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The Development of Culinary Arts and Food Science Into a New Academic Discipline—Culinology[®]

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The concept of Culinology[®]—the blending of culinary arts and food science—was introduced in 1996 by the Research Chefs Association. The result has quickly changed the way America's food industry develops new food products. A Culinology program of study incorporates elements from both the culinary arts and food science disciplines, enabling the student to understand the science behind the food while mastering the culinary arts. As a new academic discipline, Culinology will revolutionalize the food industry, and its practitioners will define the future of food.

KEYWORDS Culinary arts, culinology, food science, Research Chefs Association

INTRODUCTION

The goal of a culinary arts program is to develop competencies in planning menus, controlling food cost, developing hospitality leaders, and producing safe and healthy food. According to the Standard Occupational Classification (SOC code 35-1011) (Bureau of Labor Statistics, 2009), chefs participate in cooking or directing the preparation, seasoning, and cooking of salads,

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soups, fish, meats, vegetables, desserts, or other foods, including the planning and pricing of menu items, ordering supplies, and keeping records and accounts. Professional culinarians or chefs are in most part influenced by studying the culinary arts programs or are graduates of a culinary arts program. However, could a culinary arts program or culinarians influence food product development? How does a culinary arts program influence the development of a new but fast growing academic discipline, Culinology[®]?

The term *Culinology* was coined by Winston Riley, former president and a founder of the Research Chefs Association (RCA), to describe and formalize the fusion of two disciplines—culinary arts and food technology. This was not an arbitrary or frivolous notion on Chef Riley's part. Instead, it recognized the birth and evolution of a critical new expertise in the food industry—the ability to efficiently and economically manufacture restaurantquality convenience foods that actually look and taste like food served in a restaurant (Cousminer, 1999).

Food product development, until now, has remained solely in the hands of the food scientist. In some cases, new product concepts were the efforts of individuals with a home economics or even a dietetics degree. The notion of a culinarian involved in the research and development of food products was not fully embraced until the early 1990s. It was not until the RCA introduced the concept of Culinology in 1996 that the role of the classically trained chef in product development started to gain recognition. The result has quickly changed the way America's food industry develops new food products.

Every great chef understands the importance and value of using the finest ingredients in the preparation of each meal. Thus, it only resonates that the expertise the chef lends to product development is invaluable. Understanding the fundamental cooking methods, cuisines styles, and ingredients brings an authenticity factor to food that is critical in today's product development environment. With over 80% of all new product launches failing in the marketplace, authenticity is one key factor that ensures that the product will command a sizable market segment and survive. According to Cathleen Miller, a technical applications director for ingredients for Danisco U.S.A. (New Century, KS), "The food industry is changing rapidly to meet consumer demands, and these demands can only be met by the blending of food science and culinary." She contended that "the consumer that cooks at home wants to spend less and less time in the kitchen. So they want tasty, healthy food choices that can be rapidly prepared, or simply reheated. The foodservice industry also requires tasty, healthy food choices that can be easily prepared in a kitchen" (as cited in Luff, 2004, p. 21).

The discipline of Culinology is benefiting the food industry by providing a connection between these two formerly polar opposite ends of the product development spectrum—food science and the culinary arts. This article will provide the background behind the formation of Culinology as an academic discipline. It will also illustrate how a need that was identified



within the food industry was realized and how academia responded to this need and show how the competencies of this discipline are rooted in industry standards. Finally, it will also discuss what is needed in order to move ahead and formalize this new and emerging academic discipline into one that is based on assessment of learning outcomes.

BACKGROUND INFORMATION

The RCA is the leading professional community that makes culinary arts an integral part of food research and development. It was established in 1996 by a group of food professionals with a common interest in the challenges facing the chefs employed in the food processing industry. Today, the RCA has grown to over 2,000 members and has become the primary source of culinary and technical information for the food industry (RCA, 2009a). Its vision is that "Culinology[®] will become the universally recognized integration of culinary arts with food science and technology, and its practitioners will define the future of food" (RCA, 2009).

CULINOLOGY AS AN ACADEMIC DISCIPLINE

The RCA believes that to develop successful products, tomorrow's product development expert must understand both the culinary arts and the science of food product development. The essence of Culinology is found in the rigorous knowledge, aesthetic, and experimental sensory expressions that scholars and practitioners develop, as well as the emotional excitement, love, fun, and theater experienced while engaging with the study of the culinary field (Hegarty, 2005). It was with this posit that the then-president of the RCA, Jeffrey Cousminer, approached Michael Cheng, then-culinary arts program coordinator at Metropolitan Community College, at the 2000 RCA Annual Conference with his idea of a new academic discipline that blends both the culinary arts and food science. As a result of that initial conversation, in 2002, the Institute for the Culinary Arts program at Metropolitan Community College (Metro) in Omaha, Nebraska, in collaboration with the University of Nebraska-Lincoln (UNL) College of Education and Human Sciences, launched the nation's first curriculum in Culinology, as the only program of its kind in the world.

Metro has had a strong culinary arts program since 1974. Metro obtained its initial accreditation by the American Culinary Federation (ACF) in 1991 and by the Commission on Accreditation of Hospitality Management Programs (CAHM) in 1995. UNL, a land-grant institution steeped in tradition, has a Department of Nutrition and Health Sciences (NHS) that has existed

for over 100 years and supports a long history of addressing the changing needs of students and society.

Typically, both culinary arts and food science degree programs were not offered together at any institution. Institutions either have a food science program or a culinary arts program but not both. Some institutions have both food science and a hospitality program but oftentimes in two separate and distinct departments. Practicing chefs have developed a wide range of techniques for producing dishes that have proved remarkably successful, but to date there has been little understanding behind the science that makes all these work, thus creating golden opportunities for the researcher in culinary arts and science (Barham, 2001). Therefore, it is incumbent upon culinary professionals practicing in the field and upon culinary schools to engage with the reconciliation of culinary arts and sciences in a merged liberal/vocational curriculum, rather than to continue to coexist in a state of mutual incomprehension (Hegarty, 2005). There are several reasons that outline why the blending of culinary arts and food science has received little serious scholarly attention to date (Hegarty, 2005, p. 11):

- Because of the lack of theoretical underpinning that would allow it to become a discipline.
- Because of the difficulty in separating its transitory nature and link with physical work, "industry needs", from those of "education" in the subject; that is, "science" or "theory".
- Because of the absence of doctoral programs in the field, a major deficiency in culinary arts and science education.

This led to the collaborative efforts of faculty between two institutions in Nebraska (Metro and UNL) who saw and understood the value of merging the two disciplines under one umbrella, Culinology.

This groundbreaking program in Culinology gives students a fast-track education into the operation of a research kitchen. In this setting, the research chef, along with food scientists and dietitians, devises recipes and tests them to create the next great entree you will eat at your favorite chain restaurant. It is also in this specialized environment, which is part haute cuisine kitchen, part laboratory, that the product development team ensures that a Wolfgang Puck[®] frozen pizza from your local grocery store will match as closely as possible the quality of the pizza served in his Postrio[®] or Lupo[®] restaurants.

Culinology students enroll in courses such as Garde Manger, Classical Sauces, International Cuisine, Food Science, Research and Development of Food Products, Sensory Science, Culinary Fundamentals, Analysis and Properties of Food Products, and Concepts of Product Development, including the necessary general education requirements to enable the students

Bachelor of Science: Culinology® (59-60 Hours)	
A. Culinology [®] Foundation Courses: (10 Hours)	
CULG 100	Introduction to Culinology [®] 1
HRA 120	Food Sanitation and Safety2
CHEM 12	Introductory Organic/Biochemistry4
BIOL 377	Nutrition
B. Culinology [®] Core Courses: (49–50 Hours)	
CULG 200	Culinary Essentials I 4
CULG 210	Culinary Essentials II 4
CULG 250	Introduction to Baking & Pastry
CULG 260	Principles of Garde Manger & Buffet
CULG 310	Food Science
HRA 315	Food, Beverage, and Labor Cost Control
HRA 325	Menu Design & Service Management
CULG 350	Aromatics and Flavors
CULG 360	Food Sensory Analysis
CULG 390	Food Products Research & Development Methodology
CULG 410	Food Chemistry and Analysis
CULG 430	Fundamentals of Food Processing
CULG 450	Advanced Culinary Science
CULG 490	Product Development (Capstone)
CULG 498/9	Internship
Choose one course (2–3 credits) from the following:	
BIOL 371	Food Microbiology
CULG 300	International Cuisine
CULG 320	Principles of Meat Identification, Fabrication and Evaluation 2
CULG 440	Food Trends, Legislation and Regulation
CULG 460	Quality Assurance of Food Products

Southwest Minnesota State University Culinology® Curriculum

FIGURE 1 Example of Culinology curriculum from Southwest Minnesota State University (Marshall, MN).

to have a well-rounded education. In addition, the curriculum's nutritional component gives the Culinology student an advantage in creating recipes that are flavorful and healthy. Figure 1 shows an example of a Culinology curriculum from Southwest Minnesota State University.

A baccalaureate in Culinology can take students in many directions. Rapidly changing technology and the demand for tastier, more nutritious, and safer foods are driving a new educational trend that will result in improved flavors and new food products that reach consumers quicker (Cornwell, 2005). That means that more people will be required to understand and deal with the scientific and technological principles from fields like food production and preservation in addition to culinary arts.

Culinology will impact many aspects of our lives as well as the economy. As the food industry continues to grow, so does the need for valuable employees. Projections show that the food industry is expected to add 2 million jobs by 2017, making recruitment and retention of graduates in the food and agricultural sciences a top priority (National Restaurant Association [NRA], 2007). Many food companies have developed long-range plans to

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recruit employees who have a background in culinary arts and who are knowledgeable in the applications of science (Culinology graduates or culinologists). Current graduates in Culinology have quickly found positions in the food and restaurant industry, with starting salaries of \$45,000 per year and as high as \$75,000.

DEVELOPING A CULINOLOGY DEGREE CURRICULUM

The first step in developing any training program is the identification of specific competencies in the field of interest. Gilmore stated that competencies can provide a guide for curriculum development, evaluation, and outcome assessment, as well as a standard for accreditation purposes (as cited in McMeen, 2003). Competencies can be determined by analyzing star performers, analyzing the performance of many exemplary employees, or surveying experts.

In 1966, the Institute of Food Technologists (IFT) developed the first set of minimum standards that specified the courses necessary to make up an undergraduate food science program. These standards were intended to provide guidelines to help food science programs ensure that some minimum standards were met (Hartel, 2002). The minimum standards were revised in 1992 to include communication skills, statistics, and computer and critical thinking skills. However, the format of these minimum standards remained the same. There was a checklist of courses and prerequisites that each program had to meet in its entirety to gain IFT approval. The rigid nature of the standards did not leave room for the flexibility needed to accommodate the varied nature of food science programs. An IFT Task Force formed in 1997 to review and recommend outcomes-based guidelines resulted in the development of new guidelines, IFT Education Standards, which are based on assessment of student competencies (Morgan et al., 2006).

The American Culinary Federation (ACF) developed its standards, Required Knowledge and Competencies in 1985, under the direction of Mary Petersen, then-director of accreditation for the American Culinary Federation Foundation Accrediting Commission (ACFFAC) (Catfish Culinary News, 2005). The ACF's accrediting body is recognized and approved by the Department of Education and also by the Council for Higher Education Accreditation. Since its inception in 1985, over 100 ACF-accredited culinary arts and baking programs have been created worldwide. The primary function of the ACFFAC is culinary arts and baking programs' accreditation. This specialized accreditation is a voluntary action on the part of the institution that requires curriculum, faculty, resources, support staff, and organizational structure to meet or exceed quality standards.

The first attempt ever made to define Culinology competencies was done in 1998. Dr. Kemal Birdir (Birdir & Pearson, 1998) surveyed selected

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members of the RCA using a modified version of the Delphi technique to identify the competencies necessary to be successful as a research chef. This modification consisted of using a panel of experts to develop the pilot questionnaire rather than developing the questions from the literature; this was done because there was no body of literature describing the profession of research chef. Twelve members, considered to be leaders/experts in the field, were provided by the RCA to serve as the pilot study group; they were solicited to identify the knowledge, skills, and abilities necessary to be a successful research chef (McMeen, 2003). These identified competencies were used as the framework to develop the minimum standards for the first Culinology curriculum in Nebraska.

Using the data gathered from the Birdir and Pearson (1998) study, ACFFAC's Required Knowledge and Competencies for culinary arts, and the IFT's Education Standards as the framework, the first set of minimum standards that specified the courses needed to make up an undergraduate Culinology program was put together in 2002. Since then, all educational institutions that are interested in adding a Culinology program have been advised to follow this set of guidelines, which also include recommendations for facilities, faculty, and budget. These guidelines can be viewed on the RCA Website (RCA, 2009b).

APPROVED CULINOLOGY PROGRAMS

The first seven Culinology programs (Figure 2), listed in chronological order of inception, are the University of Nebraska–Lincoln/Metropolitan Community College, Clemson University, Dominican University/Kendall College, University of Cincinnati/Cincinnati State Technical and Community College, Cal Poly Pomona/Orange Coast College, University of Massachusetts–Amherst, and Southwest Minnesota State University.

These seven programs were approved by the RCA using the devised set of minimum standards that specified the courses needed to make up an undergraduate Culinology program as compiled in 2002. However, as this discipline continues to mature and grow, there is a clear need to transition to a curriculum based on assessment of learning outcomes as suggested by experts (Hartel & Foegeding, 2004). To assist the seven approved Culinology programs in making the transition to a learning outcomes-based curriculum, it is recommended that this process be based on several factors. These include the experience of the instructors in educational principles, the resources available, and the needs of the students at that particular institution.

For transition to a curriculum based on assessment of learning outcomes, IFT now requires that (a) a certain set of core competencies be met within the curriculum; (b) specific learning outcomes be written both



Timeline of RCA approved Culinology® Programs



FIGURE 2 Chronological illustration of RCA approved Culinology programs.

for individual courses and for the curriculum as a whole; (c) adequate assessment tools be used for measuring student learning, both for individual classes and for the curriculum as a whole; and (d) there be some well-thought-out process of curricular reform based on the results of the assessment data (Hartel & Gardner, 2003). Because there are many similarities between the process that the IFT uses and the one used by the RCA in determining its minimum standards for Culinology programs, the authors recommend that the RCA adopt the same process.

Although continual improvement is always desired, it is important not to allow change to result in a loss of the foundation of what is already done.



Any transition in educational approaches should maintain the strengths of the previous model (Hartel & Gardner, 2003). A study conducted by McMeen (2003), revealed that the identified competencies from the Birdir and Pearson (1998) study, which were used in the formation of the original minimum standards for Culinology curricula, are indeed still relevant and applicable to the field of Culinology today. Industry partners such as the RCA play a key role ensuring that these education standards are valid and vital to the future graduates of any Culinology program. In 2006, an RCA Core Competencies subcommittee comprised of RCA members representing various segments of the food industry, including culinarians, food scientists, and academicians, undertook the task of developing a list of core knowledge competencies, based on McMeen's study. The intent of the subcommittee is to develop and validate these knowledge competencies by surveying all of the present members of the RCA and to use that information to update Culinology continuing education and degree curricula as well as RCA certification competencies.

CONCLUSION AND RECOMMENDATIONS

With the rise of Culinology and the blending of these two disciplines, the authors recommend that (a) institutions with a food science degree could merge with a culinary arts school to incorporate a Culinology degree in their academic programs and vice versa; (b) institutions with an existing culinary arts and food science program might consider Culinology as an additional degree option; and (c) academic institutions continue to respond to the challenges of the industry by developing more Culinologists who understand how to maintain culinary integrity while creating safe and healthy food with exceptional quality. As the mission statement of the RCA conveys, "Culinology[®] will become the universally recognized integration of culinary arts with food science and technology, and its practitioners will define the future of food" (RCA, 2009a).

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