

The interest of Brazilian professionals and students in learning cellular agriculture

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Abstract: The development of alternative protein production systems requires strategic planning, and education plays a key role in creating new job opportunities, unlocking the potential of cellular agriculture to address various socioeconomic, environmental, and ethical objectives. This study aimed to explore the interest in learning about cellular agriculture among Brazilians. An online questionnaire was distributed between February 2022 and February 2023, yielding 387 responses from 382 participants, as five individuals responded both as professionals and students. Of the total, 201 (51.9%) were professionals and 186 (48.1%) undergraduate students, with 76 (19.6%) agrarian sciences professionals, 125 (32.2%) professionals from other fields, 138 (35.6%) agrarian sciences students, and 48 (12.4%) students in different fields. Of the total respondents, 281 (73.6%) expressed a desire to learn about cellular agriculture, motivated by the benefits of cultivated meat and the opportunity to access innovative knowledge. Interest was particularly strong among those in agrarian sciences, who saw this area as a promising career entry. Among participants, 305 (79.8%) had heard of cultivated meat, 290 (75.9%) expressed interest in trying it, and 141 (36.9%) believed that consuming it would have an impact on their personal lives. Notably, 43 (18.9%) participants expressed a willingness to adopt a diet in which cultivated meat would be the only type of meat consumed. This study highlights the growing interest in cellular agriculture among professionals and undergraduate students, including their perceptions of innovation and potential benefits of cultivated meat. It indicates a demand for a deeper understanding and new job opportunities in the field.

Keywords: Cellular animal science. Education. Opinion. Learning.

1. Introduction

Concerns about the ethics and environmental consequences of conventional animal production have driven the expansion of research into alternative proteins (AP) (Godfray et al., 2018). The output of AP is particularly praised for its greater environmental sustainability (Poore and Nemecek, 2018) and benefits for animals (Socol et al., 2024). Alternative proteins (AP) encompass food products developed as analogs or actual cell-based animal products, which do not rely on traditional systems of raising and slaughtering animals to produce meat, eggs, milk, and their processed derivatives (GFI, 2022). They are made using various methods, which can be broadly categorized into three main types: (1) plant-based products, (2) precision fermentation products, and (3) cultivated products (Socol et al., 2024). Cultivated meat, produced by cultivating animal cells under controlled conditions (Post et al., 2020), offers a significant reduction in environmental impact, with 78-96% less greenhouse gas (GHG) emissions, 99% less land use, and 82-96% less water consumption (Tuomisto & Mattos, 2011). However, the environmental impact of cultivated meat production also depends on factors such as bioreactor energy consumption, for which the benefits to conventional production systems are less clear, as well as the ingredients required to produce culture media for the cells (Tuomisto & Rynänen, 2024). Additionally, the technological challenges within such new production are substantial, encompassing cell selection, medium optimization, and the end consumers' acceptance (Post et al., 2020). There are also social, economic, regulatory, and institutional hurdles (Stephens et al., 2018; van der Weele et al., 2019; Nobre, 2022).

Despite the existing challenges, there is a growing belief that AP production methods will eventually become mainstream. In Tubb and Seba's (2020) words, we are witnessing a second domestication, the domestication of microorganisms and animal cells to produce food, unlocking exponentially higher productivity potential. The plant-based meat market in Brazil has experienced rapid growth, surpassing R\$1 billion in retail sales in 2023, according to The Good Food Institute Brazil (GFI). This follows a 42% revenue increase in 2022, when the sector generated R\$821 million. The growth is driven by shifting consumer habits focused on health, sustainability, and reduced consumption of animal products. The entry of major food companies has also boosted the sector by expanding product availability and accessibility. The plant-based meat industry is set to more than double in value by 2030, according to Plant-based News (2025). In 2024, the industry's value was US\$9.57 billion, according to Globe Newswire (2025). By 2030, it is expected to be worth \$21.81 billion, with a compound annual growth rate (CAGR) of 14.72%. This growth will be driven by increased investment in the sector, product innovation, demand for clean-label foods, and growing environmental concerns.

Moraes-da-Silva et al. (2022) reported that the introduction of AP products in Brazil requires planning to maximize the benefits and mitigate the disadvantages for the country's development since Brazil is the largest exporter and the second largest producer of meat in the world (Economic Research Service, 2021), mainly in the poultry and pork markets. Within such planning, investment in the training and development of people seems essential to create new employment opportunities (Heidemann et al., 2020; Moraes-da-Silva et al., 2022). Supporting education and dialogue among universities is crucial for people to access knowledge and new job opportunities within AP production chains, as cellular agriculture has vast potential to promote various socioeconomic goals (Socol et al., 2024; Mugabe et al., 2024). Cellular agriculture may enable production and access to proteins in diverse locations and

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Would you be interested in learning about cellular agriculture?



73.6% Yes



201 professionals

89.5% Yes

Professionals of Agricultural Sciences

48.0% Yes

Other Professionals



186 undergraduate students

92.0% Yes

Students of Agricultural Sciences

62.5% Yes

Other Students



387 responses



78.8% Had ever heard of cultivated meat



75.9% Would try cultivated meat



18.9% Were willing to exclusively consume cultivated meat