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Survey of content of *trans*-fatty acids in meat

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Abstract

Trans-fatty acids are a type of unsaturated fatty acid in which the double bonds have a *trans* structure, as opposed to the *cis* structure often found in nature. Natural types of *trans*-fatty acids are produced in the first stomach (rumen) of ruminant animals and are known to accumulate in the milk and meat of these animals. A large-scale epidemiological survey in Europe and the U.S.A. has suggested that excessive intake of *trans*-fatty acids increases the risk of coronary heart disease. We have performed a comprehensive study of the amount of *trans*-fatty acids present in meat circulating throughout Japan to assess the current amounts of *trans*-fatty acids. The results reveal that the amount of *trans*-fatty acids in the type of beef (lean and fat) regularly consumed in Japan ranges from 0.33 to 1.87 g per 100 g. In addition, in beef fat, the amount of *trans*-fatty acids ranges from 1.43 to 9.83 g per 100 g. Among offal, rumen showed 1.70 g/100 g, the highest level. The results of this study indicate that, even between the same cuts, *trans*-fatty acid levels vary depending on the type of feed and duration of the grain-feeding period. In addition, in a study of pork and chicken, the amount of *trans*-fatty acids did not exceed 0.3 g/100 g in any part of the animal.

Keywords : *trans*-fatty acids, beef, content

I Introduction

"*Trans*-fatty acid" is the name given to unsaturated fatty acids in which the double bonds have a *trans* configuration. They can be artificially produced by hydrogenation during the manufacturing of oils and fats. *Trans*-fatty acids can also be produced by microorganisms in the stomachs of ruminant animals, such as cattle and sheep, and are accumulated in very small amounts in the meat and milk of such animals. Large-scale epidemiological research in Europe and the U.S.A. has suggested that if *trans*-fatty acids are excessively ingested over a long period, low-density lipoprotein cholesterol increases in the bloodstream, while high-density lipoprotein cholesterol decreases. This increases the overall risk of heart disease through several factors such as arterial sclerosis[1, 2]. In many countries, it is mandatory to label the amount of *trans*-fatty acids in food[3]. In Japan, from a health hazard perspective, the Consumer Affairs Agency has demanded that the food-manufacturing industry disclose the amount of *trans*-fatty acids in food products on a voluntary basis. However, there have been few studies on the amount of *trans*-fatty acids in meat and milk[4, 5], and there is no description of *trans*-fatty acids in the Standard Tables of Food Composition in Japan[6]. Therefore, it is necessary to determine the current status of *trans*-fatty acid content in food.

In this study, we conducted research on the amount of *trans*-fatty acids in beef. The types of beef used in this study were American long grain, Australian short grain, and Japanese dairy-fattened steer. We examined the differences in *trans*-fatty acid content relative to the type of cut and feed consumed. We also conducted a study of pork and chicken, similar to the study of beef, to form a comprehensive assessment of the amount of *trans*-fatty acids contained in domestic meat circulating throughout Japan.

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