Journal of Biotechnology & Biomaterials

Mini Review Open Access

Biotech for Animals Latin American Microalgal Biorefinery Technology Market Trends & Opportunities

David Henry*

Department of Biotechnology, University of Brasilia, Brazil

Abstract

The background of biotechnology and its different specialty fields is assessed from a bibliometrics perspective, in a developing country within the Latin American region; Venezuela. As methodology we adopted a specialty coding by colors, a technique referred to as 'rainbow' proposed by DaSilva in 2004. The study was limited to publications from Venezuelan institutions in the period comprised within 1970 and 2010. The documentary information was retrieved from a database built for studies of this kind, referred to as Biblios. This database consolidates most bibliographic references related to Venezuelan publications spread among major international and domestic databases. Strengths shown by this database include, among others, the fact that each entry has been assigned the relevant code as set by the UNESCO nomenclature for fields of science and technology. By correlating the rainbow coding against the UNESCO coding we have been able to evidence that although biotechnology represents a third of national capacities in sciences and technology, current Venezuelan capacities only include 5 of the 15 colors in rainbow.

Keywords: Biomaterials; Biomimicry; Nanomedicine; Nanotechnology ature; Tissue engineering

Introduction

Biotechnology penetration in multiple productive activities is generating a significant impact on new areas of exchange at scientific, technological, productive and social levels. Thus, influencing minimum knowledge thresholds, technical and productive facilities, intellectual property rights, activities developed in "downstream" production activities, and on the control of complementary assets, which generate new areas of exchange favoring creation for potential markets, making it feasible to yield additional profits. So, building capacities and infrastructure for biotechnology is seen as a key factor for economic development in the 21st century, as it provides an opportunity for converting biodiversity into an economic and social factor through the appreciation, sustainable use, and preservation thereof.

Discussion

Biotechnology is understood, in its broadest concept, as "technologies which support is provided by living beings". By such definition, human beings have been biotechnologists, as of the Neolithic Revolution times (about 10 thousand years ago) up to this date. By then, they started to domesticate plants and animals becoming farmers and cattle-breeders; selecting specimens showing those features deemed as more interesting; performing empiric hybridization practices, and learning about genetic improvement of species. Human beings did also discover and developed fermentations; with bacteria and yeasts. In such sense, and for purposes of this study, the definition from the Organization for Economic Cooperation and Development (OECD) shall be used as the conceptual framework of reference. This definition describes biotechnology as the "application of science and technology to living organisms as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services. In Latin America, biotechnology had a vigorous start, by the 70's in the last century. In the late 80's, biotechnological materials and byproducts were used in pharmaceutical industries in Brazil (Biobras), Argentina (BioSidus), Cuba (human Interferon) and Chile (Bios). By 2014, from the 28 countries producing agricultural materials resulting from biotechnological designs, 11 were Latin American countries. Brazil stood out when ranked as the second country in the world, with 42.2 million hectares, while Argentina ranked as third with 24.3 million hectares. In such sense, the highest density of biotechnology driving factors can be found in Brazil and Argentina, where public policies fostered in science, technology, and innovation fields are coherent and permanent over time, and focused on encouraging staff-training and skill-building, as well as on promoting innovation and technological transfer processes and bio-prospecting. In Venezuela, biotechnology started at the agricultural industry, by adapting plant tissue culture techniques, specifically by cloning cells from plant tissues and organs. This technique has a deep theoretical basis and had a significant impact on agricultural research by the early second half of the last century with its contribution to the improvement of harvesting plants. In Venezuela, the pioneering work on tissue culture was published in the Agro journal by researchers from the School of Agronomics of the Central University of Venezuela (UCV) in 1958, and addressed the embryo culture as phytotechnology aid [1-4].

Those researches were consolidated in the country as of the 70's, when Venezuelan professionals began to return from universities abroad, upon graduating from specialty courses in this field. As of that date and up to the present, approximately 90 centers have been created in universities and public entities. Historically, the Venezuelan Government has mainly been the sole supporter for Science, Technology and Innovation activities (S + T + I) in the country. As for biotechnology, the government hires 78.4% professionals in this field and provides funding for 95% biotechnology programs and projects. The Venezuelan biotechnological sector has gone through several stages, differing by funding issues, nature of the relevant

***Corresponding author:** David Henry, Department of Biotechnology, University of Brasilia, Brazil, E-mail: david.henry@gmail.com

Received: 03-July-2023, Manuscript No. jbtbm-23-113075; **Editor assigned:** 05-July-2023, PreQC No. jbtbm-23-113075(PQ); **Reviewed:** 19-July-2023, QC No. jbtbm-23-113075; **Revised:** 24-July-2023, Manuscript No: jbtbm-23-113075(R); **Published:** 31-July-2023, DOI: 10.4172/2155-952X.1000339

Citation: Henry D (2023) Biotech for Animals Latin American Microalgal Biorefinery Technology Market Trends & Opportunities. J Biotechnol Biomater, 13: 339.

research programs and projects, and the National Biotechnology Commissions created. Such commissions -formed in 1982, 1984, and 1996- were intended to advise the government in office on scientific and technological policies related to the biotechnology sector, particularly in the agriculture, industrial, biomedicine, oil and environmental fields. Even though never deemed as a national priority, the life of such commissions has always been quite short and with a secondary influence on public policies. In 1982, the National Council for Scientific and Technological Research (Consejo Nacional de Investigaciones Científicas y Tecnológicas2 - CONICIT) set an Ad–Hoc Commission for the "Study of Biotechnology and Alternatives for its Development in Venezuela". This group identified several initiatives for defining national programs related to biotechnology, which would be accompanied by the creation of the relevant advising commission. Here we must point out that one of the recommendations issued was to create a National Biotechnology System. The National Commission for Genetic Engineering and Biotechnology (CNIGB) was created in 1984, which deemed as important those remarks and suggestions made by the commission in 1982. By this time, priority areas for research and development were proposed, including: agriculture, biomedicine and industry; also considering creating a system intended to enable the confluence of universities and research institutes and industries based on biotechnological processes, in a harmonic and articulated manner. In 1989 a global development strategy was initiated in Venezuela, based on the guidelines set by the VII National Plan as fundamental axis. A main goal for this plan was to develop competitiveness for the international sphere. This is how CONICIT concreted the design, organization and promotion for the New Technologies Program focused on activating, mobilizing, and modernizing the National Scientific and Technological Sector [5-7].

Such Program would be carried out with funding from the Inter-American Development Bank (IDB), which gave rise to the first Framing Agreement executed in 1992. Biotechnology was deemed one of the priority areas identified among cutting edge technologies. Other areas under consideration were informatics, electronics, fine chemistry and new materials. The program did also include fostering talent development and strengthening research and development laboratories and centers. However, even though some results were attained, such were just incipient, as the country failed to have a consolidated National Science, Technology and Innovation System (SNCTI) where those public policies and scientific and technological guidelines that the country needed for fully exploiting such results could be designed. In 1996, the National Biotechnology Commission was created, as advising body for assisting the President of the Republic. The main goal thereof was to plan and formulate policies intended to promote a national strategy for developing biotechnology in the country, as well as the opportunities offered by it, and the scientific, technological, and productive capacities needed to favor biotechnology development and exploitation. The new Commission set, as its goal, to "Have influence on the economic and social development of Venezuela, through the effective use of biotechnologies in projects of public and private interest, within the Health, Nutrition, Agriculture, Environment and Oil fields". For such purpose, studies on assessments in such sub-fields as biomedicine, oil and petrochemical were undertaken, as well as on how to protect intellectual property with patents. In addition, a "Program for Strategic Associations" was designed, providing that each association should include a researcher and a businessman, and that their fundamental goal should be to raise the technological level of the company and the research institute involved in the project, so as to ensure results were transferred within the short term. This commission's activities ended by 1999, failing to concrete the goals set. In parallel, an "Agenda Program" had been proposed within the CONICIT (3), intended to generate answers for specific demands from society through research and development. By mid-1998, 226 projects had been set in thirteen Agendas, which co-financing agent was the same CONICIT. Such "Agendas" addressed specific topics, such as oil, education, cocoa, biodiversity, agro-environment, health and rice, among others. Some agendas included projects related to biotechnology. Results from those agendas failed to be satisfactory. One weakness identified was the lack of theme networks, which had negatively impacted their development, as well as their applicability, ownership and the transfer of knowledge and technologies that could arise from the various projects. As of 1999, the Government started negotiations to carry out a second IDB-FONACIT program, summing up to 200 million US$, thereby considering potentials for performing the Special Biotechnology Project summing up to approximately 20 million US$. The Special Biotechnology Project would be intended to promote, encourage, and implement biotechnological processes and products developed in the country, generate scientific-technological capacities in Venezuela, share and cooperate at inter-institutional levels, and spread, disseminate and make use of biotechnology in the I + D + I filed for cooperating with agricultural producers, communities, and agro-industry and food companies. In 2004 the modus operandi for the IDB-FONACIT II Program and the fundable items were proposed. Such items were selected by considering a descriptive study of the agricultural behavior within 1992 and 2002, as well as the relevant trend analysis, where consultations made to professionals, specialists and producers from the agro-biotechnological sector were implemented, also allotting an importance level to each item as per such criteria as production, job generation, social base, consumption, biotechnological capacities and potentials [8-10].

Conclusion

This is how items comprised in the Vegetal biotechnology were selected, including rice, corn, beans, potato and cassava; as well as items in the animal one, including bovine (meat and milk), porcine, ovine and caprine species, poultry and aquiculture, and other items, based on the transversal axes, as resulting from strategic studies, bio-informatics analysis, among others, as prospective studies relevant for the future of this specialty field on Venezuela. The IDB-FONACIT II Program was completed in 2008. In spite of the investment, the technical-administrative structure having relevant information for the decision making process was not kept, thus failing to provide any continuity to the program for its consolidation, and therefore resulting in the impossibility to concrete the National Biotechnology Network, as originally foreseen. Likewise, no ex post follow-up was made on projects, or the Program as a whole, thus hindering to gain any actual knowledge about long term results.

Acknowledgment

None

Conflict of Interest

None

References

1. Zhe W, Jiawei C, Fan Z, Xinbo Z, Xinai T, et al. (2023) Combining phthalimide innate of a positive-charge nanofiltration membrane for high selectivity and rejection for bivalent cations. Water Sci Technol 87: 2944-2955.
2. Bikash RT, Rajarshi B, Brajesh KD, Sunil KM, Satinder KB, et al. (2023) Life Cycle Assessment of Microbial 2,3-Butanediol Production from Brewer's Spent Grain Modeled on Pinch Technology. ACS Sustain Chem Eng 11: 8271-8280.
3. Leonie VS, Joeri AJW, Koen S, Doris H, Roeland MHM (2023) Deformability

and collision-induced reorientation enhance cell topotaxis in dense microenvironments. Biophys J 3495: 369-372.

4. Santiago TB, Bettina B, Falk H, Miriam AR (2023) Microbial electrosynthesis with Clostridium ljungdahlii benefits from hydrogen electron mediation and permits a greater variety of products. Green Chem 25: 4375-4386.

5. Joanna KH, Maria M, Sisi C, Pamela JL, Munro P, et al. (2023) Moderate Consumption of Freeze-dried Blueberry Powder Increased Net Bone Calcium Retention Compared with No Treatment in Healthy Postmenopausal Women: A Randomized Crossover Trial1,2. Am J Clin Nutr 9165: 65961-65964.

6. Kun N, Xin YQ, Hong WC, Xin YY, Hai YZ , et al. (2023) Investigation of the enhancement for Echinocandin B fermentation with methyl oleate from transcription level. Bioprocess Biosyst Eng 46: 1045-1052.

7. Pooja N, Nishant P, Jyoti , Tripti M, Vivek A, et al. (2023) Isolation of Food Grade Dye from Flower Petals of Butea monosperma and Determination of Marker Compounds for Its Quantitative Analysis. ACS Omega 8: 17740-17747.

8. Negin N, Mansour S, Zohreh H, Maryam Y, Arash MT, et al. (2023) Biocatalytic synthesis of oxadiazole thioethers and evaluation of their antitumor activity. Org Biomol Chem 21: 4846-4853.

9. Yuanyuan Y, Jinzhi W, Xiaofan D, Hongzhu J, Aobing D, et al. (2023) Cation Co-Intercalation with Anions: The Origin of Low Capacities of Graphite Cathodes in Multivalent Electrolytes. J Am Chem Soc 145: 12093-12104.

10. Ming Q, Zhongpeng Z, Dianyu W, Zhe X, Weining M, et al. (2023) Large-Scale Metal-Organic Framework Nanoparticle Monolayers with Controlled Orientation for Selective Transport of Rare-Earth Elements. J Am Chem Soc 145: 12275-12283.