



The future of meat: A qualitative analysis of cultured meat media coverage



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ABSTRACT

This study sought to explore the informational themes and information sources cited by the media to cover stories of cultured meat in both the United States and the European Union. The results indicated that cultured meat news articles in both the United States and the European Union commonly discuss cultured meat in terms of benefits, history, process, time, livestock production problems, and skepticism. Additionally, the information sources commonly cited in the articles included cultured meat researchers, sources from academia, People for the Ethical Treatment of Animals (PETA), New Harvest, Winston Churchill, restaurant owners/chefs, and sources from the opposing countries (e.g. US use some EU sources and vice versa). The implications of this study will allow meat scientists to understand how the media is influencing consumers' perceptions about the topic, and also allow them to strategize how to shape future communication about cultured meat.

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1. Introduction

“Although meat has enjoyed sustained popularity as a foodstuff, consumers have expressed a growing concern over some consequences of meat production” (Edelman, McFarland, Mironov, & Matheny, 2005, p. 659). Some of these concerns include food related hazards, human health impacts, animal welfare, and environmental impacts (Verbeke & Viaene, 2000). Throughout the last several years, many negative stories related to meat production have made the headlines in mainstream media. Some of the most notable cases include Bovine Spongiform Encephalopathy (BSE or Mad Cow Disease) outbreaks, *Escherichia coli* and *Salmonella* outbreaks, inhumane treatment of livestock, and the contribution of livestock production to global warming (Bukaty, 2010; Cichowski, 2009; “First apparent”, 2003; Lohn, 2010; Stark, Hoffman, & Ibang, 2008; Walsh, 2008). Stories such as these have added to the increasing concerns of consumers regarding meat production. McEachern and Seaman (2005) suggested that understanding consumers' needs and concerns surrounding meat production are vital to remaining competitive in the food market.

In addition to consumer concerns regarding meat production, the ability of conventional meat production to satisfy the demand for meat in the future is uncertain, leading to increased public scrutiny regarding the meat industry. The demand for meat throughout the world is expected to double throughout the next several decades (FAO, 2006). Without substantial improvements or alternatives it is likely that as demand increases the price of meat will also increase, making meat unaffordable to a large population (Post, 2012).

A proposed alternative to conventional meat production is cultured meat (also referred to as lab grown meat or in-vitro meat). Cultured meat utilizes technology to produce meat from animal cells without killing the animal (Edelman et al., 2005; Hopkins & Dacey, 2008; Wales on Sunday, 2005). The production of cultured meat could provide the benefits of more favorable saturated fat levels, reduced food borne illnesses, reduced environmental impact, and is a proposed solution to feeding the growing population (Canon, 2011; Edelman et al., 2005). Additionally, concerns regarding animal welfare may be reduced with a meat alternative, such as cultured meat. Post (2012) indicated that for a meat alternative to be successful it must mimic real meat and have the ability to be produced in an efficient manner.

Research dedicated to developing cultured meat has been sustained for several years both in European countries and in the United States (Edelman et al., 2005). The United States displayed early research initiative in cultured meat through a 2002 National Aeronautic and Space Administration (NASA)-funded cultured meat experiment conducted at Touro College in New York (Hukill, 2006; The Daily Mail, 2005). Cultured meat research in the European Union has been gaining popularity since 2006, when studies were conducted at Eindhoven University and Maastricht University (Cheng, 2010; Rogers & Warren, 2009). Additionally, the in-vitro meat consortium, “an international alliance of environmentally concerned scientists striving to facilitate the establishment of a large-scale process industry for the production of muscle tissue for human consumption and attraction of funding to fuel these efforts,” was established in 2007 (The In Vitro Meat Consortium, 2011, para. 1). The creation of the in-vitro meat consortium led to the first in-vitro meat symposium held in Norway in 2008 (Midgley, 2008; The In Vitro Meat Consortium, 2011). European cultured meat research has been advancing largely due to the support of the Dutch government and

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sausage manufacturers and is cited as now being ahead of United States research (Carli, 2011; Rogers & Warren, 2009). The progress of United States research has recently slowed due to the closing of the leading United States cultured meat research lab and the firing of the nation's leading cultured meat researcher (Dudley, 2011).

Although considerable research still needs to be conducted before cultured meat or another meat alternative is ready for large-scale production and consumption, it is important for the meat industry to be aware of the cultured meat information being communicated to consumers through the media. Consumers often look to media for information concerning food issues; therefore, to understand how the media influences consumers' opinions of cultured meat, it is necessary for leaders in the meat industry to be aware of media coverage surrounding cultured meat (Meyers & Abrams, 2010). The future impact of cultured meat on the meat industry could be dependent on consumers' opinion of the product. Understanding the perceptions consumers are developing as a result of media coverage is integral in preparing the livestock and food production industry to address the future of cultured meat. Additionally, the meat industry has an opportunity to influence media coverage and communicate proactively about cultured meat with consumers, as media coverage and consumer awareness of cultured meat are still in its infancy.

Traditionally, the agricultural industry has communicated about food issues to the public in a reactive manner (Graves, 2005). However, communicating proactively about cultured meat could allow the agricultural industry to have greater influence in shaping consumers' perceptions on the production of cultured meat. In an effort to better understand the current messages being portrayed through the media to consumers in the countries conducting cultured meat research, this study sought to explore the information and information sources used by the media to cover preliminary stories of cultured meat in both the United States and the European Union. Gaining this knowledge will allow meat scientists to determine what information is currently being communicated to consumers through the media, how this information may be influencing consumers' opinions about cultured meat, and how they can shape future communication about cultured meat.

2. Materials and methods

2.1. Purpose and objectives

This study sought to explore the information communicated in preliminary media coverage of cultured meat in both the United States and the European Union. These findings will add to the agricultural industry's ability to develop a position on the issue of cultured meat production, gain an understanding of how consumers' opinions of cultured meat may be influenced by the media, and strategize communication about the issue in the future. The following research objectives guided this study:

- To determine the informational themes used by the print media to discuss cultured meat in both the United States and the European Union.
- To determine the informational sources used by the print media cite cultured meat information in both the United States and the European Union.

2.2. Research methodology

To explore the preliminary media coverage surrounding cultured meat, a qualitative analysis was conducted. Qualitative research is an accepted approach to study routine and controversial subjects or experiences in an effort to understand the meaning and symbols translated to individuals (Denzin & Lincoln, 2000). Thus, a qualitative analysis provides an understanding of how cultured meat is covered

in the news media. This process allowed the researchers to interpret and provide meaning to the text (Pauly, 1991).

Prior to data collection and analysis, the validity of the study was assessed. Creswell (2007) encouraged qualitative researchers to use at least two validation strategies. The validation strategies used in this study included peer debriefing and the identification of researcher bias. The role of a peer debriefer is to play "devil's advocate," questioning the lead researcher's methodology and interpretations (Creswell, 2007; Darbyshire, MacDougall, & Schiller, 2005; Harder, Lamm, & Strong, 2009; Lincoln & Guba, 1985). Additionally, identifying researcher bias allows for readers to gain an understanding of how interpretations may have been influenced by the researchers (Creswell, 2007; Harder et al., 2009; Merriam, 1988). The primary researcher was a graduate student with a background in animal science and agricultural communication. The co-researcher, who served as the peer debriefer, was a graduate student with a background in agricultural education who had previous knowledge of cultured meat.

2.3. Data collection

Newspapers were selected for analysis in this study because they are considered the most relied upon media source, especially at a local level (Rosenstiel, Mitchell, Purcell, & Rainie, 2011). Therefore, due to the importance of local papers, the search for articles included all electronically available newspapers and was not limited to state or national papers. Additionally, because media coverage of cultured meat is relatively new, including all electronically available newspapers broadened the sample to ascertain a clear understanding of different informational themes being presented across the United States and the European Union. A census of electronically available news articles written between 2005 and 2011 were included in this study. Media coverage of cultured meat prior to 2005 was minimal, and thus articles written before 2005 were not included in this study.

All articles analyzed for this study were collected using the online Access World News NewsBank database. Key terms used to search for relevant articles included "meat" in the headline and "cultured meat" in all texts. Articles were excluded if they contained less than 100 words, irrelevant content, or were duplicates. A total of 72 articles resulted from the search terms. However, many of the articles were duplicates, from the same Association Press wire, or had unrelated content. Articles of this nature were removed from the sample. The remaining 34 articles were analyzed, each of which was assigned an identification number.

2.4. Data analysis

A coding sheet and a coding guide were developed by the primary researcher and reviewed by a panel of experts prior to data collection. The primary researcher coded all articles in the sample. Items recorded on the coding sheet included the newspaper name, newspaper location, type of newspaper (local, state, or national), date of publication, number of words, newspaper section, and the headline. Additionally, the primary researcher recorded main and secondary topics, informational themes used when covering cultured meat, and the sources used for paraphrased or directly quoted information.

To analyze the data, the primary researcher used Glaser's constant comparative method to establish the dominant informational themes and sources used throughout the articles (Glaser, 1965). Following the initial analysis, the primary researcher identified numerous informational themes. However, after further examination themes were collapsed together and other themes could be dismissed due to lack of prevalence. Following this process, the co-researcher analyzed the interpretations and findings made by the primary researcher (Creswell, 2007; Darbyshire et al., 2005; Harder et al., 2009; Lincoln & Guba, 1985). The co-researcher suggested that the uncertainty/skepticism

theme could be collapsed to a skepticism theme. Other findings and interpretations were confirmed by the co-researcher.

3. Results

Of the 34 articles that were analyzed, 24 were from United States newspapers and 10 were from European Union newspapers. Half of the articles coming from United States newspapers were published in 2011, while more than half of the articles from European Union newspapers were published in 2005. The prevalence of United States newspaper articles in 2011 may be attributed to the shutdown and firing of the lead cultured meat researcher and his lab (Dudley, 2011).

3.1. Research objective 1: Prevalent themes

The examination of the information used to discuss cultured meat in the print media revealed six main themes that were prevalent in both the United States and European Union articles. These themes included benefits, history, process, time, current livestock production problems, and skepticism.

3.1.1. Benefits

The benefit theme was discussed in the most detail throughout the articles analyzed. Many articles discussed benefits of cultured meat in four main areas. These benefit sub-themes included environmental, animal welfare, food security, and human health benefits. The environmental benefits discussed often focused on greenhouse gases, land, and water components. An article from the *Burlington County Times* of New Jersey provided the following: “An Oxford University study found that this process [cultured meat production] would consume 35–60 percent less energy, 98 percent less land, and produce 80–95 percent less greenhouse gas than conventional farming.” The resolution of animal welfare issues was also discussed as a benefit of cultured meat. The articles often cited the elimination of “in-humane” treatment and “suffering” that animals experienced on “factory farms.” A statement discussing animal welfare benefits in an *Augusta Chronicle* article provided,

An end to the misery suffered by more than 10 billion animals, not even counting fish, who are killed for their flesh in the United States alone. No more castration without anesthetics. No more filthy, overcrowded sheds into which hogs and chickens are crammed.

Many of the articles also made reference to the growing human population and increasing demand for meat, while citing cultured meat as a solution to the global food crisis. For example, the following statement was provided in the *Buffalo Examiner*, “It is hard to come up with arguments against these benefits, which are future-oriented and could reasonably affect more than just one segment of the world population. In fact, they could create a food source for everyone...” The last sub-theme of benefits offered by the articles was the human health benefit. Cultured meat was described as a solution to health risks associated with the consumption of meat. One description found in the *St. Petersburg Times* included, “The fat content of the cultured meat could be controlled, and hamburger could be enriched with omega-3, which prevents rather than causes heart attacks. And food-borne disease could be significantly reduced.”

3.1.2. History

Many of the articles discussed the history of cultured meat and how this technology came to be. Some of the history went as far back as Winston Churchill, who once said, “We shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium.” Other articles included discussion of human clinical trials to grow tissue, organs, and limbs, which was the foundational science for cultured meat technology. An article in the *Chicago Sun-Times* read,

“If you don't believe this can be done, read up on the blood vessels, livers, bladders and hearts we've already grown in labs.” Additionally, many articles discussed the first United States cultured meat study that was done for NASA. An article from New York's *Albany Examiner* stated, “The concept was first pursued by NASA in an attempt to provide another food option in space.” Additional discussion of the history of cultured meat included the progression of smell tests to taste tests, the first cultured meat symposium, and the history of funding for cultured meat studies. A 2005 article from *The Independent* newspaper of London, England discussed a “sniff panel” that was used in the NASA project. A later article in the *Kansas City Star* discussed taste tests:

There are but two reports of consumption. One by a performance artist in Australia who gulped a small bit of frog flesh. The second was a Russian TV reporter who ate a sample before a researcher could object. He pronounced it tasteless.

People for the Ethical Treatment of Animals (PETA) was often discussed as a financial supporter of cultured meat. Several articles included a statement similar to the following, which was found in *The Post and Courier* of Charleston, South Carolina.

PETA is offering a \$1 million award to the first scientists to make in-vitro meat and sell it to the public by June 30, 2012. The manufactured meat, according to a PETA news release, must have ‘a taste and texture indistinguishable for real chicken flesh to non-meat-eaters and meat-eaters alike,’ and be manufactured in ‘large enough quantities to be sold commercially...in at least 10 states.’

Another discussion of cultured meat funding in *The Sun-Sentinel* of Ft. Lauderdale, Florida indicated that, “The National Institute of Food and Agriculture, part of the U.S. Department of Agriculture, won't fund it; the National Institutes of Health won't fund it; and NASA funded it only briefly.”

3.1.3. Process

A large proportion of the articles discussed the process of growing cultured meat. In addition, these articles often included what the process currently entails and what still needs to be improved. One description of the cultured meat production process in *The Post and Courier* indicated,

In the meat-making process, scientists take a biopsy from an animal. They extract stem cells and add “growth serum” to multiply them. The compound binds together to form muscle and receives electric shocks to boost protein content. It then is ground, flavored and spiked with vitamins and other nutrients.

Another account of the process, in the *Agence France-Presse*, described what a researcher had done. It said, “He has taken embryonic muscle cells called myoblasts, which turn into muscle, from turkey, bathed them in a bovine serum and then grown animal muscle tissue.” In one article from the *Milwaukee Examiner*, a cultured meat researcher expanded on the cultured meat process indicating that the process allows for researchers to match consumer preference. The following was provided:

When questioned on the taste of the meat, the researcher answered, ‘It will be functional, natural, designed food. How do you want it to taste? You want a little bit of fat, you want pork, and you want lamb? We design exactly what you want. We can design texture.’

Many of the articles indicated that meat currently being produced from this process included “hamburgers, sausages, nuggets, and Spam-

like meat.” Meat with “structure” such as steaks and chicken breasts were cited as taking “a little more work.” Improvements in “taste,” “structure,” “consistency,” and “efficiency” were mentioned among the articles. The following, from the USA *Entertainment Examiner*, is an example of the process and needs for improvement that were discussed:

Scientists have been able to take samples of animal tissue and stimulate their proliferation via special proteins. However, only thin strands of muscle tissue have so far been massively developed. The production of more space-filling features of meat such as blood vessels remain a problem. Recently, scientists have been looking to collagen, a substrate made of pure animal as a material on which to grow cells, thus theoretically packing the cells into chunks of tissue.

3.1.4. Time

The time expected until the technology of cultured meat reaches consumers was frequently discussed. However, the estimated time until a marketable product is achieved varied. Some referenced a marketable product within “the next few years,” while others indicated that it may be “decades” before consumers are eating the product. The timeline for ground or processed cultured meat products was consistently shorter than the timelines expected for steaks and other structured meats. A *St. Petersburg Times* article suggested the following:

Over the next five to 10 years, Matheny expects cultured ground meat products such as hamburger, sausage and chicken nuggets to hit the market for consumption. It will take a few decades, he said, for a steak or a whole turkey.

Another account of the culture meat timeline, found in *The Guardian* of London, England stated,

Although the research is still in its infancy, Tuomisto predicts that if more resources are put in, the first commercial lab-grown meat could be available within five years. The first samples are likely to be like mincemeat in texture, while other products such as steaks could take at least five years longer.

3.1.5. Current livestock production problems

In addition to the benefits of cultured meats, many of the articles also discussed the problems with current meat production. These problem sub-themes were very similar to the benefit sub-themes, but rather than discussing the benefits of cultured meat, they focused on the problems of current practices. For example, many of the articles cited the environmental, land availability, animal welfare, and financial issues associated with current production practices. One statement in the *Wichita Eagle* indicated, “Meat is becoming a ‘problem product’ because it uses about 70 percent of farmland and has environmental and animal welfare issues...” The following statement, from the *The Sunday Times* of London, England discussed environmental problems associated with current livestock production. This article said,

Global meat and dairy product consumption is expected to double by 2050, according to the United Nations. This could have an unprecedented impact on climate change because the warming effect on the atmosphere of methane, a digestive by-product from farm animals, is 23 times greater than that of carbon dioxide. The UN has attributed 18% of the world’s greenhouse gases to livestock.

Animal welfare problems were framed similarly to the statement provided in an article from *The Times* of London, England:

How can it possibly be more disgusting than, say, eating chickens that have ulcerated backsides from sitting for weeks in their own

excrement, bodies five times their natural size, with leg abscesses the size of 50p pieces, and end their lives strung upside down with their heads hacked off.

Additionally, some articles discussed that current livestock production is unnatural due to animal welfare issues. The following example found in *The Chicago Sun-Times* demonstrates this concept: “...cultured meat is not inherently more unnatural than producing chicken meat from tens of thousands of animals raised intensively in their own feces and fed antibiotics.” An article from the *Albany Examiner* discussed the physical and financial waste of current meat production and indicated “more than 75 percent of what is fed to an animal is lost through metabolism or inedible parts such as bones.”

3.1.6. Skepticism

Despite discussion of the benefits of cultured meat and problems with current livestock production practices, many of the articles briefly discussed the skepticism associated with the technology of cultured meat. Skepticism was referenced, at times, in a direct manner, while at other times skepticism was discussed as something that had to be overcome by proponents of cultured meat. Some articles discussed the questionable consumer acceptance of cultured meat, uncertainty, concerns/risks of cultured meat, and the negative aspects of cultured meat. When discussing consumer acceptance, many articles mentioned a “yuck” or “ick” factor that people have toward the idea of cultured meat. This is demonstrated in the following statement from the *Sun Sentinel*: “There’s a yuck factor when people find out meat is grown in a lab. They don’t like to associate technology with food.” An article, from the *Albany Examiner*, recognized the issues with consumer preference but stated, “There will be psychological hurdles; hurdles that could be overcome with improved quality, reduced cost, and education on animal suffering.” The uncertainty of cultured meat was discussed in an article from *The Times* of London, England which included, “every time we mess around with our ecological heritage there are unintended side-effects. We have a long history of unintended consequences.” Additionally, the uncertainty of cultured meat was recognized in an article from *The Capital Press* of Salem, Oregon as a concern that could be overcome. This article stated, “It may take some time to prove the new technology doesn’t harm humans.” One negative aspect of cultured meat that was discussed was the current cost. Often the skepticism theme was counterbalanced in some articles by statements such as, “If it feels and tastes like meat, people will buy it.” This statement was found in *The Sunday Times* of London, England.

3.2. Research objective 2: Information sources

An examination of the information sources used to cite cultured meat information in the media revealed that the top researchers in the cultured meat technology, sources from academia, PETA, New Harvest, Winston Churchill, restaurant owners/chefs, and sources from the opposing countries (e.g. US use some EU sources and vice versa) were commonly cited sources. Sources from academia were used most frequently in both the United States and European Union articles. Many of the quotes provided by researchers, academia, PETA, New Harvest, and Winston Churchill favored cultured meat production. One of the lead cultured meat researchers demonstrated his favorability and support toward cultured meat and said in a *Kansas City Star* article, “Think of what we’ve done in the last several years with computers and cell phones...Why can’t we make the same kind of advances with food?” An academic source stated in *The Guardian* of London, England,

...our research shows that cultured meat could be part of the solution to feeding the world’s growing population and at the same time cutting emissions and saving both energy and water, Simply

put, cultured meat is potentially a much more efficient and environmentally friendly way of putting meat on the table.

Additionally, a PETA representative showed favorability toward cultured meat and stated in a *St. Louis Post-Dispatch* article,

This is the wave of the future. People who are environmentally aware are keen on this, animal rights advocates are keen on this, health advocates are keen on this. The only people who aren't keen are in a business that this will affect.

Those quotes provided by restaurant owners/chefs did not demonstrate favoritism toward cultured meat; rather, they tended to be more skeptical. One restaurant owner, quoted in a *Kansas City Star* article said, "If I served it, I'd be out of business in a week." While a bar owner quoted in the *Agence France-Presse* said, "One of the biggest things that people enjoy as a comfort thing is food, and until people grow up with the idea of artificial meat, it's going to be hard to convince people otherwise."

It is important to note that the United States newspapers did minimally use agricultural sources, while the European Union newspapers did not use any agricultural sources. When agricultural sources were used they generally discussed why culture meat would not be successful. An article from *The Sun* of Baltimore, Maryland used a representative from the National Cattleman's Beef Association (NCBA) as a source. This NCBA source said "The cattle industry is hardly worried by the prospect of lab-grown meat. There's still an excellent market for high-grade, high-fat-content beef."

4. Discussion/recommendations

By examining the information and information sources used to cover cultured meat in the print media, the industry can understand how consumers' opinions of cultured meat are being influenced. The analysis of preliminary media coverage surrounding cultured meat showed that current livestock production problems and the benefits of cultured meat were themes commonly discussed by the print media. This shows that consumers are being reminded of commonly perceived problems associated with conventional livestock production, while being offered a solution to the problems through cultured meat. Additionally, the history and process themes presented in the print media provide consumers with insight to how cultured meat is made and where the technology originated. The discussion of the technology and process of cultured meat, while informational to the consumer, may also be confusing and overly technical. In addition, the discussion of the improvements needed to cultured meat production may leave consumers doubtful of the future success of the product. The results showed that the prediction of time until a marketable cultured meat product was available varied and was somewhat uncertain. Since the product is not currently available and the time of availability is uncertain, consumers likely place less importance on the issue now than they would if cultured meat was currently available. Skepticism of the product and the "yuck" factor are likely to resonate with consumers. Until a product is proven to be efficient and demonstrates the ability to mimic real meat (Post, 2012), consumers are likely to have an impulse "yuck" and skepticism reaction to cultured meat. These consumer reactions are barriers to the acceptance of cultured meat that will need to be addressed by the meat industry, should they wish to develop a cultured meat product accepted by mainstream consumers.

The sources used throughout the articles primarily supported or favored the production of cultured meat. Very few sources opposed the production and few represented the agricultural industry. Currently, the support of cultured meat in print media is outweighing the opposition. Therefore, it is likely that consumers will also develop favorability toward the product if support continues to be demonstrated by the

media. The meat industry and larger agricultural industry should work to create effective media strategies and continue to monitor how cultured meat and other agricultural topics are being covered in the media. As with the issue of cultured meat, it is important that the agricultural industry make strides toward communicating in a proactive manner.

As the cultured meat debate continues to progress with the advancement of the technology, it is important for all segments of the industry impacted by the development of cultured meat to collaborate and strategize in order to effectively manage the evolution of meat production systems. Interdisciplinary collaboration between the biological sciences and social sciences is also recommended as this technology advances. While biological scientists work to perfect the technology and create a marketable product, researchers in the social sciences should work to explore and shape consumers' perceptions and acceptance of the product. Further research should explore consumers' perceptions and availability of cultured meat.

It is important to note that both the articles included in the sample as well the researchers' interpretations of the articles limit this study. These limitations are both common with qualitative research (Pauly, 1991).

5. Conclusions

The results showed that common informational themes used to discuss cultured meat in the print media included history, process, time, benefits, current livestock production problems, and skepticism. The sources cited by the print media most notably included proponents of cultured meat. Some of these included academic and PETA sources. The United States did use a minimal amount of agricultural sources while the European Union did not use any.

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