Introduction

During the last few centuries a highly industrialized food sector has been evolving. The food sector is now one of the most important industrial sectors. This dissertation reflects on the role of the food sector and its particular role in patent law. Interestingly enough, food, being central to every human being, has been excluded from patentability in many patent laws, e.g. in the very first German Patent Act of 1877. 90 years later, this exemption to patentability has been abolished in Germany. Thus the first chapter is dedicated to the question of why food-related substances, which in the following will be abbreviated with food, were excluded from patentability in Germany and why this exemption was abolished in 1967. It furthermore investigates the consequences of the exemption to patentability of food in Germany, which will in the following be abbreviated with exemption.

History repeats itself. This is also true for the exemption. As Germany excluded food in its first Patent Act, so did many developing or emerging countries - and are still doing so today. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) now forces all Members of the World Trade Organization to abolish the exemption. Thus the TRIPs Agreement substantially affected the food sector when it was adopted. *Straus*[1] has described the impact of the TRIPs Agreement on genomic inventions in a way that generally applies to all food-related inventions and therefore to the food sector as a whole:

> "Bearing in mind all the specific phases of the food production process it seems clear that under the TRIPs Agreement, WTO Members have to provide patent protection and/or plant variety protection respectively, for all genomic inventions involved in that process at its different stages and their resulting end products including final foods."

For this reason, this study looks at the Patent Acts of Germany, Brazil, China, and India in a comparative law approach with respect to the exemption and the effects of its abolition.

The second part of this dissertation is dedicated to the description of the food sector of today and particularly its technological developments. Here, first and foremost the influence of biotechnology on the food sector is described. The production of agricultural raw materials has been largely influenced by biotechnology. First, the production of plant-derived agricultural raw materials is shown. Next, the production of animal-derived agricultural raw materials is analyzed in this respect. Finally, the influence of biotechnology on the production of processed food is discussed.

1 *Straus*, Genomics and the Food Industry: Outlook from an Intellectual Property Perspective, in: *Vaver&Bently* (eds.), Intellectual Property in the New Millennium – Essays in Honour of William R. Cornish, Cambridge 2004, 124, 134.

The third and last part of this dissertation is dedicated to the intellectual property situation of the food sector of today. The protection of food-related inventions under European law is examined. The patentability of inventions related to the production of agricultural raw materials and of processed food is analyzed. It shows that though the exemption has been abolished, protection in this sector is still different from that in other fields of technology.

Part I. Patentability of food from 1877 to 2005 in Germany compared to Brazil, China and India

The following review compares retrospectively the patent acts of Germany and of the emerging countries Brazil, China, and India with regard to patentability of food-related inventions, which will in the following be abbreviated with the patentability of food.

The food sector is of enormous economic importance, as it is one of the biggest industrial sectors. Moreover, the food sector has an outstanding position compared to other industrial sectors, as it affects health and nutrition. The food sector covers the basic needs of every human being and has guaranteed the survival of many generations of mankind. This unique position is reflected first and foremost in the patent system, where food has always had an exceptional position.

Nevertheless, the food sector has not yet been the focus of patent law and literature. Apart from *Straus*,[2] who investigated the patentability of genomic inventions in the food sector, there have indeed been few studies on the exemption to patentability of food. Therefore it is the aim of this thesis to identify and analyze the patentability of food in Germany, Brazil, China, and India in a comparative manner in the time period from 1877 to 2005.

Many patent systems have one phenomenon in common: the exemption. The very first German patent law, the Patent Act of 1877, excluded food from patentability. This exemption was abolished 90 years later. Until 1995, many developing or emerging countries had also excluded food from patentability. The TRIPs Agreement changed this situation sustainably. Art. 27 of the TRIPs Agreement declares inventions in all fields of technology patentable subject matter.

By 2005, thanks to the TRIPs Agreement, most countries of the world had provided intellectual property protection for food by patents or *sui generis* rights. This development is exemplified by Germany on the one hand and the developing or emerging countries Brazil, China, and India on the other hand. The exemption in the German Patent Act of 1877 proved to be rather formal in nature. In fact, case law has guaranteed the protection of formally excluded subject matter and by doing so circumvented the legislature's intention. In 1967 food became patentable as such. Germany's food sector has been thriving since then. This prospering period is reflected in an increasing number of food-related patents as will be demonstrated in the following analysis.

2 *Straus*, Genomics and the Food Industry: Outlook from an Intellectual Property Perspective, in: *Vaver&Bently* (eds.), Intellectual Property in the New Millennium – Essays in Honour of William R. Cornish, Cambridge 2004, 124.