

Quality of Delicatessen Meats

By Lester Hankin

A cooperative study by The Connecticut Agricultural Experiment Station, New Haven and the Food Division of the Connecticut Department of Consumer Protection, Hartford.

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Each American consumes about 113 grams (approximately four ounces) of meat per day. Of this amount, 38% or 43 grams (1.5 ounces) is processed meat or what are commonly called delicatessen meats (3). The 43 grams of processed meat consumed per day total about 34 pounds per year.

Processed meats take many forms and are called frankforts, salami, sausage, loafs, rolls and by many fanciful or local names. Most processed or delicatessen meat is a form of sausage (4).

In the manufacture of processed meats a single type or a mixture of meats is chopped or ground and then mixed with flavorings, sugar, salt, fillers, binders, or preservatives. Sometimes non-muscle meat such as heart, gizzard, liver, snouts, and lips are used. The chopped meat, called the emulsion, is then formed into various shapes and sizes and cooked, baked, or smoked. Being perishable, it is refrigerated until sold. It is purchased at sliced-to-order delicatessen counters or in refrigerated pre-packaged units.

Connecticut and U.S. Regulations for processed meat products are similar (1,7). Frankfort, bologna and salami can contain no more than 30% fat, no more than 3.5% fillers, which can include nonfat dry milk, cereal, and soy flour and protein; no more than 10% added water; and no more than 200 parts per million (ppm) nitrite. The water is usually added as ice during the grinding or chopping to cool the meat and equipment.

Loaf products such as "luxury loaf" or "pickle and pimento loaf", have no restriction on amount of added water or filler, but must contain no more than 30% fat. Uncooked sausage may contain up to 50% fat, but cooked

or processed sausage is restricted to 30% fat.

In this survey of processed or delicatessen meats we tested an assortment of products and brands to give consumers an overview of ingredients and nutrients in different products. Compliance with State Regulations was also examined.

Methods

During 1982-83 one hundred fifty official samples of processed meats were collected by inspectors of the Food Division of the Connecticut Department of Consumer Protection. Samples were collected in packaged units, from sliced-to-order counters, and from bulk. Samples included 39 frankforts or kielbasas, 28 salamis or wursts, 21 bolognas, 39 loafs or rolls, and 22 miscellaneous products. The miscellaneous items included head cheese, corned tongue, turkey breast, and blood sausage.

Analysis for fat, protein, total solids, ash, added water, fillers, and nitrite were made by Official Methods (5). Sodium and calcium were determined by atomic absorption spectrophotometry (2). The percentage of total carbohydrate and calories were calculated. Carbohydrate is $\% \text{ total solids} - (\% \text{ fat} + \% \text{ protein} + \% \text{ ash})$. Calories per 100 grams are the $\% \text{ fat} \times 8.79 + [\% \text{ total solids} - (\% \text{ fat} + \% \text{ ash})] \times 4$. The mean difference of duplicate tests for fat was about a half percent and for water content was about eight-tenths percent.

Results and Discussion

Table 1 lists products, brand names, and meat ingredients as shown on the label. It is not possible to list all ingredients. Samples that contain MSG (monosodium

glutamate) are indicated with an asterisk since this additive may be significant to some people. The table also shows analyses for nutrients and other materials. Underlined values indicate excesses. In some cases (marked with a †) the material was present although not shown on the label.

Frankforts and kielbasa. The average amount of fat was 29.0% but ranged from 9.5 to 40.0%. Fourteen or 36% of the samples (nos. 1, 2, 3, 4, 5, 8, 9, 12, 15, 16, 19, 30, 36, 39) contained more than 30% fat, the legal limit. Three samples contained only chicken or turkey as the meat component; the others contained beef and/or pork, sometimes combined with chicken and such other ingredients as pork stomachs and beef hearts. (Table 1)

Only eight frankfort and kielbasa samples declared use of nonfat dry milk and only one (no. 37) contained more than the 3.5% maximum allowed. Three samples (nos. 2, 13, 22) contained undeclared filler. Some samples claimed hydrolyzed plant protein was added. There is, however, no satisfactory method to determine the amount of this material added to meats. The total protein in processed meats depends not only on the amount of meat used but also on the amount of protein added in fillers as nonfat dry milk, soy products or hydrolyzed plant protein. The average protein was 14.7%.

All except sample 37 contained less than 10% added water, the limit allowed. All contained less than the 200 ppm nitrite allowed.

Sodium averaged 933 mg (milligrams) per 100 grams. If this sodium is calculated as common table salt (sodium chloride), it is 2.2% salt. The range in sodium content was broad, from 70 to 2000 mg per 100 grams.

Sugars or carbohydrates added as flavoring are usually in the form of sucrose or corn syrup, which is hydrolyzed corn starch. Lactose from nonfat dry milk would also be included as total carbohydrate. The average amount of carbohydrate was 4.4%.

Since most frankforts contain relatively large amounts of fat, the caloric content per 100 grams (about 3.5 ounces) was high, averaging 332 calories. This is about the amount in six apples or 4.5 slices of white bread.

The calcium content of these products averaged 90 mg per 100 grams. A high amount of calcium may indicate that the meat was deboned mechanically. In this process some bone may be chipped away with the meat and the bone meal incorporated into the product.

One sample (no. 23) contained an excess of phosphate, 0.86%; only 0.5% is allowed. One sample (no. 7) declared that the product contained less than 20% fat, and this was found to be correct. All samples contained less than the maximum amount of nitrite allowed.

Bologna. Bologna is similar to frankforts since essentially the same ingredients and processing are used. This product is subject to the same regulations as frankforts and kielbasa. The average fat content was 28.3%, but eight samples (nos. 41, 42, 44, 45, 47, 49, 50, 52) or a third contained more than the 30% maximum (Table 1). Five samples declared nonfat dry milk as an ingredient, but only one (no. 56) contained an excessive amount. One sample (no. 49) did not declare use of a filler, but a small amount was found.

Protein content averaged 13.8%, about 1% less than the average for frankforts. Sodium content averaged 957 mg per 100 grams. The average amount of nitrite was 12 ppm, and all samples were below the allowable 200 ppm.

Total carbohydrate averaged 4.9%, slightly more than in frankforts or kielbasa. Caloric content averaged 326 per 100 grams and calcium averaged 90 mg per 100 grams.

Salami and wursts. These products must comply with the same regulations as frankforts and bologna. The fat content of the salamis and wursts averaged 27.8%. Eleven samples (nos. 63, 64, 65, 68, 74, 75, 76, 77, 81, 86, 88) or 39% exceeded the 30% fat maximum. Protein content averaged 12.4%, about 3% higher than the average for frankforts or bologna. Three samples (nos. 65, 66, 81) contained small amounts of filler which was not declared on the label (Table 1). Two samples (nos. 80, 88) contained more than the 3.5% filler allowed.

Nitrite levels averaged 10.2 ppm, and all samples were acceptable. Carbohydrate content averaged 4.1%, about the same as in frankforts, bologna and salami. Caloric content averaged 330 per 100 grams and calcium averaged 85 mg per 100 grams. Sodium averaged 1145 mg per 100 grams.

Loafs and rolls. These products have no regulatory restrictions on filler or added water. The fat content, however, can be no more than 30%. Only three (nos. 90, 109, 121) or a twelfth of the 38 samples contained an excess of fat (Table 1). The average fat content for all samples was 18.9%.

Protein content averaged 15.5%. Nitrite levels were all within regulation, averaging 34 ppm. Sodium content averaged 959 mg per 100 grams but ranged from 157 to 1800.

Carbohydrate averaged 8.7% and calories 262 per 100 grams. Calcium content averaged 129 mg per 100 grams, higher than the average for other processed meats. One sample (no. 124) contained a filler that was not listed on the label.

Miscellaneous products. The miscellaneous products were so varied that citing average values is not meaningful (Table 1). Four samples, however, (nos. 131, 135, 137, 139) contained an excess of fat. Nitrite levels were satisfactory except for sample 133 which contained 250 ppm, exceeding the 200 ppm allowed.

In these products, as in loafs and rolls, the average caloric content of 262 per 100 grams is about 50 calories per 100 grams lower than in other products, probably because they contained less fat. Two samples (nos. 137, 144) contained a filler that was not declared on the label.

Averages for all products are shown in Table 2. Loafs and rolls and the miscellaneous group contained less fat than the other groups. Protein and sodium content was about the same for all groups. On the average, loafs and rolls contained more nitrite than other products. Loafs and rolls also contained more total carbohydrates than the other groups, either from added sugars or from starchy fillers. Also, loafs and rolls were higher in calcium content, either from meat deboned mechanically or from added materials like calcium phosphate.

Some comments concerning types of meat used in making processed meats are in order. Connecticut Regulations

state that meat food products must be made from meat that is not adulterated (1, 6). In Table 1 some products contain meats of types normally not expected in processed meats. As long as they are considered edible under the regulations and are listed on the label as an ingredient they may be used. Consumers of course are concerned with the aesthetics and how some meats might affect taste.

Conclusions

Of the 150 samples of processed or delicatessen meats tested, 39 were frankforts or kielbasa, 21 were bologna, 28 were salami or wurst, 39 were loafs or rolls, and 23 were of miscellaneous types. Overall, 26% contained in excess of the 30% fat maximum allowed and 8% either exceeded the 3.5% filler allowed or contained a filler that was not listed on the label. Excessive fat content was more common in frankforts, bolognas, and salamis than the other groups.

Sodium in all products averaged about 1000 mg per 100 grams, but the range was from 70 to over 2000. All samples except one contained less than the maximum amount of nitrite allowed. Other analyses included protein content, calcium content, and caloric value.

Table 1. Analysis of Delicatessen Meats.

Sample number	Brand & Meat Ingredients	Fat, %	Protein, %	Carbo-hydrate, %	Added water, %	Fillers, %	Sodium, mg/100 g	Nitrite ppm	Calcium, mg/100 g	Calories per 100 g
Frankforts, Hot Dogs, Kielbasa										
1.	A & P Skinless Franks: beef, pork	<u>34.5</u>	12.5	8.0	0	0	870	12	20	395
2.	A & P Skinless Beef Franks: beef	<u>31.6</u>	10.6	5.8	6.8	<u>0.3†</u>	850	50	150	344
3.	Adolf's Weiners: beef, pork	<u>34.5</u>	25.8	1.3	0	0.3	1250	24	22	411
4.	Bogner Beef Franks: beef	<u>37.3</u>	17.2	1.5	0	0	690	72	8	381
5.	Bogner Beef Franks: beef	<u>36.1</u>	14.4	2.6	0	0	1060	4	10	407
6.	Capital Farms Kielbasa: pork, beef	24.6	14.8	1.4	0	0	760	1	220	281
7.	Colonial Chicken Hot Dogs: chicken meat	12.5	15.1	9.6	0	0	960	10	20	208
8.	Colonial Beef Franks: beef	<u>34.0</u>	18.6	< 1.0	0	0	1070	1	110	372
9.	Deutschmacher Franks: beef, pork	<u>32.6</u>	12.9	6.1	0	1.9	720	2	3	363
10.	Deutschmacher German Franks: beef, pork	29.8	14.4	4.1	0	2.9	790	21	13	336
11.	Dinner Bell Franks: pork, beef	30.6	11.8	4.3	3.3	0	410	7	80	333
12.	Dinner Bell Beef Franks: beef	<u>33.5</u>	11.2	3.2	4.5	0	1010	2	7	352
13.	Dinner Bell Chicken Franks: chicken*	<u>20.8</u>	14.4	4.9	0	<u>0.3†</u>	650	24	130	260
14.	Dubuque Beef Franks: beef	30.4	11.6	6.4	2.5	0	750	10	8	339
15.	Edwards Franks: beef, pork	<u>31.9</u>	12.4	3.8	0	0	1040	2	7	345
16.	Edwards Beef Franks: beef	<u>31.3</u>	11.7	5.0	2.0	0	1080	4	10	341
17.	Fenway Beef Franks: beef	30.6	10.8	5.9	7.1	0	1710	3	12	336
18.	Hansel 'N Gretel Kielbasa for slicing: pork	9.5	16.4	11.1	0	0	1440	0.4	—	194
19.	Herrud Franks: beef, pork, chicken meat	<u>34.8</u>	12.3	3.7	0	0	690	4	514	370
20.	Hummel's Skinless Franks: beef, pork*	<u>28.8</u>	17.5	< 1.0	0	0	810	0.4	2	317
21.	Kahn's Jumbo Beef Franks: beef	29.5	17.9	< 1.0	0	0	830	30	130	334
22.	Kay-Em Franks: beef	24.9	12.3	4.6	7.5	<u>0.7†</u>	1100	18	4	286
23.	Longacre Turkey Franks: turkey	22.3	13.1	1.3	7.3	0	640	6	264	253
24.	MSB Skinless Franks: beef, pork, chicken meat	27.9	14.9	5.1	3.0	0	70	6	80	325
25.	Miller's Franks: beef, pork	28.5	15.6	1.0	0	0	920	8	40	317
26.	Miss Iowa: pork, beef, beef tripe, pork hearts	26.3	14.3	7.8	0	2.7	910	56	140	319
27.	Morrison & Schiff Beef Franks: beef	22.4	15.4	5.1	0	0	970	52	18	279
28.	Nathan's Beef Franks: beef	29.6	11.9	6.4	1.1	0	1010	15	12	334
29.	No Frills Franks: beef, pork, chicken meat	25.3	15.3	5.7	0	<u>3.6</u>	760	10	420	306
30.	Nutmeg Kielbasa: pork, beef*	<u>38.4</u>	26.9	< 1.0	0	0	1260	19	14	448
31.	Orange Poultry Farm Kielbasa: bulk	<u>29.3</u>	17.1	3.9	0	0	620	14	5	341
32.	Our Economy Pack Skinless Franks: beef, pork, chicken	26.1	13.6	4.1	1.6	1.5	820	10	390	301
33.	Our Economy Pack Skinless Franks: beef, pork, chicken	28.5	14.1	8.0	0	2.2	690	18	24	339
34.	Rosol's Kielbasa: pork, beef, veal*	30.1	17.3	4.7	0	3.0	850	8	21	353
35.	Sweet Life Skinless Beef Franks: beef	25.1	12.9	4.8	2.9	0	910	12	6	292

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Table 1. Analysis of Delicatessen Meats. (continued)

Sample number	Brand & Meat Ingredients	Fat, %	Protein, %	Carbohydrate, %	Added water, %	Fillers, %	Sodium, mg/100 g	Nitrite ppm	Calcium, mg/100 g	Calories per 100 g
36.	Table Treat Weiners: pork, beef hearts, beef, chicken, pork stomachs	<u>32.6</u>	<u>13.3</u>	6.0	0	0	1010	10	23	364
37.	Tobin's First Prize Half-n-Half Franks: pork, beef	29.5	11.3	3.5	<u>12.4</u>	<u>3.6</u>	2070	0	244	318
38.	Triple M. Franks: beef, pork, veal	26.0	13.6	3.9	0	0	880	7	210	299
39.	Weber Skinless Franks: beef, pork	<u>40.0</u>	16.1	7.1	0	2.8	1470	2	31	445
Bologna										
40.	Biergarten: unskinned pork, chicken, beef lips	25.9	19.3	2.8	0	3.3	900	0	22	316
41.	Deutschmacher: pork, beef	<u>31.5</u>	12.5	4.9	0.8	1.8	790	20	309	347
42.	Dinner Bell: pork, beef	<u>38.1</u>	<u>14.9</u>	4.9	0	0	1240	7	10	414
43.	Eat Slim Veal: veal	15.8	13.1	10.0	6.1	0	190	9	80	231
44.	German Brand: pork, beef	<u>36.4</u>	<u>16.3</u>	5.1	0	2.3	1440	3	13	405
45.	German Brand: pork, beef*	<u>37.5</u>	<u>11.5</u>	5.2	0	0	370	36	60	396
46.	Grand Union Family Pack: beef, pork	<u>26.3</u>	<u>13.7</u>	3.7	1.6	2.6	960	10	47	300
47.	Grote & Weigel Minced: beef, pork	<u>36.3</u>	16.3	< 1.0	0	0	890	13	11	387
48.	Hungarian Butcher Shop: bulk no label	<u>20.3</u>	15.1	2.6	0	0	890	24	7	249
49.	Jack & Jill German: pork, pork fat, partially defatted beef fatty tissue	<u>31.9</u>	12.9	7.1	0	<u>0.3†</u>	1120	0.2	—	360
50.	Miller's: beef, pork	<u>34.5</u>	13.6	2.7	0	0	800	9	24	368
51.	Morrison & Schiff Kosher Beef: beef	<u>21.5</u>	14.9	4.4	0	0	760	25	260	266
52.	Nagel: pork, beef	<u>40.0</u>	12.7	4.3	0	0.9	310	0	71	420
53.	Oscar Mayer Beef: beef	<u>30.3</u>	10.9	4.3	0	0	1280	4	10	327
54.	Pathmark: beef, pork	29.4	12.4	6.0	0	0	720	4	32	332
55.	Rich's Turkey: turkey	17.8	13.6	3.8	0	0	1010	38	4	225
56.	Russer Wunderbar: pork, beef lips, chicken	29.6	11.3	12.5	3.5	<u>4.1</u>	1160	8	280	355
57.	SandyMac Ham: no label available	20.5	12.5	6.9	0.3	0	1810	3	15	310
58.	Seltzer Lebanon: beef	14.4	18.5	3.7	0	0	1270	25	20	215
59.	Stop & Shop German: beef, pork, chicken meat	29.3	11.6	5.8	3.6	0	1380	6	297	327
60.	Wurstmacher German: pork, beef*	26.8	13.1	2.5	2.5	0	810	8	220	297
Salami & Wursts										
61.	Adolf's Bierwurst: pork, beef	19.8	18.0	2.8	0	0	1030	16	16	257
62.	Adolf's Schickenwurst: pork, beef	13.4	23.9	< 1.0	0	0	1160	18	12	214
63.	Armour Hard Salami: beef, pork	<u>35.3</u>	20.1	2.3	0	0	1790	2	4	400
64.	Biermaster Hard Salami: beef, pork, beef hearts	<u>43.3</u>	19.3	3.6	0	0	1830	13	29	471
65.	Carando Genoa Salami: pork, smoked pork*	<u>32.3</u>	22.1	3.5	0	<u>0.3†</u>	1760	0	12	386
66.	Colonial German Cooked Salami: beef, pork	28.6	14.6	1.3	0	<u>0.3†</u>	330	12	80	315
67.	Deutschmacher German Brand Salami: pork, beef	24.5	12.4	8.4	2.1	0	800	3	294	299
68.	DiLusso Genoa Salami: pork, beef	<u>35.6</u>	26.9	2.0	0	0	820	6	90	429
69.	Dinner Bell Cooked Salami: beef, pork, pork hearts	23.3	13.7	6.5	0	0	1220	10	7	285
70.	Dutchman's Cooked Bratwurst: pork	29.6	13.0	2.4	1.5	0	380	0	103	322
71.	Empire Turkey Salami: dark turkey, skin added	14.9	18.1	7.3	0	0	1130	14	200	232
72.	Hebrew National Beef Salami: beef	26.3	13.9	3.7	0	0	570	1	145	301
73.	Hickory Farms Beef Stick: beef	28.3	16.2	3.7	0	0	1440	17	17	328
74.	Hickory Farms Bratwurst: smoked sausage links, pork, beef*	<u>33.6</u>	12.0	2.8	0.5	0	920	22	8	355
75.	Hillshire Farms Cheddar Wurst: pork, beef*	<u>33.8</u>	16.9	< 1.0	0	0	1130	0	690	365
76.	Hormel Hard Salami: beef, pork	<u>33.6</u>	19.6	3.1	0	0	1860	10	7	386
77.	Hormel Leoni Pepperoni: pork, beef	<u>40.3</u>	14.8	11.6	0	0	1660	10	16	459
78.	Hungarian Butcher Shop Cooked Salami: bulk, no label	18.1	17.4	4.5	0	0	1150	18	72	247
79.	Hungarian Butcher Shop Smoked Kielbasa: bulk, no label	22.3	16.3	4.1	0	0	980	24	8	277
80.	Kay-Em Cooked Salami: no label available	23.5	19.7	7.2	0	<u>4.4</u>	1520	3	20	314
81.	Liguria Genoa Salami: pork, beef	<u>33.5</u>	20.7	1.7	0	<u>0.6†</u>	1680	9	26	386
82.	Longacre Turkey Salami: turkey, turkey gizzards, turkey hearts	8.3	20.4	6.8	0	0	1170	22	—	180
83.	MSB Cooked Salami: pork, beef, beef hearts	27.3	18.1	2.7	0	0	480	0	20	322
84.	Morrison & Schiff Beef Salami: beef	23.9	14.1	7.5	0	0	880	28	200	296

Table 1. Analysis of Delicatessen Meats. (continued)

Sample number	Brand & Meat Ingredients	Fat, %	Protein, %	Carbohydrate, %	Added water, %	Fillers, %	Sodium, mg/100 g	Nitrite, ppm	Calcium, mg/100 g	Calories per 100 g
85.	Mucke's Circle M. Cooked Salami: pork, beef*	27.3	20.0	1.2	0	0	1250	18	24	324
86.	Nagel Cooked Salami: pork, beef hearts, beef	<u>47.1</u>	18.6	2.6	0	0	1020	0	107	499
87.	Oscar Mayer Cotto Salami: pork, beef hearts, beef	18.4	14.3	4.0	2.9	0	1480	8	5	235
88.	Shop Rite Cooked Salami: pork, beef	<u>32.8</u>	12.7	7.9	0	<u>3.6</u>	610	2	80	370
Loafs and Rolls										
89.	A & P Chopped Ham: ham, cured ham shank	20.8	22.4	7.6	0	0	1430	7	30	302
90.	Adolf's Minced Delight: beef, pork, pork fat	<u>37.3</u>	16.8	1.7	0	0	1050	46	19	402
91.	Carando New England Luncheon Loaf: pork, beef*	6.6	18.4	14.3	0	6.6	880	8	267	189
92.	Carando Dandy Loaf: label not legible*	12.8	15.0	21.0	7.0	24.9	570	14	260	257
93.	Colonial Jellied Corned Beef Loaf: beef, gelatin	13.0	20.2	2.2	0	0	580	13	9	204
94.	Colonial Top Pepper Loaf: pork, beef	15.5	14.7	3.3	4.1	0	600	2	90	208
95.	Colonial Top Olive Loaf: beef, pork	18.8	11.7	9.8	8.7	0	790	0	189	251
96.	Dinner Bell Dutch Loaf: pork, beef, pork hearts, pork tongues*	14.9	14.1	13.0	5.3	9.8	1060	7	28	239
97.	Dinner Bell Dutch Loaf: pork, beef, pork hearts, pork tongues*	17.8	14.1	12.7	4.2	10.4	430	6	110	263
98.	Dinner Bell Kielbasa Loaf: pork, beef	28.3	13.1	5.3	2.2	3.0	890	6	22	322
99.	Dinner Bell Pickle & Pimento Loaf: beef, pork	18.8	9.9	16.3	22.1	12.8	1140	4	31	270
100.	Empire Chicken Roll: chicken breast*	1.0	19.4	18.1	0	2.2	590	28	130	159
101.	Finast Spiced Luncheon Loaf: pork, pork tongues*	25.8	16.3	6.1	0	4.6	670	8	120	316
102.	Gem Chopped Glazed Ham: ham	16.9	14.4	6.0	0	0	157	2	8	230
103.	Gem Pickle & Pimento Loaf: beef, unskinned pork*	21.6	13.2	12.9	2.7	5.7	650	10	210	295
104.	Hansel 'N Gretel Pickle Loaf: pork, beef*	18.3	13.1	6.2	6.7	0	1210	16	—	283
105.	Hansel 'N Gretel Spiced Loaf: pork, pork skins, partially defatted beef fatty tissue	18.0	15.8	4.3	0	0	1130	8	540	238
106.	Hartford Provision Luncheon Loaf: veal, pork	20.8	13.2	8.2	14.1	9.1	910	4	684	268
107.	Hartford Provision Olive Loaf: pork, chicken, veal, beef	21.5	9.6	8.4	20.3	5.1	1140	8	418	261
108.	Hormel Chopped Spiced Ham: ham	29.4	14.9	3.6	0	0	990	4	76	333
109.	Hummel's Blood & Tongue Sausage: cured pork tongue, pork fat, pork skins, beef blood	<u>30.6</u>	17.4	3.3	0	0	710	34	200	352
110.	Hummel's Our Old Fashion Loaf: pork, veal, beef, pork liver*	16.8	15.3	8.2	0	4.6	950	15	—	241
111.	Hummel's Pepper Loaf: pork, veal, beef, pork liver*	12.5	15.9	7.8	0	3.9	900	13	—	205
112.	Hummel's Pressed Luncheon Sausage, pork, beef*	5.0	24.6	7.5	0	0	600	6	100	172
113.	Kohler Plain Loaf: pork, beef	27.4	13.2	1.3	0.5	0	720	0.2	—	306
114.	Land O' Lakes Turkey Ham: turkey	4.0	22.4	10.8	0	0	870	4	70	168
115.	Medford Olive Loaf: pork	17.6	11.7	9.8	14.1	2.8	1800	6	11	241
116.	Medford Pepper Loaf: beef, pork	24.9	11.1	10.9	10.8	3.5	1670	3	20	307
117.	Mucke's Circle M Minced Delight: beef, pork*	25.6	16.1	4.7	0	0	990	—	19	308
118.	Mucke's Circle M Luxury Loaf: veal, pork, beef	16.4	16.5	15.3	0	5.6	1300	—	45	271
119.	Nagel Deluxe Loaf: ham trimmings	27.0	12.9	9.8	5.0	6.1	980	0	21	328
120.	No Frills Turkey Roll: turkey, turkey skin	<u>30.3</u>	14.8	1.9	0	3.0	1100	18	390	333
121.	Oscar Mayer Luncheon Loaf: pork, beef	<u>33.1</u>	12.9	6.9	0	0	1310	14	23	370
122.	Round Hill Turkey Roll: turkey, turkey broth	5.3	18.1	7.7	0	0	820	0	8	150
123.	Russer Ham & Cheese Loaf: ham trimmings	20.0	14.9	12.5	0	3.1	1420	8	20	286
124.	Russer Dutch Loaf: pork	15.9	13.2	14.6	1.7	<u>1.3†</u>	1130	2	170	251

Table 1. Analysis of Delicatessen Meats. (continued)

Sample number	Brand & Meat Ingredients	Fat, %	Protein, %	Carbohydrate, %	Added water, %	Fillers, %	Sodium, mg/100 g	Nitrite, ppm	Calcium, mg/100 g	Calories per 100 g
125.	Shop Rite Plain Loaf: pork	24.0	12.2	13.6	3.6	4.8	1590	9	24	314
126.	Shop Rite White Meat Chicken Roll: chicken (white) chicken broth, egg albumin	15.6	20.8	5.6	0	0	730	0	30	243
127.	Weaver Chicken Roll: chicken (white), chicken broth*	5.6	18.9	5.0	0	5.6	960	34	—	145
Miscellaneous										
128.	A & P Head Cheese: pork tongues, pork snouts, pork skins	13.4	20.1	< 1.0	0	0	1430	0	190	178
129.	Adolf's Blood Sausage: pork tongues, pork fat, pork skins, beef blood	24.1	21.9	< 1.0	0	0	750	18	2	303
130.	Adolf's Head Cheese: pork tongues, pork snouts	19.5	19.9	< 1.0	0	0	980	16	3	252
131.	Carando Mortadella: pork, pork fat*	<u>39.1</u>	13.1	3.8	0	2.2	880	8	430	411
132.	Country Canadian Style Bacon:*	9.9	19.6	< 1.0	0	—	1050	77	8	165
133.	Daniele Prosciutto: pork	9.1	24.6	4.2	0	—	1930	<u>250</u>	8	195
134.	Empire Smoked Dark Turkey: dark turkey*	5.5	20.8	10.1	0	0	560	<u>15</u>	130	171
135.	Grote & Weigel Liverwurst: pork livers, pork, veal	<u>33.4</u>	17.8	2.4	0	0	1470	46	4	374
136.	Hansel 'N Gretel Head Cheese: cooked cured pork	13.3	16.9	6.1	0	0	420	0	97	208
137.	Hatfield Hot Smoked Sausage: pork, pork snouts, beef, pork hearts	<u>33.9</u>	14.6	7.6	0	<u>3.2†</u>	950	1	210	387
138.	Health Valley Uncured Cooked Sausage: beef	21.5	15.4	2.1	0	0	1520	0	44	259
139.	Hillshire Farm Yard-O-Beef Sausage: beef	<u>31.4</u>	16.1	3.0	0	0	1150	4	5	352
140.	Herman Alpert Pastrami: no label	<u>24.0</u>	18.1	< 1.0	0	—	1030	62	3	287
141.	Hungarian Butcher Shop Head Cheese: bulk, no label	10.3	19.6	4.0	0	0	1240	18	11	184
142.	Isaac Gellis Cooked Beef Tongue: tongue	26.5	8.8	6.2	<u>22.7</u>	—	760	11	12	293
143.	Miller's Head Cheese: pork snouts, pork tongues, pork cheek meat	9.8	13.6	5.9	<u>14.9</u>	0	500	22	30	163
144.	Mogen David Liverwurst: veal, beef, beef liver	29.1	16.4	1.5	0	<u>0.6†</u>	1140	48	17	328
145.	Morrison & Schiff Kosher Kishke: beef fat	21.3	8.6	22.5	12.5	3.6	460	0	21	311
146.	Mosey's Smoked Pastrami: *	27.0	15.8	< 1.0	0	0	1000	77	14	301
147.	Oldtown Smoked Link Sausage: pork salivary glands, lymph nodes & fat (cheek), pork, chicken	28.0	14.0	5.7	0	1.3	1050	0	20	325
148.	Parks Sweet Smoked Sausage: pork, beef, beef tripe, partially defatted beef fatty tissue*	20.3	13.7	9.0	3.5	3.0	740	42	210	269
149.	Sal's Cooked Meat Loaf with Tomato Topping: beef, eggs	23.5	14.6	11.6	0	4.7	380	2†	311	140
150.	Shenandoah Turkey Breast: turkey breast, turkey broth	4.6	20.1	7.0	0	0	490	0	8	149

* indicates MSG (monosodium glutamate) listed on label

† indicates material present but not listed on label
underlined value indicates excessive amount

Table 2. Average values found in delicatessen meats.

Product	Samples	Fat, %	Protein, %	Carbohydrate, %	Nitrite, ppm	Sodium, mg/100 g	Calcium, mg/100 g	Calories per 100 g
Frankfort & Kielbasa	39	29.0	14.7	4.4	13.4	933	90.1	332
Bologna	21	28.3	13.8	4.9	12.0	957	90.0	326
Salami & Wurst	28	27.8	17.4	4.1	10.2	1145	84.9	330
Loafs & Rolls	39	18.9	15.5	8.7	10.2	959	129.0	264
Miscellaneous	23	20.8	16.7	5.1	31.2	951	77.4	262