking, 59 Fed. Reg. 34375, 34375 (1994). Moreover, “[i]f FSIS receives written adverse comments or written notice of intent to submit adverse comments within 30 days of the publication of a direct final rule, FSIS will publish in the Federal Register a notice of withdrawal of the direct final rule.” *Id.* at 34376. Comments are “adverse” if they “suggest that the rule should not be adopted.” *Id.* at 34375. Obviously, these very comments meet that definition, making it impossible to satisfy the requisites for a direct final rule.

Second, if Kemin’s request is more generally intended to spur FSIS to dispense with the generally applicable notice-and-comment requirements of the Administrative Procedure Act (“APA”), that is likewise unwarranted. In the case of a substantive regulatory change like the one proposed by Kemin, the APA’s requirement to provide notice of proposed rulemaking and an opportunity for public comment may be avoided only “when the agency for good cause finds . . . that notice and public procedure thereon are impracticable, unnecessary, or contrary to the public interest.” 5 U.S.C. § 553(b)(B). Similarly, the APA’s requirement to publish a rule 30 days before it becomes effective may be avoided “for good cause found and published with the rule.” *Id.* § 553(d)(3).

Courts have made clear that these “exceptions to § 553 should be ‘narrowly construed and only reluctantly countenanced.’” *Xin-Chang Zhang v. Slattery*, 55 F.3d 732, 744 (2d Cir. 1995) (quoting *Methodist Hospital v. Shalala*, 38 F.3d 1225, 1236 (D.C. Cir. 1994), in turn quoting *New Jersey v. EPA*, 626 F.2d 1038, 1045 (D.C. Cir. 1980)). There is no reason to think—and Kemin has certainly provided none—that notice and public comment are impracticable in this matter, i.e., that it would prevent FSIS from carrying out its functions. There is likewise no evidence

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that engaging in notice and public comment is unnecessary, as would be the case for a mere technical amendment in which there is little public interest. To the contrary, there is likely to be substantial public interest—these very comments are examples—in a rulemaking that would permit the uses of sodium benzoate proposed by Kemin. Finally, there is no evidence that notice and comment rulemaking would be contrary to the public interest. In fact, in light of the increased exposure to sodium benzoate that would result from Kemin’s proposal, and given the scientific evidence that raises questions about the safety of sodium benzoate, circumventing notice and comment rulemaking would be affirmatively contrary to the public interest.

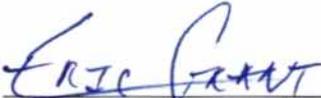
This conclusion accords with FSIS’s own understanding of a healthy regulatory process. In the 1995 regulatory revision discussed above, FSIS explained that its regulations generally “provide that no substance may be used in the preparation of any meat or poultry product unless the use of the substance is approved by the Administrator and listed in the regulations.” 60 Fed. Reg. at 67461. FSIS further explained that “[i]n order to add a new substance to these listings, increase the permitted use level, or expand the category of products in which an approved substance may be used”—precisely what Kemin proposes here for sodium benzoate—“FSIS amends these listings by *notice-and-comment rulemaking*.” *Id.* at 67462 (emphasis added). FSIS should adhere to that salutary precept in the present circumstances.

IV. Conclusion

For all of these reasons, FSIS should deny the Petition with respect to the Kemin’s proposed use of sodium benzoate. Should FSIS decide to proceed with rulemaking in response to the Petition, FSIS should deny Kemin’s request to circumvent the APA’s generally applicable notice-and-comment requirements.

Thank you for your consideration.

Cordially,
HICKS THOMAS LLP


Eric Grant

**Estimated Daily Intake of Sodium Benzoate by the U.S.
Population Resulting from the Proposed Use in Meat and
Poultry Products**

September 8th, 2010

Estimated Daily Intake of Sodium Benzoate by the U.S. Population Resulting from the Proposed Use in Processed Meat and Poultry Products

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Estimated Daily Intake of Sodium Benzoate by the U.S. Population Resulting from The Proposed Use In Processed Meat and Poultry Products

1.0 INTRODUCTION

An assessment of the consumption of sodium benzoate by the United States (U.S.) population based on the proposed use in all meat and poultry products at a level of 0.1% has been conducted. Estimates for the intake of sodium benzoate were based on the proposed food-uses and use-levels in conjunction with food consumption data included in the National Center for Health Statistics' (NCHS) 2005-2006 National Health and Nutrition Examination Surveys (NHANES) (CDC, 2006; USDA, 2009). Calculations for the mean and 90th percentile all-person and all-user intakes, and percentage of consumers were performed for each of the individual proposed food-uses of sodium benzoate. Similar calculations were used to determine the estimated total intake of sodium benzoate from all proposed food-uses combined. In both cases, the per person and per kilogram body weight intakes were reported for the following population groups:

- infants, ages 0 to 2;
- children, ages 3 to 11;
- female teenagers, ages 12 to 19;
- male teenagers, ages 12 to 19;
- female adults, ages 20 and up;
- male adults, ages 20 and up; and
- total population (all age and gender groups combined).

2.0 FOOD CONSUMPTION SURVEY DATA

2.1 Survey Description

National Health and Nutrition Examination Surveys (NHANES) for the years 2005-2006 are available for public use. NHANES are conducted on a continual yearly basis; data from these surveys are released in 2-year cycles. Each year about 7,000 people from 15 different locations across the U.S. are interviewed, and approximately 5,000 complete the health examination component of the survey. Any combination of consecutive years of data collection is a nationally representative sample of the U.S. population. It is well established that the length of a dietary survey affects the estimated consumption of individual users and that short-term surveys, such as the typical 1-day dietary survey, overestimate consumption over longer time periods (Anderson, 1988). Because two 24-hour dietary recalls administered on 2 non-

consecutive days (Day 1 and Day 2) are available from the NHANES 2005-2006 survey, these data were used to generate estimates for the current intake analysis.

The surveys provide the most recent data for evaluating food-use and food consumption patterns in the United States and contain 2 years of data on individuals selected *via* stratified multistage probability sampling of the U.S. civilian non-institutionalized population. NHANES 2005-2006 survey data were collected from individuals and households *via* 24-hour dietary recalls administered on 2 non-consecutive days (Day 1 and Day 2) throughout all 4 seasons of the year. Day 1 data were collected in-person, and Day 2 data were collected by telephone within the following 3 to 10 days, on different days of the week, to achieve the desired degree of statistical independence. The data were collected by first selecting Primary Sampling Units (PSUs), which were counties throughout the U.S. Small counties were combined to attain a minimum population size. These PSUs were segmented and households were chosen within each segment. One or more participants within a household were interviewed. Fifteen PSUs are visited each year. For NHANES 2005-2006, 9,349 individuals were selected for the sample, and 8,429 were interviewed (90.2%).

In addition to collecting information on the types and quantities of foods being consumed, NHANES 2005-2006 collected socioeconomic, physiological and demographic information from individual participants in the survey, such as sex, age, height and weight, and other variables useful in characterizing consumption. The inclusion of this information allows for further assessment of food intake based on consumption by specific population groups of interest within the total population. Sample weights were incorporated with NHANES 2005-2006 to compensate for the potential under-representation of intakes from specific population groups as a result of sample variability due to survey design, differential non-response rates, or other factors, such as deficiencies in the sampling frame (CDC, 2006; USDA, 2009).

2.2 Statistical Methods

Consumption data from individual dietary records, detailing food items ingested by each survey participant, were collated by computer and used to generate estimates for the intake of sodium benzoate by the U.S. population. Estimates for the daily intake of sodium benzoate represent projected 2-day averages for each individual from Day 1 and Day 2 of NHANES 2005-2006 data; these average amounts comprised the distribution from which mean and percentile intake estimates were produced. Mean and percentile estimates were generated incorporating survey weights in order to provide representative intakes for the entire U.S. population. All-person intake refers to the estimated intake of sodium benzoate averaged over all individuals surveyed, regardless of whether they potentially consumed food products containing sodium benzoate, and therefore includes "zero" consumers (those who reported no intake of food products containing sodium benzoate during the 2 survey days). All-user intake refers to the estimated intake of sodium benzoate by those individuals potentially consuming food products containing

sodium benzoate, hence the “all-user” designation. Individuals were considered users if they consumed 1 or more food products containing sodium benzoate on either Day 1 or Day 2 of the survey.

2.3 Statistical Reliability

Mean or percentile intake estimates based on small sample sizes or with high variability relative to the mean [assessed using the coefficient of variation (CV)] may be less statistically reliable than estimates based on adequate sample sizes or low variability relative to the mean (LSRO, 1995). Data presented herein for the estimated daily intake of sodium benzoate follow the guidelines proposed by the Human Nutrition Information Service/National Center for Health Statistics Analytic Working Group for evaluating the reliability of statistical estimates adopted in the “Third Report on Nutrition Monitoring in the United States”, whereby an estimated mean may be unreliable if the CV is equal to or greater than 30% (LSRO, 1995). The CV is the ratio of the estimated standard error of the mean to the estimated mean, expressed as a percentage (LSRO, 1995). Therefore, for the estimated intakes of sodium benzoate presented herein, values were considered statistically unreliable if the CV was equal to or greater than 30% or the sample size is less than 30 respondents. These values were not considered when assessing the relative contribution of specific food-uses to total sodium benzoate consumption and are marked with an asterisk.

2.4 Food Usage Data

Food codes representative of the proposed use in processed meat and poultry products were chosen from the NHANES 2003 -2004 and 2005-2006 data sets (CDC, 2006; USDA, 2009). Product-specific adjustment factors were developed based on data provided in the standard recipe file for the CSFII 1994-1996, 1998 survey (USDA, 2000). All food codes included in the current intake assessment are listed in Appendix C.

3.0 FOOD SURVEY RESULTS

The estimated total intake of sodium benzoate from all proposed food-uses in the U.S. by population group is summarized in Table 3-1. Table 3-2 presents these data on a per kilogram body weight basis.

Approximately 71.6% of the total U.S. population was identified as potential consumers of sodium benzoate from the proposed food-uses (11,958 actual users identified). Consumption of these types of foods by the total U.S. population resulted in estimated mean all-person and all-user intakes of sodium benzoate of 57 mg/person/day (1.0 mg/kg body weight/day) and 77 mg/person/day (1.3 mg/kg body weight/day), respectively (Tables 3-1 and 3-2). The 90th percentile all-person and all-user intakes of sodium benzoate from all proposed food-uses by

the total population were 149 mg/person/day (2.5 mg/kg body weight/day) and 174 mg/person/day (3.0 mg/kg body weight/day), respectively.

On an individual population basis, the greatest mean all-person and all-user intakes of sodium benzoate on an absolute basis were determined to occur in male adults at 78 mg/person/day (0.9 mg/kg body weight/day) and 99 mg/person/day (1.2 mg/kg body weight/day), respectively. Infants displayed the lowest mean all-person and all-user intakes of sodium benzoate on an absolute basis, with values of 25 and 48 mg/person/day, respectively. Conversely, on a body weight basis the mean all-person and all-user intakes of sodium benzoate were highest in infants with intakes of 2.1 and 3.9 mg/kg body weight/day, respectively. The lowest all-person and all-user mean intakes on a per kilogram body weight basis was observed to occur in female adults with values of 0.6 and 0.8 mg/kg body weight/day, respectively.

Population Group	Age Group (Years)	% Users	Actual # of Total Users	All-Person Consumption		All-User Consumption	
				Mean (mg)	90 th Percentile (mg)	Mean (mg)	90 th Percentile (mg)
Infants	0 to 2	45.0	861	25	78	48	103
Children	3 to 11	80.7	2,205	52	127	65	141
Female Teenagers	12 to 19	72.0	1,430	47	124	68	159
Male Teenagers	12 to 19	79.6	1,544	67	168	83	183
Female Adults	20 and Up	69.2	2,961	42	112	61	134
Male Adults	20 and Up	77.0	2,957	78	199	99	219
Total Population	All Ages	71.6	11,958	57	149	77	174

When heavy consumers (90th percentile) were assessed, all-person and all-user intakes of sodium benzoate from all proposed food-uses also were determined to be greatest in male adults at 199 and 219 mg/person/day, respectively. The lowest 90th percentile all-person and all-user intakes were again observed to occur in infants with values of 78 and 103 mg/person/day, respectively, on an absolute basis (Table 3-1). On a body weight basis, infants were determined to have the greatest all-person and all-user 90th percentile intakes of sodium benzoate with estimates of 6.0 and 8.3 mg/kg body weight/day, respectively (Table 3-2). The lowest all-person and all-user 90th percentile intakes of sodium benzoate on a body weight basis were observed to occur in female adults at 1.6 and 1.9 mg/kg body weight/day, respectively).

Population Group	Age Group (Years)	% Users	Actual # of Total Users	All-Person Consumption		All-User Consumption	
				Mean (mg/kg)	90 th Percentile (mg/kg)	Mean (mg/kg)	90 th Percentile (mg/kg)
Infants	0 to 2	45.0	859	2.1	6.0	3.9	8.3
Children	3 to 11	80.7	2,201	2.0	4.9	2.5	5.4
Female Teenagers	12 to 19	71.9	1,425	0.8	2.1	1.2	2.6
Male Teenagers	12 to 19	79.6	1,542	1.0	2.5	1.3	2.8
Female Adults	20 and Up	69.1	2,945	0.6	1.6	0.8	1.9
Male Adults	20 and Up	77.0	2,936	0.9	2.3	1.2	2.5
Total Population	All Ages	71.6	11,908	1.0	2.5	1.3	3.0

4.0 CONCLUSIONS

Consumption data and information pertaining to the individual proposed food-uses of sodium benzoate were used to estimate the all-person and all-user intakes of sodium benzoate for specific demographic groups and for the total U.S. population. This type of intake methodology is generally considered to be 'worst case' as a result of several conservative assumptions made in the consumption estimates. For example, it is often assumed that all food products within a food category contain the ingredient at the maximum specified level of use. In addition, it is well established that the length of a dietary survey affects the estimated consumption of individual users. Short-term surveys, such as the typical 2- or 3-day dietary surveys, overestimate the consumption of food products that are consumed relatively infrequently.

In summary, on an all-user basis, the mean intake of sodium benzoate by the total U.S. population from all proposed food-uses was estimated to be 77 mg/person/day or 1.3 mg/kg body weight/day. The heavy consumer (90th percentile) all-user intake of sodium benzoate by the total U.S. population from all proposed food-uses was estimated to be 174 mg/person/day or 3.0 mg/kg body weight/day. The highest individual population group all-user mean and 90th percentile intakes on an absolute basis were observed to occur in male adults at 99 and 219 mg/person/day, respectively. On a body weight basis, these intakes were observed to be greatest in infants at 3.9 and 8.3 mg/kg body weight/day, respectively.

6.0 REFERENCES

- Anderson, S.A. (Ed.). 1988. Estimation of Exposure to Substances in the Food Supply. Federation of American Societies for Experimental Biology (FASEB), Life Science Research Office (LSRO); Bethesda, MD. [Contract No. FDA 223-84-2059].
- CDC. 2006. Analytical and Reporting Guidelines: The National Health and Nutrition Examination Survey (NHANES). Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS); Hyattsville, Maryland. Available from: http://www.cdc.gov/nchs/data/nhanes/nhanes_03_04/nhanes_analytic_guidelines_dec_2005.pdf.
- CFR (2008a). Part 170—Food additives. §170.3—Definitions. In: *U.S. Code of Federal Regulations (CFR). Title 21: Food and Drugs (Food and Drug Administration)*. Washington (DC): U.S. Food and Drug Administration (U.S. FDA), U.S. Government Printing Office (GPO), pp. 5-9. Available at: http://a257.g.akamaitech.net/7/257/2422/26mar20071500/edocket.access.gpo.gov/cfr_2007/aprqr/pdf/21cfr170.3.pdf.
- CFR (2008b). Part 101—Food labeling. §101.12—Reference amounts customarily consumed per eating occasion. In: *U.S. Code of Federal Regulations (CFR). Title 21: Food and Drugs (U.S. Food and Drug Administration)*. Washington (DC): U.S. Food and Drug Administration (U.S. FDA), U.S. Government Printing Office (GPO), pp. 46-56. Available at: http://a257.g.akamaitech.net/7/257/2422/26mar20071500/edocket.access.gpo.gov/cfr_2007/aprqr/pdf/21cfr101.12.pdf.
- LSRO. 1995. Third Report on Nutrition Monitoring in the United States. Prepared by the Life Sciences Research Office (LSRO), Federation of American Societies for Experimental Biology (FASEB) for the Interagency Board for Nutrition Monitoring and Related Research; Bethesda, Maryland. U.S. Government Printing Office; Washington, DC, Vol. 1, pp. 19-31 & III-1 to III-10 and Vol. 2, pp. VB-1 to VB-2.
- USDA. 2000. 1994-1996, 1998 Continuing Survey of Food Intakes by Individuals (CSFII) and Diet and Health Knowledge Survey (DHKS) (On CD-ROM). U.S. Department of Agriculture (USDA); Riverdale, Maryland. [PB2000-500027 Supercedes PB98-500457].
- USDA. 2009. What We Eat In America: National Health and Nutrition Examination Survey (NHANES): 2003-2004 and 2005-2006. U.S. Department of Agriculture (USDA); Riverdale, Maryland. Available from: <http://www.ars.usda.gov/Services/docs.htm?docid=15044>.

APPENDIX A

**Representative NHANES 2005-2006 Food Codes for All Proposed
Food-Uses of Sodium Benzoate in Processed Meat and Poultry in the United States**

**Representative NHANES 2005-2006 Food Codes for All Proposed Food-Uses of Sodium
Benzoate In Processed Meat and Poultry in the United States**

Processed Meat Products

Bacon

[Sodium benzoate] = 0.10%

21601000	Beef, bacon, cooked
21601250	Beef, bacon, cooked, lean only eaten
21601500	Beef, bacon, formed, lean meat added, cooked
22501010	Canadian bacon, cooked
22600100	Bacon, NS as to type of meat, cooked
22600200	Pork bacon, NS as to fresh, smoked or cured, cooked
22601000	Pork bacon, smoked or cured, cooked
22601020	Pork bacon, smoked or cured, cooked, lean only eaten
22601040	Bacon or side pork, fresh, cooked
22602010	Pork bacon, smoked or cured, lower sodium
22605010	Pork bacon, formed, lean meat added, cooked

Mixed foods prepared with bacon

(Adjusted for a bacon content of 0.2 to 30%)

[Sodium benzoate] = 0.0020 to 0.030%

27212050	Beef and macaroni with cheese sauce (mixture)
27250270	Clams Casino
27350030	Seafood stew with potatoes and vegetables (excluding carrots, broccoli, and dark-green leafy), tomato
27350310	Seafood stew with potatoes and vegetables (including carrots, broccoli, and/or dark-green leafy), to
27450250	Oysters Rockefeller
27510360	Cheeseburger with mayonnaise or salad dressing, tomato and bacon, on bun
27510390	Double bacon cheeseburger (2 patties, 1/4 lb meat each), on bun
27510400	Bacon cheeseburger, 1/4 lb meat, with tomato and/or catsup, on bun
27510430	Double bacon cheeseburger (2 patties, 1/4 lb meat each), with mayonnaise or salad dressing and tomato
27510440	Bacon cheeseburger, 1/4 lb meat, with mayonnaise or salad dressing and tomatoes, on bun
27513060	Roast beef sandwich with bacon and cheese sauce
27520110	Bacon sandwich, with spread
27520120	Bacon and cheese sandwich, with spread
27520130	Bacon, chicken, and tomato club sandwich, with lettuce and spread
27520140	Bacon and egg sandwich
27520150	Bacon, lettuce, and tomato sandwich with spread
27520160	Bacon, chicken, and tomato club sandwich, on multigrain roll with lettuce and spread
27520170	Bacon on biscuit
28321130	Bacon soup, cream of, prepared with water
28350050	Fish chowder
32105030	Egg omelet or scrambled egg, with ham or bacon
32105080	Egg omelet or scrambled egg, with cheese and ham or bacon
32105085	Egg omelet or scrambled egg, with cheese, ham or bacon, and tomatoes
32202070	Egg, cheese, and bacon on biscuit
32202075	Egg, cheese, and bacon griddle cake sandwich
32202080	Egg, cheese, and bacon on English muffin

32202085	Egg, cheese and bacon on bagel
32202090	Egg and bacon on biscuit
35002000	Scrambled eggs, bacon, home fried potatoes (frozen meal)
41210090	Stewed beans with pork, tomatoes, and chili peppers, Mexican style (Frijoles a la charra)
41210200	Black beans, Cuban style (Habichuelas negras guisadas a la Cubana)
41310220	Fried chickpeas, Puerto Rican style (Garbanzos fritos)
41601010	Bean soup, NFS
41601020	Bean with bacon or pork soup
58109010	Italian pie with meat
58125110	Quiche with meat, poultry or fish
58126270	Turnover, chicken- or turkey-, and cheese-filled, no gravy
58127290	Croissant sandwich with bacon and egg
58127350	Croissant sandwich with bacon, egg, and cheese
58146130	Pasta with carbonara sauce
71411000	White potato skins, with adhering flesh, fried, with cheese and bacon
71508060	White potato, stuffed, baked, peel eaten, stuffed with bacon and cheese
71508070	White potato, stuffed, baked, peel not eaten, stuffed with bacon and cheese
71602010	Potato salad, German style
75140500	Broccoli salad with cauliflower, cheese, bacon bits, and dressing
75144100	Lettuce, wilted, with bacon dressing
75145000	Seven-layer salad (lettuce salad made with a combination of onion, celery, green pepper, peas, mayon)
75148000	Cobb salad with dressing
75365000	Vegetable mixture, dried
76601010	Vegetable and bacon, baby food, strained
83101500	Bacon dressing (hot)
83101600	Bacon and tomato dressing

Deli Meats

[Sodium benzoate] = 0.10%

25220010	Cold cut, NFS
23322100	Deer bologna
25230110	Luncheon meat, NFS
25220390	Bologna, beef, lowfat
25220400	Bologna, pork and beef
25220410	Bologna, NFS
25220420	Bologna, Lebanon
25220430	Bologna, beef
25220450	Bologna ring, smoked
25220490	Bologna, with cheese
25220470	Bologna, beef, lower sodium
25220500	Bologna, beef and pork, lowfat
25220610	Cervelat, soft
25220650	Chicken and beef sausage, smoked
25220710	Chorizos
25230450	Honey loaf
25230710	Sandwich loaf, luncheon meat
25231110	Beef, sliced, prepackaged or deli, luncheon meat
25221110	Knockwurst
25221210	Mortadella
25221250	Pepperoni
25221480	Mettwurst
25221500	Salami, NFS
25221510	Salami, soft, cooked
25221520	Salami, dry or hard

25221530	Salami, beef
25221610	Scrapple, cooked
25221810	Thuringer
25221910	Vienna sausage, canned
25221920	Vienna sausage, chicken, canned
25221950	Pickled sausage
25230110	Luncheon meat, NFS
25230210	Ham, sliced, prepackaged or deli, luncheon meat
25230220	Ham, sliced, low salt, prepackaged or deli, luncheon meat
25230230	Ham, sliced, extra lean, prepackaged or deli, luncheon meat
25230410	Ham loaf, luncheon meat
25230430	Ham and cheese loaf
25230450	Honey loaf
25230510	Ham, luncheon meat, chopped, minced, pressed, spiced, not canned
25230520	Ham, luncheon meat, chopped, minced, pressed, spiced, lowfat, not canned
25230530	Ham and pork, luncheon meat, chopped, minced, pressed, spiced, canned
25230540	Ham, pork and chicken, luncheon meat, chopped, minced, pressed, spiced, canned
25230550	Ham, pork, and chicken, luncheon meat, chopped, minced, pressed, spiced, canned, reduced sodium
25230560	Liverwurst
25230810	Veal loaf
25231110	Beef, sliced, prepackaged or deli, luncheon meat

Frankfurters, Hot Dogs, and Sausages

[Sodium benzoate] = 0.10%

25210110	Frankfurter, wiener, or hot dog, NFS
25210120	Frankfurter or hot dog, breaded, baked
25210150	Frankfurter or hot dog, cheese-filled
25210160	Frankfurter or hot dog, bacon and cheese-filled
25210170	Frankfurter or hot dog, chili-filled
25210210	Frankfurter or hot dog, beef
25210220	Frankfurter or hot dog, beef and pork
25210230	Frankfurter or hot dog, beef and pork, lowfat
25210250	Frankfurter or hot dog, meat and poultry, fat free
25210280	Frankfurter or hot dog, meat and poultry
25210310	Frankfurter or hot dog, chicken
25210410	Frankfurter or hot dog, turkey
25210510	Frankfurter or hot dog, low salt
25210610	Frankfurter or hot dog, beef, lowfat
25210700	Frankfurter or hot dog, meat & poultry, lowfat
25220100	Beef sausage, NFS
25220110	Beef sausage, brown and serve, links, cooked
25220120	Beef sausage, smoked, stick
25220130	Beef sausage, smoked
25220140	Beef sausage, fresh, bulk, patty or link, cooked
25220150	Beef sausage with cheese, smoked
25220210	Blood sausage
25220310	Bockwurst
25220350	Bratwurst, cooked
25220360	Bratwurst, with cheese
25221310	Polish sausage
25221350	Italian sausage
25221400	Sausage (not cold cut), NFS
25221410	Pork sausage, fresh, bulk, patty or link, cooked
25221420	Pork sausage, brown and serve, cooked

25221430	Pork sausage, country style, fresh, cooked
25221450	Pork sausage rice links, brown and serve, cooked
25221460	Pork and beef sausage
25221470	Pork and beef sausage, brown and serve, cooked
25221650	Smoked link sausage, pork
25221660	Smoked link sausage, pork and beef
25221680	Smoked sausage, pork
27560300	Corn dog (frankfurter or hot dog with cornbread coating)

Mixed foods prepared with frankfurters, hot dogs, or sausages
 (Adjusted for a frankfurter, hot dogs, or sausage content of 40 to 75%)
 [Sodium benzoate] = 0.040 to 0.075%

27120110	Sausage with tomato-based sauce (mixture)
27420460	Sausage and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), tomato-bas
27420470	Sausage and peppers, no sauce (mixture)
27560310	Corny dog, with chili, on bun
27560650	Sausage on biscuit
27560660	Sausage griddle cake sandwich
27560670	Sausage and cheese on English muffin
27560700	Sausage on biscuit, diet
27560705	Sausage balls (made with biscuit mix and cheese)
27560710	Sausage sandwich
27560720	Sausage and spaghetti sauce sandwich
27560910	Submarine, cold cut sandwich, on bun, with lettuce
58310410	Sausage rice links and whole wheat pancakes (frozen meal)

Mixed foods prepared with frankfurters, hot dogs, or sausages
 (Adjusted for a frankfurter, hot dogs, or sausage content of 10 to 39%)
 [Sodium benzoate] = 0.010 to 0.039%

27120120	Sausage gravy
27220120	Sausage and rice with tomato-based sauce (mixture)
27220150	Sausage and rice with (mushroom) soup (mixture)
27220170	Sausage and rice with cheese sauce (mixture)
27220190	Sausage and noodles with cream or white sauce (mixture)
27260500	Vienna sausages stewed with potatoes, Puerto Rican style (Salchichas guisadas)
27320080	Sausage, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), tomato-based s
27320090	Sausage, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), tomato-base
27320120	Sausage, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), gravy (mix
27320130	Sausage, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), gravy (mixtur
27420450	Sausage and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), tomato-
27500050	Sandwich, NFS
27500100	Meat sandwich, NFS
27560000	Luncheon meat sandwich, NFS, with spread
27560110	Bologna sandwich, with spread
27560120	Bologna and cheese sandwich, with spread
27560410	Puerto Rican sandwich (Sandwich criollo)
27560510	Salami sandwich, with spread
32105120	Egg omelet or scrambled egg, with sausage and mushrooms

32105121	Egg omelet or scrambled egg, with sausage and cheese
32105122	Egg omelet or scrambled egg, with sausage
32105160	Egg omelet or scrambled egg, with chorizo
32105190	Egg casserole with bread, cheese, milk and meat
32202030	Egg, cheese, and sausage on English muffin
32202050	Egg, cheese, and sausage on biscuit
32202055	Egg, cheese, and sausage griddle cake sandwich
32202060	Egg and sausage on biscuit
32202120	Egg, cheese and sausage on bagel
35001000	Scrambled eggs, sausage, hash brown potatoes (frozen meal)
35003000	Scrambled eggs, sausage, pancakes (frozen meal)
41205030	Refried beans with meat
41310210	Stewed chickpeas with Spanish sausages, Puerto Rican style (Garbanzos guisados con chorizos)
58126150	Turnover, meat- and cheese-filled, tomato-based sauce
58127270	Croissant sandwich with sausage and egg
58127330	Croissant sandwich with sausage, egg, and cheese
58128000	Biscuit with gravy
58128250	Dressing with meat and vegetables
58156210	Rice with vienna sausage, Puerto Rican style (arroz con salchichas)
58156310	Rice with Spanish sausage, Puerto Rican style
58310110	Frozen breakfast, NFS (frozen meal)
58310210	Sausage and french toast (frozen meal)
58310310	Pancakes and sausage (frozen meal)

Mixed foods prepared with frankfurters, hot dogs, or sausages
(Adjusted for a frankfurter, hot dogs, or sausage content of 1 to 9%)
[Sodium benzoate] = 0.0010 to 0.090%

27350020	Paella with seafood
27360090	Paella, NFS
27363100	Jambalaya with meat and rice
27460510	Antipasto with ham, fish, cheese, vegetables
41601120	Bean soup with vegetables, rice, and pork
58100340	Burrito with eggs, sausage, cheese and vegetables
58106510	Pizza with meat, NS as to type of crust
58106520	Pizza with meat, thin crust
58106530	Pizza with meat, thick crust
58106710	Pizza with meat and vegetables, NS as to type of crust
58106720	Pizza with meat and vegetables, thin crust
58106730	Pizza with meat and vegetables, thick crust
58106780	Pizza with meat and vegetables, lowfat, thin crust
58108010	Calzone, with meat and cheese
58108030	Panzerotti, with meat, vegetables, and cheese
58108050	Pizza rolls
58109010	Italian pie with meat
58134610	Tortellini, meat-filled, with tomato sauce
58134613	Tortellini, meat-filled, with tomato sauce, canned
58134650	Tortellini, meat-filled, no sauce
58134710	Tortellini, spinach-filled, with tomato sauce
58134720	Tortellini, spinach-filled, no sauce
58148550	Pasta salad with meat (macaroni or noodles, vegetables, meat, dressing)
75414020	Mushrooms, stuffed
75656010	Vegetable soup, Spanish style, stew type
77513010	Spanish stew, Puerto Rican style (Cocido Espanol)

Processed Beef and Beef Products

[Sodium benzoate] = 0.10%

21002000	Beef, pickled
21416000	Corned beef, cooked, NS as to fat eaten
21416110	Corned beef, cooked, lean and fat eaten
21416120	Corned beef, cooked, lean only eaten
21416150	Corned beef, canned, ready-to-eat
21602000	Beef, dried, chipped, uncooked
21602010	Beef, dried, chipped, cooked in fat
21602100	Beef jerky
21603000	Beef, pastrami (beef, smoked, spiced)
25231150	Corned beef, pressed
25240310	Roast beef spread
25240320	Corned beef spread
27211400	Corned beef hash

Mixed foods containing processed beef products

(Adjusted for a beef content of 60 to 92%)

[Sodium benzoate] = 0.060 to 0.092%

21602010	Beef, dried, chipped, cooked in fat
27112000	Beef with gravy (mixture)
27116200	Beef with barbecue sauce (mixture)
27118140	Stuffed pot roast, Puerto Rican style, NFS (assume with gravy and stuffing)
27160010	Meat with barbecue sauce, NS as to type of meat (mixture)
27163010	Meat with gravy, NS as to type of meat (mixture)
27214300	Beef wellington
27418310	Corned beef with tomato sauce and onion, Puerto Rican style (mixture)
27418410	Beef steak with onions, Puerto Rican style (mixture) (Biftec encebollado)
27510000	Beef sandwich, NFS
27513010	Roast beef sandwich
28315120	Beef vegetable soup with noodles, stew type, chunky style
28315130	Beef vegetable soup with rice, stew type, chunky style

Mixed foods containing processed beef products

(Adjusted for a beef content of 31 to 54%)

[Sodium benzoate] = 0.031 to 0.054%

27113000	Beef with cream or white sauce (mixture)
27115000	Beef with soy-based sauce (mixture)
27118130	Stewed dried beef, Puerto Rican style (Tasajo guisado, carne cecina guisada)
27118180	Puerto Rican style beef stew, meat with gravy (potatoes reported separately)
27211000	Beef and potatoes, no sauce (mixture)
27211100	Beef stew with potatoes, tomato-based sauce (mixture)
27212000	Beef and noodles, no sauce (mixture)
27212100	Beef and noodles with tomato-based sauce (mixture)
27212200	Beef and noodles with gravy (mixture)
27214500	Corned beef patty
27418110	Seasoned shredded soup meat (Ropa vieja, sopa de carne ripiada)
27510910	Corned beef sandwich
27511010	Pastrami sandwich
27513020	Roast beef sandwich, with gravy
27513030	Roast beef sandwich dipped in egg, fried, with gravy and spread
27513040	Roast beef submarine sandwich, on roll, with lettuce, tomato and spread
27513050	Roast beef sandwich with cheese

27563010 Meat spread or potted meat sandwich
 28310130 Beef, broth, bouillon, or consomme, dry, not reconstituted
 32105330 Scrambled eggs with jerked beef, Puerto Rican style (Revoltillo de tasajo)

Mixed foods containing processed beef products
 (Adjusted for a beef content of 15 to 30%)
 [Sodium benzoate] = 0.015 to 0.030%

27116300 Beef with sweet and sour sauce (mixture)
 27211300 Beef (roast) hash
 27212300 Beef and noodles with cream or white sauce (mixture)
 27213100 Beef and rice with tomato-based sauce (mixture)
 27213600 Beef and rice with cheese sauce (mixture)
 27311110 Beef, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mix
 27311120 Beef, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)
 27311210 Corned beef, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce
 27311220 Corned beef, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce
 27313010 Beef, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)
 27313020 Beef, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)
 27313150 Beef, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-based sauce
 27313160 Beef, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), soy-based sauce
 27313210 Beef, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), tomato-based sauce
 27313220 Beef, noodles, and vegetables (excluding carrots, broccoli, and dark-green leafy), tomato-based sauce
 27315010 Beef, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixture)
 27315020 Beef, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)
 27315210 Beef, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), tomato-based sauce
 27315220 Beef, rice, and vegetables (excluding carrots, broccoli, and/or dark-green leafy), tomato-based sauce
 27315520 Beef, rice, and vegetables (excluding carrots, broccoli, and dark-green leafy), soy-based sauce (mix
 27317010 Beef pot pie
 27360050 Meat pie, NFS
 27411100 Beef with vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), tomato-based
 27415100 Beef and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), soy-based
 27415120 Beef, tofu, and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), soy
 27415220 Beef, tofu, and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), soy-based
 27416450 Beef and vegetables (including carrots, broccoli, and/or dark-green leafy (no potatoes)), gravy (mix

27416500 Beef and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)),
gravy (mixture)

27510950 Reuben sandwich (corned beef sandwich with sauerkraut and cheese), with spread

27513070 Roast beef submarine sandwich, on roll, au jus

27515050 Fajita-style beef sandwich with cheese, on pita bread, with lettuce and tomato

27516010 Gyro sandwich (pita bread, beef, lamb, onion, condiments), with tomato and spread

28110120 Beef with potatoes (frozen meal, large meat portion)

28110200 Sirloin, chopped, dinner, NFS (frozen meal)

28110220 Sirloin, chopped, with gravy, mashed potatoes, vegetable (frozen meal)

28110620 Beef short ribs, boneless, with barbecue sauce, potatoes, vegetable (frozen meal)

28310210 Chili beef soup

28310320 Beef noodle soup, Puerto Rican style (Sopa de carne y fideos)

28310420 Beef and rice soup, Puerto Rican style

28315100 Beef vegetable soup with potato, stew type

28316020 Beef and mushroom soup, canned, low sodium

28317010 Beef stroganoff soup, chunky style

28360100 Meat broth, Puerto Rican style (Caldo)

32202130 Egg and steak on biscuit

58126110 Turnover, meat-filled, no gravy

58126120 Turnover, meat-filled, with gravy

Mixed foods containing processed beef products
(Adjusted for a beef content of 0.4 to 14%)
[Sodium benzoate] = 0.00040 to 0.014%

27214600 Creamed dried beef on toast

27315510 Beef, rice, and vegetables (including carrots, broccoli, and/or dark-green leafy), soy-
based sauce (mixture)

27415200 Beef and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)),
soy-based sauce

27416100 Beef and vegetables, Hawaiian style (mixture)

27460010 Chow mein or chop suey, NS as to type of meat, no noodles

27601000 Beef stew, baby food, toddler

27610710 Beef with vegetables, baby food, strained

27610730 Beef with vegetables, baby food, toddler

28101000 Frozen dinner, NFS

28110000 Beef dinner, NFS (frozen meal)

28110250 Sirloin tips with gravy, potatoes, vegetable (frozen meal)

28110270 Sirloin beef with gravy, potatoes, vegetable (frozen meal)

28110350 Salisbury steak with gravy, potatoes, vegetable, dessert (frozen meal, large meat portion)

28110380 Salisbury steak with gravy, macaroni and cheese (frozen meal)

28110510 Beef, sliced, with gravy, potatoes, vegetable (frozen meal)

28111010 Corned beef hash with apple slices, vegetable (frozen meal)

28113140 Beef with spaetzle or rice, vegetable (frozen meal)

28140920 Chicken, fried, with potatoes, vegetable, vegetable soup, dessert (frozen meal)

28160660 Stuffed green pepper (diet frozen meal)

28310110 Beef, broth, bouillon, or consommé

28310120 Beef, broth, bouillon, or consommé, canned, low sodium

28310140 Beef, broth, bouillon, or consommé, low sodium, dry, not reconstituted

28310160 Beef broth, with tomato, home recipe

28310170 Beef broth, without tomato, home recipe

28310330 Beef and rice noodle soup, Oriental style (Vietnamese Pho Bo)

28315110 Beef noodle soup, chunky style

28315140 Beef vegetable soup, Mexican style (Sopa / caldo de Res)

32105240 Beef egg foo yung (young)

58126140 Turnover, meat- and bean-filled, no gravy

58126170 Turnover, meat-and vegetable- filled (no potatoes, no gravy)
 58126180 Turnover, meat-, potato-, and vegetable-filled, no gravy
 58307010 Beef and pork cannelloni (diet frozen meal)
 77563010 Puerto Rican stew (Sancocho)

Processed Pork and Pork Products

[Sodium benzoate] = 0.10%

22001000 Pork, pickled, NS as to cut
 22107000 Pork chop, smoked or cured, cooked, NS as to fat eaten
 22107010 Pork chop, smoked or cured, cooked, lean and fat eaten
 22107020 Pork chop, smoked or cured, cooked, lean only eaten
 22300120 Ham, fried, NS as to fat eaten
 22300130 Ham, fried, lean and fat eaten
 22300140 Ham, fried, lean only eaten
 22300150 Ham, breaded or floured, fried, NS as to fat eaten
 22300160 Ham, breaded or floured, fried, lean and fat eaten
 22300170 Ham, breaded or floured, fried, lean only eaten
 22311000 Ham, smoked or cured, cooked, NS as to fat eaten
 22311010 Ham, smoked or cured, cooked, lean and fat eaten
 22311020 Ham, smoked or cured, cooked, lean only eaten
 22311200 Ham, smoked or cured, low sodium, cooked, NS as to fat eaten
 22311210 Ham, smoked or cured, low sodium, cooked, lean and fat eaten
 22311220 Ham, smoked or cured, low sodium, cooked, lean only eaten
 22311450 Ham, prosciutto
 22311500 Ham, smoked or cured, canned, NS as to fat eaten
 22311510 Ham, smoked or cured, canned, lean and fat eaten
 22311520 Ham, smoked or cured, canned, lean only eaten
 22321110 Ham, smoked or cured, ground patty
 22421000 Pork roast, smoked or cured, cooked, NS as to fat eaten
 22421010 Pork roast, smoked or cured, cooked, lean and fat eaten
 22421020 Pork roast, smoked or cured, cooked, lean only eaten
 22704010 Pork, cracklings, cooked

Mixed foods containing processed pork products

(Adjusted for a pork content of 30 to 59%)

[Sodium benzoate] = 0.030 to 0.059%

22431000 Pork roll, cured, fried
 25220510 Capicola
 25230430 Ham and cheese loaf
 27120020 Ham or pork with gravy (mixture)
 27120030 Ham or pork with barbecue sauce (mixture)
 27120090 Ham or pork with (mushroom) soup (mixture)
 27120100 Ham or pork with tomato-based sauce (mixture)
 27120150 Pork or ham with soy-based sauce (mixture)
 27163010 Meat with gravy, NS as to type of meat (mixture)
 27220010 Meat loaf made with ham (not luncheon meat)
 27220050 Ham or pork with stuffing (mixture)
 27220080 Ham croquette
 27220210 Ham and noodles, no sauce (mixture)
 27220310 Ham or pork and rice, no sauce (mixture)
 27220510 Ham or pork and potatoes with gravy (mixture)
 27220520 Ham or pork and potatoes with cheese sauce (mixture)
 27320020 Ham pot pie

27320410 Ham, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), no sauce (mixture)

27320450 Ham, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), no sauce (mixt

27420010 Cabbage with ham hocks (mixture)

27420020 Ham or pork salad

27420250 Ham and vegetables (including carrots, broccoli, and/or dark- green leafy (no potatoes)), no sauce (

27420270 Ham and vegetables (excluding carrots, broccoli, and dark-green leafy (no potatoes)), no sauce (mixt

27520300 Ham sandwich, with spread

27520310 Ham sandwich with lettuce and spread

27520320 Ham and cheese sandwich, with lettuce and spread

27520340 Ham salad sandwich

27520350 Ham and cheese sandwich, with spread, grilled

27520360 Ham and cheese sandwich, on bun, with lettuce and spread

27520380 Ham and cheese on English muffin

27520540 Ham and tomato club sandwich, with lettuce and spread

Mixed foods containing processed pork products
 (Adjusted for a pork content of 10 to 29%)
 [Sodium benzoate] = 0.010 to 0.029%

27120080 Ham stroganoff

27146250 Chicken or turkey cordon bleu

27150190 Lobster sauce (broth-based)

27220020 Ham and noodles with cream or white sauce (mixture)

27220030 Ham and rice with (mushroom) soup (mixture)

27320020 Ham pot pie

27320030 Ham or pork, noodles and vegetables (excluding carrots, broccoli, and dark-green leafy), cheese sauce

27320070 Ham or pork, noodles, and vegetables (including carrots, broccoli, and/or dark-green leafy), tomato-

27420080 Greens with ham or pork (mixture)

27520250 Ham on biscuit

27520330 Ham and egg sandwich

27520370 Hot ham and cheese sandwich, on bun

27520390 Ham and cheese submarine sandwich, on multigrain roll, with lettuce, tomato and spread

27520410 Cuban sandwich, (Sandwich cubano), with spread

27520420 Midnight sandwich, (Media noche), with spread

28120310 Pork with rice, vegetable, in soy-based sauce (diet frozen meal)

28320130 Ham, rice, and potato soup, Puerto Rican style

28320140 Ham, noodle, and vegetable soup, Puerto Rican style

28320150 Pork, vegetable soup with potatoes, stew type

28340750 Hot and sour soup

32101500 Egg, Benedict

32105030 Egg omelet or scrambled egg, with ham or bacon

32105060 Egg omelet or scrambled egg, with peppers, onion, and ham

32105080 Egg omelet or scrambled egg, with cheese and ham or bacon

32105085 Egg omelet or scrambled egg, with cheese, ham or bacon, and tomatoes

32202010 Egg, cheese, and ham on English muffin

32202020 Egg, cheese, and ham on biscuit

32202025 Egg, cheese and ham on bagel

32202110 Egg and ham on biscuit

41601110 Bean and ham soup, chunky style

41601160 Bean and ham soup, canned, reduced sodium, prepared with water or ready-to-serve

41601180	Bean and ham soup, home recipe
41602010	Chunky pea and ham soup
41602030	Split pea and ham soup
41602090	Split pea and ham soup, canned, reduced sodium, prepared with water or ready-to-serve
58100560	Enchilada with ham and cheese, no beans
58117510	Hallaca, Puerto Rican style (hominy, pork or ham, vegetables)
58127210	Croissant sandwich, filled with ham and cheese
58127310	Croissant sandwich with ham, egg, and cheese
58145150	Macaroni or noodles with cheese and pork or ham
58149210	Somen salad with noodles, lettuce, egg, fish, and pork
71305110	White potato, scalloped, with ham
74415110	Tomato and sofrito stewing sauce, Puerto Rican style

Mixed foods containing processed pork products

(Adjusted for a pork content of 1 to 9%)

[Sodium benzoate] = 0.0010 to 0.090%

27118140	Stuffed pot roast, Puerto Rican style, NFS (assume with gravy and stuffing)
27135150	Veal cordon bleu
27150160	Shrimp with lobster sauce (mixture)
27221110	Pork roast, stuffed, Puerto Rican style
27448010	Chicken or turkey fricassee, no potatoes, Puerto Rican style, NFS (assume with sauce)
27448020	Chicken or turkey fricassee, with sauce, no potatoes, Puerto Rican style (potatoes reported separate)
27460510	Antipasto with ham, fish, cheese, vegetables
28320120	Pork vegetable soup with noodles, stew type, chunky style
28340700	Bird's nest soup (chicken, ham, and noodles)
32110100	Eggs a la Malaguena, Puerto Rican style (Huevos a la Malaguena)
41210100	Stewed dry red beans, Puerto Rican style (Habichuelas coloradas guisadas)
41210110	Stewed dry lima beans, Puerto Rican style
41210150	Stewed pink beans with viandas, ham, Puerto Rican style
41303500	Stewed green peas, Puerto Rican style (Habichuelas del pais)
41310150	Stewed chickpeas, Puerto Rican style
41601130	Bean soup, mixed beans
58112110	Dim sum, meat filled (egg roll-type)
58116110	Meat turnover, Puerto Rican style (Pastelillo de carne; Empanadilla)
58134610	Tortellini, meat-filled, with tomato sauce
58134650	Tortellini, meat-filled, no sauce
58156510	Soupy rice from Puerto Rican style Asopao de Pollo (chicken parts reported separately)
71301120	White potato, cooked, with ham and cheese
71508120	White potato, stuffed with ham, broccoli and cheese sauce, baked, peel eaten
76607000	Vegetable and ham, baby food, NS as to strained or junior
76607010	Vegetable and ham, baby food, strained
76607020	Vegetable and ham, baby food, junior
76607030	Potatoes with cheese and ham, baby food, toddler

Processed Poultry Products

Processed Chicken and Turkey Products

[Sodium benzoate] = 0.10 %

24198570	Chicken, canned, meat only, light and dark meat
24198670	Chicken, chicken roll, roasted, light and dark meat
24198710	Chicken patty with cheese, breaded, cooked
24198740	Chicken nuggets
24198770	Chicken nuggets, lowfat

24201500	Turkey, light or dark meat, smoked, cooked, NS as to skin eaten
24201510	Turkey, light or dark meat, smoked, cooked, skin eaten
24201520	Turkey, light or dark meat, smoked, cooked, skin not eaten
24202120	Turkey, drumstick, smoked, cooked, skin eaten
24203120	Turkey, wing, smoked, cooked, skin eaten
24206000	Turkey, canned
24208000	Turkey, nuggets
24208500	Turkey bacon, cooked
25210110	Frankfurter, wiener, or hot dog, NFS
25210250	Frankfurter or hot dog, meat and poultry, fat free
25210280	Frankfurter or hot dog, meat and poultry
25210310	Frankfurter or hot dog, chicken
25210410	Frankfurter or hot dog, turkey
25210700	Frankfurter or hot dog, meat & poultry, lowfat
25220010	Cold cut, NFS
25220440	Bologna, turkey
25220480	Bologna, chicken, beef, and pork
25221840	Turkey breakfast sausage, bulk
25221850	Turkey sausage, smoked
25221860	Turkey sausage, reduced fat, brown and serve, cooked
25221870	Turkey and pork sausage, fresh, bulk, patty or link, cooked
25221880	Turkey, pork, and beef sausage, reduced fat, smoked
25221890	Turkey, pork, and beef sausage, lowfat, smoked
25230310	Chicken or turkey loaf, prepackaged or deli, luncheon meat
25230790	Turkey ham, sliced, extra lean, prepackaged or deli, luncheon meat
25230800	Turkey ham
25230820	Turkey pastrami
25230840	Turkey salami
25230900	Turkey or chicken breast, prepackaged or deli, luncheon meat

Mixed foods containing processed chicken or poultry products
(Adjusted for a poultry content of 60 to 90%)
[Sodium benzoate] = 0.060 to 0.090%

25240110	Chicken salad spread
27246300	Chicken or turkey cake, patty, or croquette
27540170	Chicken patty sandwich, miniature, with spread
27540180	Chicken patty sandwich or biscuit
27540190	Chicken patty sandwich, with lettuce and spread
27540230	Chicken patty sandwich with cheese, on wheat bun, with lettuce, tomato and spread
27540320	Turkey salad or turkey spread sandwich
27560400	Chicken frankfurter or hot dog, plain, on bun
28140720	Chicken patty, or nuggets, boneless, breaded, potatoes, vegetable (frozen meal)
28140740	Chicken patty, or nuggets, boneless, breaded, with pasta and tomato sauce, fruit, dessert (frozen meal)
28141050	Chicken patty parmigiana, breaded, with vegetable (diet frozen meal)