

Chapter 27


Revolutionizing the Food and Beverage Industry Through Molecular Gastronomy

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ABSTRACT

Twenty years ago the worlds of science and cooking were neatly compartmentalized. There were the basic sciences, physics and chemistry and biology, delving deep into the nature of matter and life. There was food science, an applied science mainly concerned with understanding the materials and processes of industrial manufacturing. The food and beverage production techniques have totally transformed from being standard recipes to innovative and contemporary dishes, by way of 'molecular gastronomy'. For many years, these molecular transformations were neglected by the food-science field. In 1988, the scientific discipline called “molecular gastronomy” was created, and the field is now developing in many countries. The new education materials deal with following key concepts in chemistry: solubility, proteins, carbohydrates, sourness, water features and emulsions. The present analytical research aims at focusing on the concept, origin and development of Molecular Gastronomy as an innovative approach in the field of food and beverage production.

INTRODUCTION

Food has played a significant role in the development of human and mankind. When humans started to use fire to cook the food, the human biological system could process the food's nutrients more effectively. Various food poisonings could also be eliminated through cooking. In the Agricultural Revolution humans transitioned to a lifestyle of settlement, agriculture and cattle breeding. It also enabled humans to concentrate on the taste instead of just the sufficiency of food (Myhrvold et al., 2011). Many scientific

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inventions have their origins in food inspired research. Some of the first written texts on food-related scientific studies were found in ancient Egypt. An anonymous person had studied why fermented meat weighs more than unfermented meat (Myhrvold et al., 2011). During the 1780s Antonio Lavoisier scientifically examined the density of meat stock (This et al., 2006). William Scheele discovered maleic acid in 1785 while studying apples (Doppins, 1931). Food and nutrition sciences born in the early 20th century were mainly focused on nutritional or processing features of food and ignored the features related to its enjoyment. In the 1980s this was considered a deficiency, until in 1988 French Hervé This and a professor of physics in Harvard, originally Hungarian Nikolas Kurti, stated that cooking and gastronomy deserved to be considered a separate research subject in natural sciences (This, 2009).

For years, a new culinary trend called 'molecular cooking' has been touted as the most exciting development in *haute cuisine*. It is now the newest fashion for chefs to offer their customers fake caviar made from sodium alginate and calcium, burning sherbets, spaghetti made from vegetables, and instant ice cream, fast-frozen using liquid nitrogen. In the most recent ranking of the world's top 50 chefs—by the British magazine *Restaurant*—the top three chefs were Ferran Adria from El Bulli in Rosas, Spain; Heston Blumenthal from The Fat Duck in Bray, UK; and Pierre Gagnaire from his restaurant in Paris, France (*Restaurant*, 2006). In 2005, Blumenthal was first and Adria came second. What is remarkable is that all three of these talented and popular chefs have been inspired by molecular gastronomy. What is molecular gastronomy? Is it only a temporary trend for people who are prepared to spend a small fortune on the latest in fine food, or is it here to stay? Is it a useful technique for both the average chef and anyone preparing dinner for their family? What does it mean for the future of food preparation? What are we going to eat tomorrow? As stated by Herve This: **“I defined molecular cooking as a culinary trend using ‘new’ tools, ingredients, and methods. Molecular gastronomy is science and science only”**.

The scientific processes in cooking were first introduced to the public in 1969 when Nicholas Kurti held a televised presentation “The Physicist in the Kitchen” for the Royal Society. In the presentation he explained the principles of microwave heating and demonstrated how pineapple juice tenderised pork (Lersch, 2012). In 1984 Harold McGee published his work *On Food and Cooking – The Science and Lore of the Kitchen*, where the chemistry and physics of home cooking were systematically introduced for the first time (McGee, 2011). The historical origins of molecular gastronomy are not entirely beyond dispute (Cousins et al., 2010). The term molecular gastronomy was first used during the ERICE international scientific workshops. The first ERICE workshop was organised in 1992 by the initiative of Hervé This, Nicholas Kurti ja Elizabeth Cawdry-Thomas. The term Molecular Gastronomy was born in 1992 when an English teacher of cookery, Elizabeth Cawdry Thomas, proposed a workshop in which professional cooks could learn about the physics and chemistry of cooking. This first workshop of what ended up being a series of events until 2004 was called “Workshop on Molecular and Physical Gastronomy”. Elizabeth Cawdry Thomas was married to a physicist who she met at a physics conference in the Ettore Majorana Centre for Scientific culture in Erice, Italy. At that time, there was a group of scientists that used to have annual meetings in Erice to discuss the physics and chemistry of cooking but there were no chefs involved. The Erice centre was the perfect venue for the first Molecular Gastronomy workshop. Elizabeth then recruited Nicholas Kurti, an Oxford physicist who had a television show and had written a book about the science of cooking. The organizing group was then completed by the addition of Harold McGee, the American food science writer, and Hervé This, French physical chemist and magazine editor in Paris.

Even though the term Molecular Gastronomy sounds sophisticated, the first meeting just covered basic food chemistry involved in traditional preparations. About half of the attendees were scientists and the other half were cooks. At that point, most of the cooks were skeptical about the application of

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