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Fat and Sulfite Content of Ground Beef Purchased in the Rochester Area*

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Fat and Sulfite Content of Ground Beef
Purchased in the Rochester Area

By

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Summary

Fourteen samples of ground beef purchased in Rochester area supermarkets between July 11 and July 23, 1970, were analysed for fat and sulfite content. The average fat content was 26%. Six samples (43%) contained fat in excess of the desirable range of 12 to 25%, and three samples (21%) contained fat in excess of the maximum permitted by Federal and State laws (30%). No sulfite was detected in any sample of meat tested.

Neither the name given to the ground beef nor its price was a reliable indication of the fat content of the meat. There was no apparent correlation of fat content with whether the store was located in the inner city or in the Brighton area.

Background

The jurisdiction for inspection of meat in Monroe County is divided among three agencies. Meat packing establishments engaging in interstate commerce come under the jurisdiction of the Division of Meat Inspection, USDA. Wholesale distributors engaging in commerce within New York are under the jurisdiction of the NYS Department of Agriculture, Division of Meat Inspection. Retail supermarkets are under the jurisdiction of the NYS Department of Agriculture and Markets, Division of Food Control. All three agencies apply the same standards for the inspection of ground beef.

The Division of Food Control inspects the several hundred retail outlets in Monroe County on a regular basis. Checks of cleanliness and labeling are performed. Meat samples are subjected to analysis when suspected of containing prohibited adulterants or excessive fat or restricted additives. Consumer complaints of inferior meat are investigated by inspection of the meat in question and, if warranted, by inspection and sampling at the store in which the meat was purchased. Currently the names of stores found guilty of violating NYS food standards and regulations are not made public.

* This study was initiated on the suggestion of Mrs. Edward Braiman that the presence of illegal additives in ground beef should be investigated. The assistance of Mrs. A. Fenton in obtaining and encoding the ground beef samples is gratefully acknowledged.

The maximum fat content for ground beef permitted by USDA (1) and NYS standards is 30% by weight. Ground meat labeled "ground beef" must consist entirely of beef. Meat labeled "hamburger" may contain meat from sources other than beef, but the fat content must not exceed 30%. Meat labeled "hamburg patties" may contain additives such as soybean flour or powdered milk. USDA and NYS regulations prohibit the addition of water or adulterants such as dyestuffs, sodium benzoate, sodium sulfite, or ascorbic acid to ground beef.

The desirable range of fat content for ground beef has been recommended (2) as 12 to 25%. Typical fat contents have been reported (1) as 20% for "regular" ground beef and 12% for "lean" ground beef. Fats are the richest source of food energy (calories) in the diet. However, beef fat has one of the lowest contents of polyunsaturated fats (containing less than 2% of linoleic acid). Polyunsaturated fats are essential in the diet and are possibly involved in the control of cholesterol levels in the blood.

Sodium sulfite and ascorbic acid have been used to retard and reverse the discoloration of old or decomposed meat, and for this reason are not permitted as additives. Sodium sulfite is considered moderately toxic; however, in the quantities normally used as an adulterant it is rapidly metabolized to sodium sulfate, which is relatively harmless. Sulfite destroys thiamine (vitamin B₁), of which beef is a moderate source in the diet. Ascorbic acid (vitamin C) is an essential vitamin and is not harmful in excess.

Methods of Study

Packages of ground beef, chosen to be representative of the ground beef offered for sale at the time of purchase, were purchased in Rochester area stores between July 11 and July 23, 1970. Each package weighed approximately 1 pound, except for samples 9 and 11 (see Table 2), which weighed 2-3 pounds. Composites from a number of sections of each sample were mixed, encoded, then stored in sealed containers until analysis.

The presence of sulfite was tested for by the Malachite Green test (4), official method 27.084 (3). In control tests, sodium sulfite could clearly be detected when added at a concentration of 50 ppm (as SO₂).

The amount of fat present in ground beef was determined by the methanol-chloroform modification (5) of the Soxhlet extraction procedure, official method 23.005 (3). The chloroform-methanol extracts were evaporated to dryness under vacuum, dissolved in anhydrous ether, filtered, and evaporated to dryness under vacuum. Analyses of several cuts of beef are shown in Table 1. The results of analyses of fourteen samples of ground beef are shown in Table 2.

TABLE 1

FAT CONTENT OF SEVERAL CUTS OF BEEF

<u>Type of Beef</u>	<u>% Fat</u>
Lean Beef	0.4
Sirloin marbled with fat	8.5
Ground Beef (avg. of 14 samples)	26.0
Ground Chuck (Park Edge)	29.3
Fatty tissue from Chuck Roast	70.2
Fatty tissue from Sirloin	71.0

TABLE 2

FAT CONTENT OF GROUND BEEF

<u>Source</u>	<u>Name</u>	<u>Price/lb.</u>	<u>% Fat</u>	<u>Sulfite</u>
A and P 12 Corners	Ground Beef	0.69	18.4	Neg. ^b
A and P Goodman Plaza	Lean Ground Beef	0.69	19.2	"
Super Saver Goodman Plaza	Fresh Ground Beef	0.67	20.3	"
IGA 844 Genesee St.	Fresh Ground Beef	0.69	22.5	"
Harvest Market 1500 Hudson Ave.	Fresh Ground Beef	0.69	23.5	"
Star Market Main and Winton	Fresh Ground Beef	0.69	23.7	"
Super Duper 12 Corners	Ground Beef	0.63	24.0	"
Loblaw's 1004 Culver Rd.	Fresh Regular Ground Beef	0.69	24.6	"
Harvest Market 1500 Hudson Ave.	Ground Beef Economy Pack.	0.57	26.1	"
Star Market 1550 Mt. Hope Ave.	Lean Ground Beef	0.59	26.9	"
Park Edge 2609 W. Henrietta	Fresh Ground Beef	0.59	29.1	"
Wegman's Midtown Plaza	Regular Ground Beef	0.59	33.8 ^a	"
Wegman's 1115 Hudson Avenue	Regular Ground Beef	0.69	35.3 ^a	"
Big M 12 Corners	Ground Beef	0.69	36.8 ^a	"

^aAverage of two determinations

^bBelow the limit of detection of the analytical method

Conclusions

The fat content of six of the fourteen samples exceeded the desirable range of 12 to 25%. Three samples (21%) exceeded the maximum fat content permitted by law. The high fat content found for a number of samples indicates that in some cases excessive fatty tissue is being incorporated into the ground beef.

In cooking, excessive fat separates from the cooked meat and is generally discarded. If one assumes that the fat in excess of the value given by the USDA for typical "lean" ground beef (1) is discarded and one considers the material remaining, then ground beef containing 30% fat must sell for \$0.59 or less per pound to be competitive with the two samples of lowest fat content, which sold for \$0.69 per pound.

All samples of ground beef selling for \$0.59 per pound or less were equal to or above the average of the samples measured in fat content. However, there was no reliable correlation of fat content with price, since the two samples of highest fat content had the highest price (\$0.69 per pound). No clear distinction in fat content could be made between ground beef sold in the inner city area and that sold in the Brighton area. The name "lean" applied to ground beef was not a reliable indication of fat content since one sample named "lean ground beef" contained 26.9% fat, and of the samples containing below average fat content, only one was named "lean ground beef".

Although the samples tested were representative of the meat offered for sale at the time of purchase, they are not necessarily representative of ground beef sold at other times by the same store or by other stores of the same supermarket chain. Hence, the results of this study should be viewed as indicative of the general quality of ground beef offered for sale in this area, and not as a guide to the quality of meat in a given supermarket.

No sample of ground beef contained sulfite in excess of the limit of detection of the analytical method.

Secrecy of Food Law Violations

The practice of the Department of Agriculture and Markets of not releasing the name of food processors and sellers who have allegedly violated the food laws and regulations had been the unofficial policy for many years and was adopted as an official policy according to NYS regulations in 1963.

When a State inspector detects a violation endangering health and welfare, the State takes immediate action, such as seizure or quarantine. In less severe cases, such as apparent economic fraud, a warning is issued and samples may be taken for analysis. Of food samples of all types taken for analysis during 1969, 18% were found to be in violation of NYS standards (7). After a twenty-day interval, re-inspection is made, and if conditions are not satisfactory, the matter is referred to the Department of Agriculture and Markets' Legal Bureau. On the average, about 400 cases are referred to the Legal Bureau each month. In 1969 ca. 2,800 cases were settled by civil compromise, i.e. by withdrawal of charges and payment of a fine. Of the remaining cases, ca. 10% are closed without penalty, usually because of insufficient evidence, and the remainder are referred to the Attorney General for prosecution.

Civil compromise does not amount to legal admission of guilt. Last year a total of \$106,000 was collected in fines by the Department of Agriculture and Markets. This represents an average of about \$39 per case settled by civil compromise. Since the minimum fine is \$50, apparently a number of cases are settled without fines. Of the cases handled by the Attorney General's office, an additional \$31,000 was collected in fines in 1969.

It was announced on September 25, 1970 (6) that in the future the Commissioner of Agriculture and Markets will issue monthly reports concerning alleged violators of State laws. In cases where the alleged violation is corrected by the time of reinspection, the names of the accused food processor or sellers will not be made public. The names of those whose cases are referred to the Attorney General for prosecution and of those whose cases are settled by civil compromise will be released. The nature of the alleged violation and the value of any fines will be reported.

REFERENCES

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- (5) S. N. Hagan, E. W. Murphy and L. M. Shelly, J. Assoc. Offic. Agr. Chemists, 50, 250 (1967).
- (6) Press Release, State of New York, Executive Chamber, R. Maiorana, Press Secretary, September 25, 1970.
- (7) 1969 Annual Report, New York State Department of Agriculture and Markets.