



Stimulating Undergraduate Students to Pursue a Career in Meat Science

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SUMMARY

Human capital is the most valuable asset of any business. Attracting talented, creative, and dedicated people into positions with meat companies has been problematic in the past, and the challenge to recruit new people will be greater in the future due a smaller number of people entering basic and applied academic pursuits in meat science at the baccalaureate level. This manuscript focuses on factors that have attracted people into meat science and strategies for recruiting human capital into the meat industry. A survey of industry professionals was conducted to determine factors influencing their entry into the meat industry and to gather their opinions on recruiting issues. Numerous comments reflected the opinion that action needs to be taken in regard to meat industry recruiting, but the respondents were not sure who the recruiters should be and how the issue should be addressed. Several mentioned that recruiting was "assumed to be occurring and would continue". If the industry is serious about effective recruiting, a comprehensive plan must be developed, and responsibilities to accomplish strategies must be assigned to academia, industry, and allied meat organizations, and government. Various recommendations were presented and several templates for recruitment were suggested.

INTRODUCTION

For over 30 years presentations at this congress have addressed timely issues critical to the well being of the meat industry. Notably, these topics have included the nutritive value of meat in a healthy diet, efficiencies of producing skeletal muscle in animal production, biochemistry and physiology of muscle as a food, animal rights/animal welfare, food safety, the many aspects of meat and meat product quality, processing technologies, and the future of the worldwide meat business. Tarrant (1998) succinctly stated that "unless meat eating becomes compatible with the humane treatment of animals, with environmentally sustainable production, and with eating that is healthy and safe, it could be consigned to a minor role in the diet in developed countries during the next decades." Gurkan (1999) provided qualitative and quantitative analyses of the hurdles for success in the meat sector to 2005. Valin (2002) had an excellent review of many of these factors relating to research objectives and requirements in meat science and technology. However, to our knowledge, no presentation has addressed the status and need for human resources to produce, manage, and merchandise meat in a global economy. The purpose of this paper is to provide a look at recruitment of young people into the meat industry.

There is some question as to the need for and availability of technically trained people in the meat industry. Most however, agree with Crews (2003) who stated that availability is an issue and also pointed out that there is a growing need to prepare for the exodus of key leaders as they retire. He further

Keywords

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indicated that there is essentially no activity directly related to recruiting talented young people into the profession. In fact, he emphasized the need for the industry to take an aggressive approach to recruiting the best possible future meat scientists and to start giving students good reasons to pursue careers in this industry. Discussions at this congress clearly reflect the need for technically trained people to handle day-to-day production, to troubleshoot variances in quality and safety, to address regulatory issues, and to counter the perception by the general public that meat is not necessary in a healthy diet. In view of recent problems with Bovine Spongiform Encephalopathy, Hoof and Mouth Disease, *Listeria*, *E. coli*, environmental issues, HACCP, traceback, country of origin labeling, and a host of other scientifically based problems, it is difficult to fathom how any company in the meat industry could remain a leading provider of dietary protein without having qualified people trained in the technical aspects of muscle as meat.

A survey of industry professionals was conducted regarding human resource needs and recruitment of people into the meat industry; the major aim was to characterize why or how meat science professionals entered the industry.

SURVEY DEMOGRAPHICS

About 160 surveys were sent via the Internet to a random sample of individuals that had attended the International Congress of Meat Science and Technology the last three years ($n \sim 40$) and to student ($n \sim 30$) and professional ($n \sim 60$) members of the American Meat Science Association ($n = 786$ total membership in 2002). This population may not represent the average of the meat industry *per se* but does represent those most involved with recruiting and placing students at academic institutions or recruiting human resources for company positions. Over 68% of the surveys were returned. Forty percent of respondents were outside the United States. About 60% of the respondents held positions that combined responsibilities for teaching, research, and/or management and the remainder were in positions with individual duties either in teaching, research, management, or government. Experience in the industry ranged from less than 5 years to more than 30 years. The respondents were predominantly male (Table 1). Although not a large population, those surveyed would represent a cross-section of professionals involved with attracting and placing students in the meat industry.

SURVEY RESULTS AND INTERPRETATIONS

The meat industry may be losing future professionals, and certainly not attracting new individuals, from the lack of early emphasis on animal products in the education process. About half of the respondents chose the meat industry

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Table 1. Demographics of survey respondents

Trait	Percent of respondents
Nationality	
International	40 (17 countries)
USA	60
Years in Industry	
<5	11
6-10	14
11-15	14
16-20	15
21-25	13
26-30	16
>31	17
Gender	
Male	85
Female	15

sometime during their undergraduate education and about 20% did not make the decision until sometime during graduate school (Table 2A). Approximately 25% moved into the meat industry with their first job. This indicates a lack of emphasis about animal product career opportunities in high schools and early in college. Nearly 80% of respondents indicated that education in the livestock/agricultural sector is not focused toward products (Table 2B). In fact, some respondents estimated that 90% of their education was production driven. Although there is some emphasis in graduate programs on animal products, clearly there is a lack of focus on meat science, the conversion of muscle to meat, postmortem technologies, and other topics pertinent to the meat industry early in post-secondary education. The difficulty in successfully publicizing opportunities in meat science could also be attributed to lack of prior knowledge and familiarity with meat science by younger students.

Early exposure to meat science, even on an elementary level, is vital to drawing students into the discipline. Competition teams for meat or livestock are one way to gain familiarity with the livestock and meat industries. Nearly 50% of U.S. respondents had participated in meat or livestock judging (Table 2C), whereas few of the non-U.S. respondents had these experiences. Competition teams for livestock and/or meat judging involve teams of three to five individuals evaluating animals and/or carcasses and cuts for various quality, cutability, and marketability traits. Teams receive intense and focused coaching and spend considerable time in slaughter and fabrication plants. Students may compete in junior (first-time) and senior (more experienced) contests, and eventually a "national" champion is determined. There was a general feeling by participants and others closely associated with these activities that they had a very positive influence on



students and their willingness to enter the meat industry. Students involved with these activities interact closely with industry professionals in plant environments and university settings and may develop a passion for working with meat products.

Being involved with other youth activities seems to influence student career choice. Over 50% of respondents were involved with youth meat-related activities such as 4-H, FFA (Future Farmers of America), science camps, science fairs, and/or junior farmer organizations where they received early exposure to the industry (Table 2D). A few respondents attributed their early exposure to meat to being involved on a family farm (home processing), but this trend was decreasing. International respondents had little experience with 4-H or FFA because these activities are not as prevalent overseas as in the United States. Perhaps another way to expose a large number of international youth to the meat industry is through global organizations such as Boy Scouts and Girl Scouts. Several youth activities could be developed to increase interest in meat/food.

The Council for Agricultural Science and Technology (CAST) sponsors a tremendous example of an outreach program for middle school children in the United States. This program gives hundreds of students the opportunity to compete in an essay-writing contest where they discuss current topics in modern agriculture, such as urban agriculture, genomics, alternative fuels, agricultural technology, and food science and nutrition. The state and regional winners are invited to a grand presentation and the collection of winning essays is published and distributed to industry and academic professionals across the nation (CAST, 2003). The students get early exposure to agriculture and science with the hope that some will be intrigued enough to consider some phase of agriculture for a career. At the award presentations student winners frequently mention that this experience will likely influence their career choice. This contrasts with experiences of more than 80% of respondents who indicated that careers in the meat industry were never mentioned in meetings with secondary education school counselors or at career expo gatherings (Table 2E). Career fairs and secondary education school counselors could be excellent ways to reach a large number of students at the elementary, middle, and secondary school level.

One might think that numerous materials are available that would entice people into considering employment in the meat industry. Sixty-two percent of respondents either were aware of "some" career promotional materials for the meat industry or were aware of "very few or limited" materials; about 34% were not aware of any (Table 2F). The promotional materials of which most respondents were aware could be categorized as "company publicity/advertising" or "position recruiting announcements" rather than tools for recruiting people into a career. Only a few of those responding "yes" referred to specific industry publications on opportunities in meat science, such as those distributed by larger meat companies and the brochure by professional organizations such as the American Meat

Table 2. Selected survey questions and percentage of responses.

Question		Percentage of respondents
	Response	
A. At what point in your academic career did you decide to enter the meat industry?		
Before entering college		5.4
During undergraduate years		51.4
Graduate school		16.2
Post graduation or first job		27.0
B. Early in your career, was there more information about livestock production opportunities (genetics, nutrition, reproduction, veterinarian) than for livestock products (meat, milk, etc.)?		
Yes		79.5
No		19.2
Equal		1.4
C. Were you on a judging or competition team?		
Yes		48.0
No		52.0
D. With what other youth meat-related activities (4-H, FFA, school science fairs, etc) were you involved?		
4-H, FFA, Others		55.6
None		40.3
Other		4.1
E. Was meat or food science ever mentioned to you at any career fair activities or meetings with secondary education school counselors?		
Yes		17.1
No		82.9
F. Are there career promotional materials available for the meat industry?		
Yes, some or limited		62.0
No		33.8
Do not know		4.2
G. Is there any need to worry about human resource availability for meat science professionals in the future?		
Yes		83.6
No		16.0
Not sure		0.4

Science Association (AMSA, 2003). A general concern was that the promotional materials that exist may be outdated, may have limited distribution, and are not necessarily designed to attract people to the profession. Often these publications effectively communicate positive images of the industry only with those familiar with the livestock or meat industry and not with the general public. Respondents suggested that these materials should highlight the diversity and rewarding challenges of jobs within the meat industry so it would be more widely known that there are good jobs



in the meat industry other than those in packing plants or laboratories.

Almost 85% of respondents indicated that there was an urgent concern over human resource availability for meat science professionals in the future (Table 2G). Many of the international meat scientists that responded noted that universities in their countries did not offer courses in meat science and rarely offered courses in food science. Additionally, respondents noted the trend that processing facilities often hire non-meat science graduates to fill positions in quality assurance or operations because of the lack of qualified applicants with meat backgrounds. About 15% of those responding to the survey did not believe that human resource availability was an issue for the meat industry. They stated there would always be a demand for meat and meat products and that the growing number of food safety issues would help the meat industry recruit for itself. These respondents suggested students would recognize the demand for qualified professionals in the meat sector and would choose an area of study accordingly. However, the question remains: how will they learn of the demand? Additionally, since many countries do not have formal programs in meat science or muscle biology, students learn of the demand indirectly through job opportunities and mentors in fields like biology, chemistry, and veterinary medicine.

The general shortage of youth coming from agricultural backgrounds could be a reason for the lack of students interested in meat science. According to the United States Department of Agriculture's National Agricultural Statistics Service (USDA-NASS, 1997) the number of farms and people directly associated with farming in the United States has decreased significantly during the twentieth century. Similar trends are occurring in other countries. Fewer farms, combined with the increasing use of machines for labor, leads to fewer people coming from agricultural backgrounds and likely fewer people who have grown up around the livestock and meat industries. Having fewer people aware of the meat industry makes recruiting more difficult.

The meat industry could benefit by recruiting a greater number of female professionals. Only 15% of the respondents were female, reflecting the well-known fact that although the number is growing in several countries, there are not many women employed by the meat industry. Noteworthy, however, is the fact that while only 21% of the American Meat Science Association's professional membership is female, graduate student members are 40% female, suggesting that the number of women exploring the subject is on the rise. Singer and Arkin (2002) suggest that women tend to be unfamiliar with the science and engineering disciplines due to a lack of guidance by a mentor already in the field. Recruiters and mentors who specifically target women into the meat industry could find their efforts to be very successful.

WHY SELECT THE MEAT INDUSTRY?

Most respondents stated that they selected the meat industry as a career because of personal interest in the profession, the prospect of a challenging career, and their academic coursework (Table 3A). Other factors included a positive outlook for the meat industry job market, career stability, the multitude of career opportunities, the chance to work in a unique and rare trade, and industry size, scope, and complexity. Several of the international respondents indicated that they entered the meat industry because of their agricultural background and some learned of the opportunities in meat science during graduate school. Many respondents, both US and international, credited their move into the meat industry to a specific mentor, such as an instructor of a class, their academic advisor, friend, or family member. These same positive factors also were given as being attractive recruiting issues for the meat industry. Respondents emphasized the positive job market, career stability, and industry size, scope, diversity, complexity, transferable skills, the challenge of meat science, the attractiveness of the bright future of meat science, the opportunity for advancement, and clearly defined career pathways. A more concrete suggestion for recruitment was to promote extracurricular activities, meat judging and internships. There is a pressing need for individuals to market these advantages in order to attract people into the meat industry.

Several reasons were given for the difficulties associated with recruiting into the meat industry. Respondents referred to the undesirable working environment of the meat industry as being the most detrimental factor for recruiting students into meat science (Table 3B). This unattractive environment included the "body parts and pieces" surroundings, long hours, locations of packing plants, and excessive travel and/or relocation associated with professions in the industry. Also cited were the poor reputations of meat and of animal agriculture among the media and general public, the dietary issues associated with meat, and the perception of meat science being a low-valued profession or "a place for the uneducated".

When asked to pinpoint the major problem with recruiting, respondents overwhelmingly referred to the unglamorous image of the meat industry (Table 3C). Others stated that students are not aware of all the possibilities for careers in the meat industry and do not see how an education in meat science fits the career opportunities of which they are aware. A few of those surveyed suggested that the undesirable working environment mentioned previously, combined with low salaries, an uneven pay scale, and plant locations, contributed to meat science's recruiting problems. Finally, some responded that it is generally hard to recruit students with no agricultural background and that there is also an overall lack of recruitment efforts into the meat industry.



The general consensus among respondents was that universities, industry, and allied professional organizations should all work to recruit talented young people into meat science careers (Table 3D). It was expressed that universities should be providing information to high school students to spark an interest in further education in meat science; then, industry should have a presence in classrooms as guest speakers and also provide internship opportunities. A few respondents warned that if something was not done, recruiting would become more difficult.

Similar problems exist with recruitment of women into the engineering (NSF, 2002). A National Science Foundation intervention program was established in the 1990s to increase the participation of women in engineering and science through various summer academies (Ellis-Kalton, 2002). These programs have been successful and various mentoring programs and activities have evolved (Singer & Arkin, 2002). These established methods could provide an excellent template for recruitment efforts for the meat industry, providing that salaries are competitive.

WHO SHOULD WE RECRUIT?

An obvious issue and perhaps the real reason for this discussion, is how to recruit talented people into the meat industry. To address this problem, it helps to know how and why people select a particular career. There are hundreds of recruiting services available worldwide that specialize in helping people get jobs. Unfortunately, few of these recruiting businesses, if any, actively recruit talented students into the meat industry or address the fundamental reasons why or how people select a new career when they make a change. However, there are a few psychological and career assessment tools that are used worldwide to assist people seeking help choosing a career path. The Strong Interest Inventory (SII, 2001), the Campbell Interest and Skill Survey (CISS, 2000), and the pioneering work by Holland (Holland, 1990) provide insight into the types of interests and skills that could be compatible with human capital needs of a variety of industries, including the meat industry. These surveys are well respected and widely used by secondary education counselors, career counselors, and psychologists. They are based on the idea that when people with certain skills (SII, 2001) work at jobs they find interesting (SCI, 1996) and with people with similar interests and goals (CISS, 2000), they are more productive and satisfied.

The Campbell Interest and Skill Survey assessment uses a 320-question survey to identify interests similar to people successfully employed in various fields. A personalized report includes almost sixty occupations and a career planner to help the individual interpret the results (CISS, 2000). The Strong Interest Inventory and Strong Skills Confidence Inventory measure interests in a wide variety of occupations, occupational activities, hobbies, leisure activities, and types of people. Like the CISS, the SII and SCI compare the individual's interests to thousands of workers who are satisfied with their careers (SII, 2001; SCI, 1996).

Table 3. Most frequent responses to selected survey questions (listed in order of frequency)

A. What were the most important in your selection of a career in the meat industry? What is attractive for recruiting students in meat science?
▪ A personal interest, often from a mentor ▪ Coursework ▪ Positive job market ▪ Career stability ▪ Opportunity for advancement ▪ Industry size, scope and complexity ▪ Transferable skills ▪ The challenge ▪ Clearly defined career pathways ▪ Bright future
B. What is unattractive for recruiting students into meat science?
▪ Undesirable working environment ▪ Long hours ▪ Location ▪ Excessive travel ▪ Need to relocate ▪ Poor reputation of meat and animal agriculture among media and general public ▪ Dietary issues associated with meat ▪ Perception of meat science as being a "low-valued" profession
C. What really is the problem with recruiting people into the meat industry?
▪ Unglamorous image ▪ Students not aware of all possibilities for careers ▪ Undesirable working conditions ▪ Low salaries ▪ Uneven pay scale ▪ Plant locations ▪ Declining number of agriculture youth ▪ Overall lack of recruitment efforts
D. Who should be doing this recruiting?
▪ Universities ▪ Industry ▪ Allied professional organizations ▪ All of the above

Another career assessment tool is included in the ACT Assessment examination (formerly the American College Testing Program), which is taken by thousands of students prior to entering college to assess their basic academic skills and help students make informed decisions about which colleges to attend and which programs to study (ACT, 2003). Post-secondary institutions use ACT scores more frequently for admission standards than CISS, SII, or SCI data, which are used for career counseling. Accompanying the results of this inventory is an ACT "World-of-Work" analysis, which suggests to students what types of work

are consistent with their academic skills (Prediger, 2002). However, few of these work areas suggest anything related to the meat/food industry.

The career assessment surveys described above may not be recruiting tools, but they allow industry and academic recruiters to identify which types of young people may possess traits that make them ideal recruits for the meat industry. University admissions offices or career planning offices can profile incoming students or students already at the university based on one or more of the interests and skills analyses, and once identified, these students could be targeted as potential recruits. Recruiters could focus on key categories, such as those listed in Table 4 and 5, if for example, the position is science-based. However, targeting

a "science-like" person may not be adequate because there are needs in several career areas in the meat industry such as sales, marketing, production, management, communications, technical services, information technology, and research and development. Other profile categories are available for jobs dealing with business strategy, marketing, personnel relations, and communications. The main point here is that anyone concerned about meat science recruitment ought to be looking for people with interests and skills that match those categories in Tables 4 and 5. At the very least, recruiters could make students aware that there are opportunities within the meat industry that match their interests and skills.

Table 4. Strong Interest Inventory categorizations of six general occupational themes.

Occupational Theme	Description	Typical majors	Work environment
Enterprising	- Active persuaders who prefer to influence or lead others through selling the merits of ideas or products.	- Business Administration - Government & Politics - Management - Marketing - Travel and Tourism - Hotel & Restaurant Mgt - International Relations	- Government - Investment Firm - Law Office - Marketing dept - Retail/Wholesale
Investigative	- Scientific problem solvers who take an analytical approach involving research, experimentation, or diagnosis.	- Biological/physical Sci - Engineering - Mathematics - Health Sciences - Social Sciences	- Laboratory - Medical facility - Develop Software - Scientific R & D Firm - University
Social	- Empathic helpers who take a helping or altruistic approach involving teaching, developing, or caring for others.	- Child and Family Studies - Education - Medical Services - Ethnic Studies - Social Work	- Community Affairs - Hospital - Personnel Office - Religious Organization - School - Youth Center
Conventional	- Careful organizers who take an orderly approach to organizing and managing finances, procedures, or data.	- Accounting - Business Education - Computer Operations - Statistics - Data management	- Accounting Firm - Bank - Courthouse - Database Division - Insurance Agency - Quality Control
Artistic	- Creative communicators who take a self-expressive or creative approach involving art/design, music, or writing.	- Art and design - Languages - Architecture - English - Graphic design - Journalism	- Advertising Agency - Art Studio - Graphic Design Firm - Publishing Company - Theater - Concert Hall
Realistic	- Practical doers who take an active hands-on approach involving construction, mechanical, or outdoor activities.	- Agriculture - Civil Engineering - Game Management - Law Enforcement - Physical Education - Electronics - Ecology	- Construction Site - Manufacturing Firm - Military - Outdoors - Repair Shop - Sports Arena

Table 5. The seven career orientation groups and corresponding examples of occupations and fields of study as listed by the Campbell Interests and Skills Survey.

Orientation	Occupations Related to Meat/Food Science	Fields of Study
Adventuring	None	None
Analyzing	Biologist Quality Control Inspector Research Analyst	Engineering Physiology Veterinary Medicine
Creating	Baker Caterer Technical writer	None
Helping	None	None
Influencing	Director of Research and Development Operations Manager Sales Manager	Agri-business Management
Organizing	Food Service Manager	Quality Management
Producing	Agricultural Extension Agent Food Scientist Rancher	Animal Sciences Food Science and Technology

SUMMARY

Numerous comments reflected the opinion that action needs to be taken in regard to meat industry recruiting, but the respondents were not sure who the recruiters should be and how the issue would be addressed. Several mentioned that recruiting was just "assumed to be occurring and would continue". If the industry isn't diligent in establishing a more formal recruiting effort, there could be serious talent deficiencies in the near future. If the industry chooses to enter the recruiting arena, there are various templates for recruiting that could be helpful.

RECOMMENDATIONS

- Develop a comprehensive recruiting strategy that can be adapted to the differences and needs of various countries. It must be sustainable and on-going, multiple entities should be incorporated into the plan (e.g. academic, industry, government, special interest groups, and counselors), and it should capitalize on the templates available for recruiting women into science and engineering.
- Emphasize the positive job market, career stability, significance of the industry, and industry size, scope, diversity, and complexity, and other selling points for the meat industry.
- Develop mentor programs. This area may be one of the most important and therefore needs special attention and focus to be effective.
- Attract more students into meat judging.
- Promote internships.
- Develop educational activities (not publicity materials) appropriate for elementary and secondary schools.
- Develop a variety of "glossy" brochures that are designed for different audiences. These should supplement current career brochures (e.g. AMSA careers brochure) and be suitable for an array of target age/educational groups.
- Increase awareness of educational and employment opportunities through science fairs, 4-H, FFA, essay contests, or any other creative activity reaching a large number of students of various ages.
- Meat industry commodity groups should unite to work with food industry organizations to interact with career defining companies (e.g. ACT, Campbell, Strong, and others) to get keywords like "meat" and "food" in the lexicon of their occupational profiles, skill inventories, job opportunities, and academic majors.
- Utilize information from ACT, CISS, SCI, SII, and any other source indicating student skills and interests compatible with specific hiring needs of the meat industry.
- Communicate with these students more frequently and effectively.



- Do not assume that other parties will automatically recruit talent for the meat industry.
- Do not assume that students will hear about the meat industry by accident.
- Be pro-active on the issue of recruitment.

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