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## A perspective of cultured meat market

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Recently, the cultured meat market, which replaces meat produced through traditional methods of livestock farming, has drawn increased attention in the food industry. Alternative meat can be categorized into two main types: (1) meat manufactured using plant ingredients (hereafter referred to as imitation meat) and (2) meat artificially produced in a laboratory (hereafter referred to as cultured meat). While imitation meat is currently available in meat markets globally, cultured meat faces multiple barriers in achieving the same global market access.

The manufacturing technology necessary to mass-produce cultured meat has not yet reached the stage of industrialization and lacks economic feasibility and safety. Nevertheless, the alternative-meat market is expected to grow rapidly in the future owing to the environment-friendly nature of the manufacturing process. The environmental pollution resulting from livestock products and the negative health effects of consuming high amounts of red meat are of worldwide concern.

According to the data of the Ministry of Environment, the sources of greenhouse gas emissions in Korea and their relative contributions are as follows: 65% from power sector, 13% from transportation, 8% from buildings, 8% from industrial processes, and only 3% from agriculture. In agriculture, while rice paddies and fields are responsible for the emission of over 60% of greenhouse gases, livestock sector is responsible for only over 30% of the emission. Although the domestic livestock industry leads to greenhouse gas emissions and the resultant environmental pollution, it is unreasonable to regard it as a major source of such emissions. We need to consider certain claims regarding the safety of alternative meat consumption.

According to the National Assembly's parliamentary audit data and the Ministry of Food and Drug Safety's data, majority of the imported soybeans and corn originate from

genetically modified organisms. Furthermore, most of the exposures to heavy metals and pesticide residues are reported to emanate from grains and vegetables. Therefore, the debate whether alternative meat from plants is safer than the traditional meat harvested from livestock is ongoing. Attempting to completely replace traditional meat with plant-based substitutes is not the most sustainable solution for the environmental problems related to the meat industry. Other ways include curtailing the population growth and reducing the meat consumption.

The global livestock industry must aspire for qualitative growth rather than quantitative growth, and it is imperative that innovative technologies that enable livestock and mankind to co-exist be introduced. If the livestock industry shows an utter disregard for the environment and is only concerned about generating profit, it will face a difficult situation and its sustainability will become questionable. Both industry professionals and academic scholars have the responsibility of understanding how consumer views on the livestock industry have changed.

Currently, many question the growth of the alternative-meat market and the efficacy with which it can reduce the negative factors associated with the traditional livestock industry. The alternative-meat market has to grow so that consumers have a variety of choices. Alternative meat can serve as a suitable option for consumers who are uncomfortable about eating meat because of health or religious reasons. Recently, the number of startups involved in cultured meat production has rapidly increased throughout the world. Similarly, large companies are also expected to invest immensely in technology development to facilitate the industrialization of cultured meat production. Nevertheless, there is still a long way to go to

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achieve global market relevance for cultured meat. The main requirement for manufacturing cultured meat is an animal-derived material. Therefore, animal welfare is still a stumbling block for the process. Above all, safety-related issues in cultured meat consumption are yet to be properly studied and discussed.

The so-called industrialization of food is viewed as a popularized situation in which food can be purchased at convenience stores and fast-food restaurants. Given these trends in the food industry, it is possible for cultured meat to enter the market as a food material within a few years. However, much more effort will be required to market cultured meat in such a manner that it is popularized. If industrialization is achieved earlier, the cultured meat industry may face some problems.

According to Article 2 of the Livestock Products Sanitary Control Act, “meat refers to the carcass, retail cut, intestines and other parts of livestock for the purpose of eating.” Thus, imitation meat manufactured from plant ingredients and cultured meat produced in laboratories may lead to legal controversies. Indeed, in the United States, there is a situation

that has been challenged by the meat industry. It is important to remember that alternative meat is an alternative and not a substitute for meat. Nevertheless, there is no doubt that the growth of the alternative-meat market will continue.

### **Conflicts of Interest**

The authors declare no potential conflict of interest.

### **Ethics Approval**

This article does not require IRB/IACUC approval because there are no human and animal participants.

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