



***Trans* Fatty Acids in Human Nutrition**



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Trans Fatty Acids in Human Nutrition

Second Edition

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Preface

The chemistry of fats and oils has enjoyed a long and successful history. The first evidence of the occurrence of *trans* fatty acids (TFA) in edible fats was demonstrated by direct chemical analysis more than 80 years ago by Bertram in 1928 (*Biochem. Z.*, 197, 433–441). In studying ruminant fats, Bertram discovered the *trans*-11 18:1 acid and named it vaccenic acid. It was shown later that vaccenic acid is not the only TFA found in ruminant fats and more recent research revealed that vaccenic acid is further metabolized in ruminants as well as in other animals.

Over the last thirty years numerous studies have been carried out in a number of fields including analytical chemistry, food science, nutrition and epidemiology to understand the composition, physical properties and health implications of TFA found in partially hydrogenated vegetable oils. The basic chemical information gained was that partial hydrogenation of vegetable oils generates a very complex and diverse profile of TFA isomers. These TFA were found to be conspicuously more stable toward chemical oxidation reactions compared to their polyunsaturated precursors and to exhibit distinct physical properties. However, the most recent research over the past two decades has documented various detrimental effects of consumption of TFA on risk factors of vascular health.

Since the 1990s there has been increasing regulatory concern about the health effects of the *trans* mono-ethylenic acid isomers formed during partial hydrogenation of vegetable oils. Consequently public health policies have been implemented in various countries including Denmark, USA and Canada, to ban the use or limit the consumption of TFA from industrial origin. However, debate still rages around the world as to agreeing the most appropriate policies, determining which specific chemicals are deleterious and by what mechanisms and in what quantities, and deciding how regulatory agencies should guide the public to appropriate food choices based on their TFA contents. To frame this debate, scientific knowledge must take a central role. Therefore the editors undertook to produce a state-of-the-art book that assembles the scientific knowledge of *trans* fats – what is known and what needs to be determined.

An earlier book carried out a very similar task for the state of our knowledge in the late 1990s; this was *Trans Fatty Acids in Human Nutrition* co-edited by one of us (Jean-Louis Sébédio) together with William W. Christie who also contributes to the present book. Also like the present book, the earlier volume was published by The Oily Press. Therefore it was decided that the new book

should become the Second Edition of *Trans Fatty Acids in Human Nutrition* even though the rapid expansion and progress in the subject meant that it would be completely re-written and be expanded from the original 9 to the present 15 chapters.

In this book, authors who are recognized international authorities in their field have addressed various domains of TFA research such as consumption, analysis, biochemistry, synthesis and natural TFA biosynthesis, health effects, food formulation, and also regulation and consumer perception.

Each chapter contains the latest references and major advances and breakthroughs in the different areas of scientific research. Furthermore, the book also includes a discussion of a major question on the health effects of the ‘natural *trans* isomers’, comparing their effects to those observed for the industrially produced TFA. We hope that the availability of so much information in a single volume will help to clarify the major effects of TFA in human nutrition discovered over the last two decades and guide the next generation of scientists to the important opportunities for making further progress in this challenging field of research.

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