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Development and Innovation on Dental Products in Argentina: A Technological Prospecting Based on Patents

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Abstract:

Background: Argentina has progressed with industrialization in comparison to other Latin American countries and this process had a direct impact on the innovative capacity of the national economy. A constantly search for market leadership, including Dentistry field and dental materials, stimulates the industries to launch daily new products. Inventions related to health researches are mostly protected by patents as intellectual property. A patent landscape analysis through searches in patent banks is a tool used to identify trends in different areas of innovations. **Objective**: Identify and evaluate the scenario of research, development and innovation of dental products in Argentina by a technological prospecting based on patents. **Method**: A survey of patent documents was conducted by searching for deposited and granted patents of dental products. The searches were carried out during January 2020 in the patent database of the National Institute of Industrial Property of Argentina (INPI-AR). The terms "dentistry", "buccal", "dental" and "oral" were used to select in the titles and abstracts of patent application reports. The information extracted from patent reports was organized in tables and graphs using GraphPad Prism 6 software to evaluate the applications. **Results**: A total of 363 patents were published from 1989 to 2016, mainly by international industries, 93.3 % as Patent Invention and 3.0 % as a Utility Model applications on Dentistry. Only two patents (0.5 %) were deposited by universities, as University of Melbourne (Patent number 20060102378) and Universidad Nacional del Nordeste (Patent number 20140104149) which only the last one is national. Among the deposits only 6.6 % were granted, the most was in force, denied or lost. According to the specialties, most patents were related to compositions (64.7 %) and personal products (21.7 %), also on Dentistry/Cariology (6.33 %) and Prostheses/Implants (4.68 %). **Conclusion**: In general, we find that the most patent applications are related to the preventive area, personal products and compositions for formulations. Few dental patents deposits are currently available in Argentina, suggesting that the importation of products into the area remains large, which can make dental products more expensive. It is important to invest in technology-based companies to promote increased economic activity, being a consequence of investment in knowledge creation and intellectual property to the Dentistry area.

Keywords: Dentistry, Patents, Intellectual Property, Innovation, Patent Indicators, Dental products.

1. INTRODUCTION

In Latin America, countries' underdevelopment is attributed to problems with their industrialization process, where it is based on import substitution. This process has resulted in the establishment of fragile sectoral production structures and a heterogeneous mix of industrial companies. Argentina, although it has industrial structures marked by such fragility and heterogeneity, has progressed with industrialization in comparison to other Latin American countries. It is known that this late and incomplete industrialization process had a direct impact on the innovative capacity of the Argentina economy [1].

The import substitution model lasted about 40 years, until the current development pattern still under development with a marked shifting towards a market-led path. Emerging international trends led Argentina to adopt a new, more flexible, proactive and participatory model of national science, technology and innovation policy, further boosted by the creation of the Ministry of Science, Technology and Productive Innovation (MINCYT) in 2007 [2]. In addition, the

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status of science, technology and innovation (STI) rose to the level of state policy in the country. The Inter-American Development Bank (IDB), since the middle of the last century, has been a strategic partner of Argentina in the development of STI with loans worth more than US $ 1 billion [3].

Argentina, also including other countries such as Brazil, Chile and Uruguay, are middle-income countries, by the definition of the World Bank, with active research systems that receive low to moderate levels of investment in R&D [4]. For Argentine science, publishing scientific articles on basic research and new discoveries is a necessary condition for the country to insert itself in another way in the globalized economy. Thus, with good investments, Argentine scientists can produce good publications, with some in high-level journals, so that they can be commented on, being an important part that has its economic effect for the country. Furthermore, science and technology can effectively contribute to the creation of work with quality, based on education and research, this can be observed in countries that sustain their economy precisely on the knowledge [5].

Investing in technological innovation, especially in industries, is essential to keep up with the market. Innovation is considered one of the main drivers of economic development and its part of Intellectual Property (IP). The IP is the area that seeks to protect the creations of the human mind, in accordance with the right to property, to give exclusive use to the market of intellectually created products [6].

Today, capitalism revolves around technology and innovation. When both, industries or research centers, develop products, they may be patented. The filing of a patent is done through an intellectual property bank and upon submission of the required documents and payment of fees, the inventor(s) and the product are protected for a period of time, which varies according to the law and rules of the country. A patent report must contain information about the new invention, justification that it presents novelty and evidence of a previous study carried out through research in other intellectual property banks worldwide [7]. For something to be patented it must have the following characteristics: worldwide innovation, novelty, technology and possibility of commercialization [8-10].

Intellectual property banks are institutions responsible for filing and granting patents. Each country has a responsible bank and legislation varies according to the nation. Intellectual property law is fundamental to the movement of the economy and the emergence and protection of new products and processes [11]. By filing and granting the patent, inventors will have the exclusive right to market the product for some time or even transfer the rights to an industry, a very common practice when the inventor does not have the technical and economic resources to market the product [10, 12].

Invention is not always something completely new, often innovative products are the result of modifications that result in a new product. This is common especially with regard to chemicals [13]. Because of this, there are two types of patents: patent invention (PI) and utility model (UM). PIs are suitable for completely new products, the latter for existing products but with some new technology. In Argentina the institution responsible for filing patents is the National Institute of Industrial Property (INPI), where the granting process can last up to 5 years, however the inventor is protected and the invention can be marketed from the filing date. Argentine law considers as a patent for invention a physical product and new methods for manufacturing products. This type of patent may also include chemical compounds and microorganisms, having a protection time of 20 years, without the right to renewal. UM in Argentina only protects products and has a 10 years protection time. Inventions, even when marketable, such as theories, aesthetic creations, new teaching methodologies, games, living substances already existing in nature, or any that harms the public order or life of living beings, cannot be patented [14].

Inventions from the field of health research are mostly protected by patents. Among the different areas, the technical-scientific advancement in Dentistry grows every day and the investment of multinational industries and institutions of research in the sector is huge [15-17]. A constantly search for market leadership, including Dentistry and dental materials, stimulates the industries to launch daily new products. Dental products for both personal and professional use may undergo constant changes in their shape and/or composition, or may be a stimulus for new sales in the market [17-19].

A patent landscape analysis through searches in patent banks is a tool used to identify trends in different areas of innovations. Despite the important source of information, patent analysis studies are not too used and known, especially in the academic world [10-11].

As well as scientific articles, patents are important indicators of science and technology, with several published articles on scientific production in different dental areas, however these data are scarce when it comes to patent analysis. Therefore, the objective of this study was to identify and evaluate deposited and granted patents of research, development and innovation on Dentistry and dental products at the National Institute of Industrial Property (INPI) in Argentina in order to assess the main materials and industrial production of the country.

2. MATERIALS AND METHOD

2.1 Elaboration of the Technological Prospecting Study

This is a prospective study of exploratory analysis performed in January 2020, including since the first patent deposit until the current time. The survey was conducted

through collection, treatment and analysis of extracted information from selected patent reports.

The searches were directed with access to patents deposited in the National Institute of Intellectual Property of Argentina (INPI-AR).

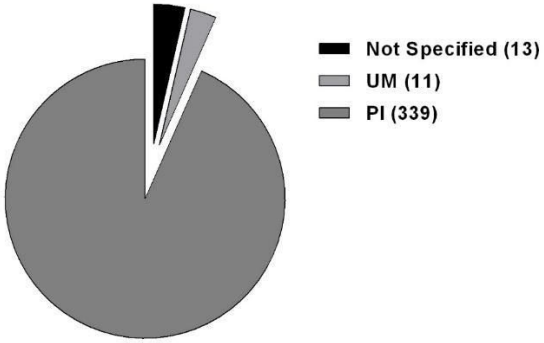
2.2 Search Strategy

For the preparation of the survey, we conducted a mapping of patent reports related to applications of dental products in the INPI-AR using the terms "dentistry", “buccal”, "dental" and “oral” in the search field with the exploratory reading of titles and abstracts, as an inclusion criteria of the patents found. The relevant information that describes the invention in the reports was selected and organized in graphics in GraphPad Prism 6 program for analysis of descriptive statistics.

The data extracted represent the types of patented products, types of applicants, the annual evolution of deposits, distribution of the number of patents by countries, the main application areas of the patents on dental application and the status of patents deposited in the bank.

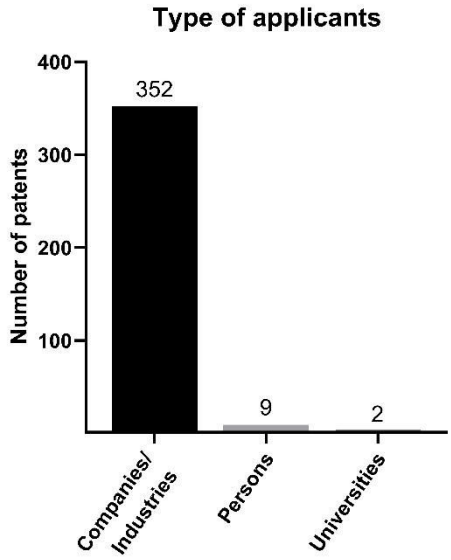
3. RESULTS

The search resulted in 363 patents found with the terms "dentistry", “buccal”, "dental" and “oral” in the INPI-AR, followed by the stage title and abstract read to selection patents directed to dental products applications from the first report deposited until the last one.



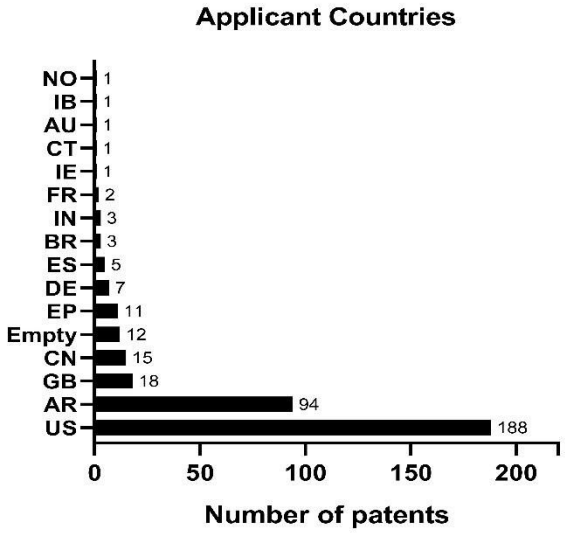
Graph 1. Types of patents filed related to Dentistry at the National Institute of Industrial Property, INPI-AR, 2019. PI: Patent Invention, UM: Utility Model.

According to Graph 1, the patents were divided by the type related to the application of the invention. The applications showed there was a predominance of PI with 339 (93.3 %) reports over UM with 11 (3.0 %) reports. In the search, some reports did not specify the patent type with a total of 13 (3.5 %) applications.



Graph 2. Applicants for Dentistry-related patents at the National Institute of Industrial Property, INPI-AR, 2019.

We organized the findings according to the type of patent applicant (Graph 2). The companies and industries were the applicants with highest number of patents deposits of dental products with predominance of 97.0 % of the reports and only two deposits are represented by universities equivalent to 0.5 % of the patents analyzed [19,20].



Graph 3. Origin of Dentist-related patent applicants found at the National Institute of Industrial Property, INPI-AR, 2019.

Graph 3 shows the origin of the applicant countries with a wide variety of countries and highlighting the United States

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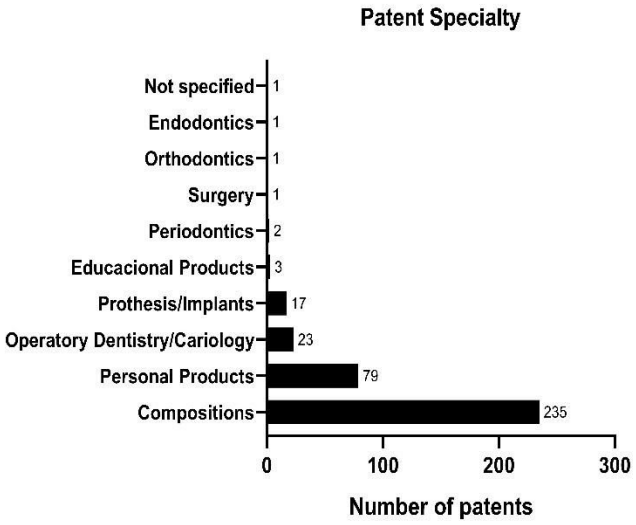
as the largest applicant with 188 (45.4 %) deposits, followed by Argentina with 94 (25.8 %) deposits.

Graph 4. Relationship between the amount of Dentistry-related patent registrations during the years, National Institute of Industrial Property, INPI-AR, 2019.

Graph 4 shows the patenting activity according to the number of patent registrations made per year, highlighting that deposits occurred mainly between 2003 and 2006. The last one was made in 2016 and no deposits were found between 2017 and 2019 [21].



Graph 5. Specialties related to Dentistry-related patents filed at the National Institute of Industrial Property, INPI-AR, 2019.

The main results are shown in graph 5 with the distribution of patents d according to their specialty with most patents related to compositions (64.7 %) and personal products (21.7 %), both for prevention purposes. Regarding the related specialties, Dentistry/Cariology (6.33 %) and Prostheses/implants (4.68 %) stood out.

Graph 6. Status of Dentistry-related patent applications at the National Institute of Industrial Property, INPI-AR, 2019.

Regarding the status of patent filings, 41 % was still under analysis and may already be sold, however without a registration number by the INPI-AR. Only 6.6 % were already granted, but some expired. In the analysis it can be observed that most of the patents had been lost, due to abandonment or some pending (Graph 6).

4. DISCUSSION

A total of 363 reports have been found, however few with concession. Most patents were not active for voluntary reasons, for failure to pay fees or for having expired.

The entrepreneurship of one nation can also be assessed by indicators of innovation and development. New technologies foster the economic and social development of the country, and there is a direct relationship between the countries that produce the most science and high development [22].

In 1971 an international classification system was created that classifies patents into codes, known as IPC - International Patent Classification, thus distributing products in technological areas from classes A to H, where each class has its subclasses and thus facilitates the searches [10,17,23]. Thus, possible investment in relationships that bring the university, industry and government closer together is fundamental for collaborative work and this is convenient for scientific research approximation [24]. In addition, patent of products, as well as scientific articles, are also one of the results of the researcher's career [24].

Dentistry is a field that currently receives large investments in innovation, which is a response to market demands for new products and technology. Although new product development is constantly increasing, it is modest compared to the number of scientific articles in the area [16,25]. In the present study it was observed that most of the deposits belonged to industries, as Colgate-Palmolive, Unilever and GSK, were mostly products of compositions for incorporation in formulations, such as rinses and toothpastes for example, and personal products such as floss and toothbrushes. In addition to these, some more innovative ones were also found, such as those that were compositions with whitening substances, prebiotic with amino acids and natural products [26-29].

Universities play a great role in both science and innovation in the countries, which consequently contributes to its social and technological development. The purpose of patents is not only financial, but also important to give prominence to scientific research, being also an indicator of production, as well as scientific articles [12,17,30,31]. In Mexico, for example, partnerships between small businesses and universities are common to realize technological innovations. In sectors of high technological intensity, the degree of interaction with academic institutions is much lower than that found in Brazil and Argentina [32]. In our findings in this study, the participation of universities on protection of intellectual property was not significant with only two patent deposits found by University of Melbourne and Universidad Nacional del Nordeste, which only the last one is national [19,20].

According to the applicant countries, there is a great interest from the United States (US) and the European Union in patenting in other countries. Initiatives to change the legislation of most Latin American countries have almost all US influence. This can be seen by noting that the US was the country with the most deposits in the reports analyzed (188). [13].

Currently, the legislation in Argentina makes it more difficult, as there are many bureaucratic aspects related to the national government which limits protection [13]. For example, Argentine companies cannot obtain software intellectual property rights under national law, so they need

to seek protection in other countries [32]. The number of patent applications rejected or lost, and the absence of filings found in the last two years of this study may be a reflection of the difficulties imposed by the legislation. The lack of financial resources can be another factor.

Multinational companies commonly perform deposits in countries other than of their origin in order to increase the protection and disclosure of their products which is normally done through the Patent Cooperation Treaty (PCT), known as the international patent. When depositing the invention in this way, the product is protected in all country members of the treaty [33]. In the case of Argentina, the country is not part of the PCT treaty, which directly influences the quantity and continuity of deposits as showed in this study. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) sets minimum standards for intellectual property rights and the member States should incorporate these standards into their legislation [34].

One study compared the relationship between low to high tech companies and universities in Argentina, Brazil and Mexico. In this study, Mexico stood out in relation to low technology companies, while Argentina and Brazil in relation to high technology companies. In this same study, Argentina was the country with the highest patenting index in high-tech sectors and Brazil in the medium-intensity ones [35].

Currently, the development of STI has a greater potential due to public planning strategies and concrete lines of action, according to the country's production needs, in which STI strengthens the production model, generating greater social inclusion, increasing and improving the competitiveness of the Argentine economy, making knowledge the support point for national development [2]. It is necessary to guide how national intellectual property rights laws could be better designed to benefit developing countries in the context of international agreements. In general, public researchers and academics in the countries of Latin American often face constraints in undertaking private sector activities and incentives to encourage patenting are weak [4]

Studies of patents are a recent trend and currently are being used to assist decision-making within a context of changes, especially with regard to the advances of technology and researches specially in industries and universities [10-11].

Probably there is a lack of incentive and/or technical advice to maintain the requests. Financial resources to pay the fees may have been one of the factors for the dropouts found. In addition, most products involved low and medium technology. The current context requires new challenges and investments in technology in Dentistry.

CONCLUSION

Records of patents are essential to evaluate the technological level of a given area. This study was the first one about this topic in Argentina. After the analysis of patents for dental purposes at INPI-AR, our findings showed that most are related to the preventive area, personal products and compositions for formulations. The United States is the country with the largest number of deposits with industries being the main patent holders, followed by Argentina.

Moreover, our data show that a few dental patent deposits are currently available in Argentina, suggesting that the importation of products into the area remains large which can make dental products more expensive. It is important to invest in technology-based companies to promote increased economic activity, being a consequence of investment in knowledge creation and intellectual property. just as the granting of patents on Dentistry also stimulates innovation on dental products market.

There should be an increase in collaborations between industries and universities, implementation of programs aimed at the formation of national research networks with other Latin American countries, as well as an interaction between the dental sectors and patent offices.

CURRENT & FUTURE DEVELOPMENTS

Dentistry in recent years has developed interest in the field of intellectual property such as patents due to extensive research in the universities and existing competition. Since it is a segment in constant development and innovation, great attention is required from manufacturers and industries so that they can remain competitive and meet the demands of the domestic and foreign markets for dental products.

The dental products market is under the influence of different elements, such as: external factors reflecting national economic trends according to cultural aspects and economic capacity; the amount of demand highlighted the evolution of dental pathologies and the development of new products and techniques; as well as the quality of supply of manufacturers related to research and development efforts. Such factors positively influence productivity and distribution system determining the quantity and quality of the products used, also the added value and greater economic value.

In Argentina, the IDB supports the MINCYT strategy to support sectoral funds for technological innovation. With these resources, the ministry seeks to create solutions through research and development for critical economic issues in various sectors such as agribusiness, energy, health, the environment and social development. In addition to the training of qualified and specialized human resources for scientific and technological research.

Argentine's internal research and development capacity is still low in its economy and serves to complement the external acquisition of knowledge for use in product innovation. When we observe that the integration of foreign trade has a positive effect on the propensity of companies for

innovation, this devalues the incentive in national research, where it could supply the acquisition of foreign technology.

However, it becomes necessary to direct more and more investments in research and development, mainly in universities and research entities, generating scientific knowledge and innovation environments. Investing in technological innovation, especially based on R&D, can increase economic development and the creation of new products, being decisive in the technological advancement of the dental sector in Argentina. These objectives are important to promote public interest in sectors of vital importance for their socioeconomic and technological development.

LIST OF ABBREVIATIONS

AR = Argentine

IDB = Inter-American Development Bank

INPI = National Institute of Industrial Property

IP = Intellectual Property

IPC = International Patent Classification

MINCYT = Ministry of Science, Technology and Productive Innovation

PCT = Patent Cooperation Treaty

PI = Patent Invention

STI = Science, Technology and Innovation

UM = Utility Model

US = United States

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

REFERENCES

[1] Gonçalvez E, Lemos MB, Negri J. Determinants of technological innovation in Argentina and Brazil. Cepal Review 2008; 94: 71-95.

[2] Lengyel M, Pesado MB. New Trends in Argentina's Science, Technology and Innovation Policy. Foresight Brief 2015; 254: 1-4.

[3] Inter-American Development Bank – IDB. The IDB and technological innovation in Argentina, 2011. Available at: https://www.iadb.org/en/news/webstories/2011-05-27/the-idb-and-technological-innovation-in-argentina%2C9393.html (Accessed on: Nov 12, 2020).

[4] Kay L, Shapira P. Developing nanotechnology in Latin America. J Nanoparticle Res 2009; 11: 259-78.

[5] Barañao L. ¿Hacia dónde va la ciencia Argentina? Medicina 2012; 72: 339-49.

[6] Lee EK, Ferreira LM, Horibe EK. Patents on hospital medical and dental equipment (EMHO). Question and answer tool. Acta Cir Bras 2019; 34.

[7] Oliveira MR de, Yanai AE, Moreira DS, de Souza CD, de Castro CEG. Internet of Things (IoT): Technological Indicators from Patent Analysis. Springer International Publishing 2018; 13-22.

[8] Ferreira AA, Guimarães ER, Contador JC. Patente como instrumento competitivo e como fonte de informação tecnológica. Gestão e Produção 2009; 16: 209-21.

[9] Lima JAA. Digressões sobre Propriedade Intelectual como agente de desenvolvimento, Inovação e Estratégia. Âmb Jur 2006; 14: 45-55.

[10] Furtado Jr JH, Valadas LAR, Mendonça KS, de Oliveira Filho RD, Gadelha LMU, Fiallos NM. Propolis and its Dental Applications: A Technological Prospection. Recent Pat Biotechnol 2018; 12: 288–96.

[11] Mueller SPM, Perucchi V. Universidades e a produção de patentes: tópicos de interesse para o estudioso da informação tecnológica. Perspect em Ciência da Informação 2014; 19: 15-36.

[12] Haase H, Araújo EC, Dias J. Inovações vistas pelas patentes: exigências frente às novas funções das universidades. Rev Bras de Inov 2005; 4: 12-22.

[13] Fundacion ISALUD. El mercado de medicamentos en la Argentina. 1st ed. Buenos Aires: Secretaría de Industria Comercio y Minería, 1999.

[14] Instituto Nacional de la Propriedad Industrial - INPI, 2019. Available at: http://www.inpi.gob.ar (Accessed on: Nov 11, 2020)

[15] Dalmarco G, Dewes MF, Zawislak PA, Padula AD. Universities' Intellectual Property: Path for Innovation or Patent Competition? J Technol Manag Innov 2011; 6: 159-69.

[16] Rosa WLO, Silva TM, Lima GS, Silva AF, Piva E. Fifty years of Brazilian Dental Materials Group: Scientific contributions of dental materials field evaluated by systematic review. J Appl Oral Sci 2016; 24: 299-307.

[17] Valadas LAR, Queiroz LR, Bandeira MAM, Filho RDO, Diógenes ÉSG, Fiallos ACM, et al. Analyses of deposited and Granted Patents at Federal University of Ceara in Brazil. Journal of Young Pharmacists 2017; 9: 307-10.

[18] Valadas LAR, de Oliveira-Filho RD, de Oliveira MBL, de Mello Fiallos AC, Lotif MAL, de França Fonteles MM, et al. Products of Dental Use Containing Copaiba Oil-resin: Technological Prospecting Based on Patents. Recent Pat Biotechnol 2020; 14: 33-40.

[19] Gabriela SA. Método para la mineralización de una superficie dental. AR057353A1, 2007.

[20] Alberto B. Dispositivo de fijación autoestática para odontologia. AR101916A1, 2017.

[21] Sandra T. Producto para cuidado oral y metodos de uso del mismo. AR070356A1, 2016.

[22] Silveira GS, Freitas LP, Campolina FC, Marques-Neto HT, Oliveira DD. A produção tecnológica na odontologia: o registro de patentes. HU Rev 2018; 44: 35-40.

[23] Machado BAS, Cruz LS, Nunes SB, Guez MAU, Padilha FF. Estudo prospectivo da própolis e tecnologias correlatadas sob o enfoque em documentos de patentes depositados no Brasil. Rev GEINTEC 2012; 2: 221-35.

[24] Siekierski P, Lima MC, Borini FM. Mobilidade acadêmica internacional e depósito de patentes no país de origem. Rev Adm Pub 2019; 53: 560-74.

[25] Paul LC. Cosmeceuticals and patents: the physician and dentist brands. Clin Dermatol 2009; 27: 507–12.

[26] Repossi E. Composiciones blanqueadoras para el cuidado oral. AR098922A1, 2016

[27] Roldan RM. Composiciones para el cuidado oral, prebioticas, que contienen aminoácidos. AR098960A1, 2016.

[28] Tchakirian S. Composiciones para el cuidado bucal que contienen un extracto de eucalyptus. AR052855A1, 2007.

[29] Domenichini P. Composiciones bucales que contienen extractos botânicos. AR068599A1, 2014.

[30] Cohen WM, Nelson RR, Walsh JP. Links and Impacts: The Influence of Public Research on Industrial R&D. Manag Sci 2002; 48: 1-23.

[31] Amadei JRP, Amadei AL, Torkomian V. As patentes nas universidades: análise dos depósitos das universidades públicas paulistas. Ciênc Inf 2009; 38: 9-18.

[32] Motta JJ, Zavaleta L, de los Ángeles MM. Innovación y mecanismos de apropiabilidad en la industria del software de Argentina. Pymes, Innov Desar 2014; 2: 100-20.

[33] John E, Prates RC. Influência dos custos transacionais sobre a inovação: um estudo multicaso de empresas industriais no Brasil. Manag Connec 2015; 4:120-43.

[34] Oliveira MA, Bermudez JAZ, Chaves GC, Velásquez G. Has the implementation of the TRIPS Agreement in Latin America and the Caribbean produced intellectual property legislation that favours public health? Bull World Health Organ. 2004; 82: 815–21.

[35] de Negri F, Laplane M. Fatores Locacionais e o Investimento Estrangeiro em P&D: evidências para o Brasil, Argentina e México. 1st ed. Rio de Janeiro: Instituto de Pesquisa Econômica Aplicada 2011.