

Popularization and dissemination of biotechnology in Brazil

Short Communication

According to the United Nations Convention on Biological Diversity, biotechnology is defined as “the use of living organisms and systems to develop, produce, or modify products or processes”. Thus, biotechnology can be applied in different areas, from molecular biology to chemical engineering, influencing different sectors of the economy (including health, education, technology, food, education, the environment, agriculture, among others) and impacting all segments of society.¹

Despite the relevance of modern biotechnology, which has existed since the discovery of recombinant DNA (1970s), a large portion of the population remains unaware of its importance and its widespread presence in various products and services.²

Despite its vast territory, rich biodiversity, and large population—being the 5th largest country in area, 7th most populous, and the most biodiverse—Brazil still lags behind global biotechnology leaders like the United States, China, and several European countries. While these nations benefit from strong R&D ecosystems, well-established biotech industries, and substantial investments, Brazil’s biotechnology sector remains underdeveloped. For instance, the U.S. held 39% of global biotech patents in 2020, followed by the EU (18%) and China (10%), whereas Brazil falls within the residual 33% shared by the rest of the world. The U.S. also had about 3,000 active biotech companies in 2022, compared to Brazil’s estimated 190 in 2017 and around 350 today, according to Endeavor. Venture capital investment highlights this disparity: global biotech startups attracted \$35 billion between 2019 and 2021, while Brazil received only \$32 million since 2015, according to McKinsey. Although Brazil leads Latin America in the Global Innovation Index (GII), ranking 49th out of 132 countries of the world, it still struggles to convert its scientific potential into a robust biotech industry.^{3–7}

Limited public awareness about biotechnology may further limit Brazil’s expansion in the Biotechnology field, highlighting the crucial role of scientific communication and outreach in fostering the country’s development. Different strategies can be adopted to popularize and disseminate biotechnology. In Brazil, the power of digital platforms and the Internet is widely explored for this purpose. Numerous initiatives—including science communicators profiles, websites of educational and research institutions, and independent projects—help disseminate biotechnology through the use of accessible language to ensure that biotechnological advances reach the public clearly and efficiently. Compared to traditional or in-person approaches, digital platforms offer significant advantages: they eliminate the need for physical infrastructure, are less expensive, and enable a rapid and widespread outreach across different social classes and age groups.^{8,9} These advantages make digital platforms the most relevant means of popularizing biotechnology in Brazil.

In this context, Profissão Biotec (which translates to ‘Biotech Profession’ in English) stands out for its relevance in advancing

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biotechnology in Brazil. Profissão Biotec is an independent project created in 2016, a scientific dissemination platform formed by volunteers (students or professionals in the biotechnology field) and considered the main Brazilian network for the dissemination of biotechnology. Profissão Biotec website (profissaobiotech.com.br) usually has 30,000 visits per month. Profissão Biotec has a digital scientific dissemination magazine with more than 800 articles on biotechnology topics, published in the local language (Portuguese), with high-quality information, robust references that combat fake news and pseudoscience, in order to disseminate scientific content in a language that is more accessible to young and/or non-specialized audiences.¹⁰

In addition to its digital magazine and dedicated website, Profissão Biotec is present on various social media platforms (Instagram, LinkedIn, X, Facebook, YouTube, TikTok), allowing for greater engagement and interaction with its audience - which totals more than 60,000 followers across all networks. It also shares weekly job opportunities in the biotechnology field in Brazil, promotes innovations and entrepreneurship by Brazilian companies and scientists, and organizes online events on careers in biotechnology. Additionally, it has published in 2021 the Biotec Map, a free interactive platform that listed over 500 Brazilian biotechnology companies, including multinationals, as well as companies and startups of Brazilian origin. All these initiatives help foster and strengthen biotechnology as a profession and career option in a country traditionally focused on agriculture and commodity exports.^{10,11}

The impact of Profissão Biotec in promoting and disseminating biotechnology in Brazil is evident through several key indicators. First, its materials have been published in school-provided textbooks and suggested as readings for school assignments. Rio de Janeiro city included Profissão Biotec’s articles in their science textbooks for 2 consecutive years.¹² Second, high school students frequently reach out to Profissão Biotec expressing interest in pursuing a biotechnology degree after engaging with its content. Third, major national and multinational biotechnology companies operating in Brazil recognize Profissão Biotec as a reference, supporting its projects and utilizing its platforms to promote their biotechnology initiatives in the country. Finally, the platform’s relevance was further highlighted during the

COVID-19 pandemic, when articles on the topic reached a peak of 100,000 views.¹⁰

In addition to Profissão Biotec, there are independent science communication initiatives in Brazil—often driven by individuals and primarily using social media platforms like YouTube, Instagram, Facebook, X, and TikTok. Examples include NuncaVi! Cientista and popular science communicators such as Pirula, Atila Iamarino, and Mellanie Fontes-Dutra. There are also institutional networks focused on strengthening biotechnology in the country, such as the Rede SulBiotec, the Rede Nordeste de Biotecnologia (RENORBIO) and the Associação Nacional de Empresas de Biotecnologia e Ciências da Vida (ANBIOTEC Brasil). These networks foster innovation by connecting companies, startups, and universities to share resources, technical expertise, and infrastructure, and to promote biotechnology developed in Brazil. Additionally, some public universities run outreach projects to engage the public with biotechnological research and encourage entrepreneurship in biotech products and services.^{8,10,13}

As highlighted earlier, the most impactful biotechnology popularization initiatives in Brazil are those with high engagement on digital platforms, reaching a broad and diverse audience. These digital strategies have proven to be an effective approach to science communication and could be adopted by other countries alongside institutional initiatives to further promote biotechnology outreach. However, it is important to recognize the limitations of relying solely on digital tools. A significant portion of the Brazilian population may not have reliable internet access or may be excluded by platform algorithms, limiting their exposure to this content. Despite these challenges, such initiatives play a crucial role in strengthening biotechnology and contributing to its progress by expanding innovation networks, disseminating technological knowledge, and promoting biotechnological products and services that are essential to society.

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Conflict of interest

Authors declare that there is no conflict of interest.

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