FATTY ACID PROFILE OF CANOLA OIL *vs.* OTHER OILS AND FATS FROM THE NORTH AMERICAN MARKET

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ABSTRACT

Recent changes in nutritional labeling have prompted a re-evaluation of basic fats and oils. Representative samples were obtained during April-June, 1994 from food stores in Canada and the United States of America or directly from processors. Fatty acid profiles of canola, safflower, sunflower, corn, olive, soybean, peanut, cottonseed, palm and coconut oils, as well as of those lard, butterfat and beef tallow are presented and their nutritional value is discussed.

INTRODUCTION

During the past twenty years, there has been noticeable shift in customer preference; the consumption of animal fats has decreased, while the consumption of oils from vegetable sources is growing steadily.

Several factors, such as: progress in processing methodology, new canola varieties, and consumer education, which in Canada, have resulted in canola oil accounting for two-thirds of all vegetable oils processed annually, with a current average consumption of ca. 30 grams per person per day.

The aim of this presentation is to compare fatty acid composition of the most common dietary fats available on the North American market. The cholesterol content of lard, beef tallow, and butterfat was also analyzed.

EXPERIMENTAL

Materials and Methods.

Six samples of each of thirteen oils and fats were obtained during April - June 1994 from the food stores in Canada and United States of America or directly from distributors/processors.

Sample storage and subsequent analysis was conducted according to documented procedures specified in the POS Analytical Services quality assurance manual, which is based on the ISO 9000 system of quality control and quality assurance.

Fatty Acid Composition.

Preparation of fatty acid methyl esters for subsequent gas chromatographic analysis was performed using the sodium methoxide transesterification procedure as described by Daun, et al.. Separation of methyl esters was accomplished using a HP 5790 gas chromatograph equipped with a Flame Ionization Detector, and a 25 meter DB 225 (J & W Scientific, Folsom, CA) capillary column, i.d. 0.32, 0.25 μ of liquid phase. Data collection and processing was performed by the Millennium 2000 Chromatography Manager software. Results for individual fatty acids are expressed as a percentage of total fatty acids found in the oil.

Cholesterol Content.

Determination of cholesterol in fat was performed using the procedure described by Slover et al. Samples containing ca. 100 mg of fat were saponified in capped tubes with aqueous potassium hydroxide by heating for 8 minutes at 80 °C; the unsaponifiable fraction was extracted with cyclohexane, freed of solvent, derivatized to form the trimethylsilyl ethers of sterols, and chromatographed on a 25 m x 0.32 mm HP-1 (Hewlett-Packard) capillary column.

Results and Discussion

Amongst thirteen tested oils and fats tested (i.e. canola, safflower, sunflower, corn, olive, soybean, peanut, cottonseed, palm and coconut oils and lard, beef tallow), canola oil showed the lowest level of the saturated fatty acids (7%). Canola oil is rich in monounsaturated fatty acids (61%), next to olive oil (75% of unsaturated) and showed an intermediate level of polyunsaturated fatty acids.
The highest level of cholesterol was detected in butterfat and no cholesterol was present in any of the vegetable oils.

The advantage of canola oil over other oils, from a dietary perspective is as follows:

- it contains the lowest level of saturated fat of any oil tested
- it has a high level of a monounsaturated fatty acid, oleic acid, which has been shown to reduce blood cholesterol levels
- like all other vegetable oils, it is cholesterol-free
- it is a rich source of essential fatty acids.

Table 1 shows the fatty acid distribution and cholesterol content of fats and oils tested from the Canadian and United States markets.

TABLE 1. Fatty Acid Distribution and Cholesterol Content in Tested Fats and Oils.

DIETARY FAT	Saturated Fatty Acids	Monoun-saturated Fatty Acids	Linoleic Acid	α-Lino lenic Acid	Chole sterol [mg/g]
Canola Oil	**7.0**	**60.8**	**21**	**11.1**	**n.d.**
Safflower Oil	9.9	14.4	75.5	0.1	n.d.
Sunflower Oil	12.0	16	71.4	0.6	n.d.
Corn Oil	12.6	29.3	56.9	1.1	n.d.
Olive Oil	14.7	75.2	9.5	0.6	n.d.
Soybean Oil	15.2	22.4	54.1	8.3	n.d.
Peanut Oil	19.3	47.3	32.9	0.5	n.d.
Cottonseed Oil	26.8	18.5	54.2	0.5	n.d.
Lard	42.9	47.1	8.5	1.1	1.06
Beef Tallow	51.2	39	9.5	0.3	1.46
Palm Oil	47.9	48.9	2	0.5	n.d.
Butterfat	68.6	27.8	3.1	0.6	3.66
Coconut Oil	91.4	6.9	1.7	-	n.d.

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