

INTELLECTUAL PROPERTY OF SPIRIT IN BRAZIL BY PATENTING ACTIVITY

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Abstract—Spirits drinks are often consumed in Brazil being produced by the fermentation, distillation and maturation processes. The spirits made of sugar cane are the most consumed and produced in the country being cachaça recognized as the spirit from Brazil with its own characteristics. However, over the years fruit byproducts have been used to produce these beverages. The marketing growth of import and especially export of spirits in Brazil imposed a new set of technological innovation and quest for continuous quality improvement in this segment. This study aimed at evaluating the technological development trends of spirits in Brazil through data of patent deposits. The research was conducted using the software AcclaimIP ® trial version for data collection. The search was carried out with the word "spirit" having a filter with the database of the National Institute of Industrial Property (INPI). Given the results, there were a number of 44 patent applications associated with the word "spirit". Most of the documents refers to the main group C12G3 (Preparation of other alcoholic beverages), followed by C12H1 (Pasteurization, sterilization, preservation, purification, clarification, or ageing of alcoholic beverages). In addition, it was noted that independent inventors hold the majority of deposits with 70%, followed by universities and companies.

Keywords— Spirit, drinks, patents, technological forecasting.

I. INTRODUCTION

According to the Constitutional Decree from the Brazilian legislation Nº 6.871 from 2009, spirit is a drink that has an alcoholic graduation that ranges from 38% to 54% in volume, at 20 °C, and it is obtained by distillation of the fermented mash (Brazil, 2016). The spirit made of sugar cane is one of the drinks most consumed in Brazil and around the world. In accordance with the Brazilian Development Program of Cane Spirit, Caninha or Cachaça (PBDAC), the production of cane spirit is approximately 1.3 billion liters per year being 75% produced in an industrial way and 25% handcrafted. Only about 1% to 2% of the cachaça production is exported (2.5 billion liters) and the remaining is consumed by the Brazilian population. Among the countries that export the Brazilian spirit are German, Italy, Portugal, Paraguay and Uruguay

(SAKAI, 2016).

The Brazilian legislation regulates the standards of identity and control of spirits being cachaça the sugar cane spirit typical of Brazil. The production of sugar cane spirit is done by the extraction of the sugar cane juice and then submitted to fermentation and distillation processes. After these processes, it is necessary a maturation period that is usually done in tunnel of determined wood. Through this process, the sensorial profile is refined and the chemical quality is improved (BORTOLLETO e ALCARDE, 2013).

The quality standard required by the legislation has the objective to standardize the chemical composition of the drinks in order to protect the consumers' health. With that, the maximum and minimum limits of non-alcoholic volatile compounds, like the organic contaminants are established (BORTOLETTO e ALCARDE, 2015).

The use of agricultural residues, mainly fruits residues, from industrial activities have been used to produce spirits. These residues have a high potential due to its low cost, characteristic flavor and the content of sugar that are converted in ethanol during fermentation (SAMPAIO, *et al.*, 2013). The fruits spirits are obtained with the distillation of fruits fermented. It is necessary the process adaptation according to the raw material (ASQUIERI, *et al.*, 2009). New spirits have been developed with fruits residues, such as spirits made of skin and pulp of jabuticaba and a spirit produced with the residues of orange concentrated juice production (SAMPAIO, *et al.*, 2013).

Due to the lack of uniformity of the spirit process in Brazil, it is essential the development of technologies with the propose of improvement and controlling the quality and standard of this drink which is traditional and it has a economic importance in the country. With exportations, it is fundamental that exists the standardization and quality of the spirits and cachaça so that the international requirements are attended and the external public accepts the product. This fact results in acquiring new consumers markets besides maintaining the old buyers (MIRANDA, *et al.*, 2007).

The objective of the present study was to analyze the patenting activity associated to spirits in Brazil. So that, it was possible to evaluate and identify the trends related to the technological development in this area in the country. Moreover, with the searches, it was verified the patent deposits by the quantity, date and areas of interest.

II. METODOLOGY

It was conducted the analysis of the patent documents related to spirits using a software called AcclaimIP® (trial version) for data collection. The National Institute of Intellectual Property (INPI) of Brazil was chosen as the data base to only evaluate the deposited patents in Brazil. The search was done using the key-word “aguardente”.

To elaborate and analyze data, it was used the following indicators: The International Classification of Patents (ICP) to verify the areas of interest of the technological development, the quantity of patents deposited in Brazil until the present year and the relationship of the priority and publication year, besides evaluating the assignees and main inventors.

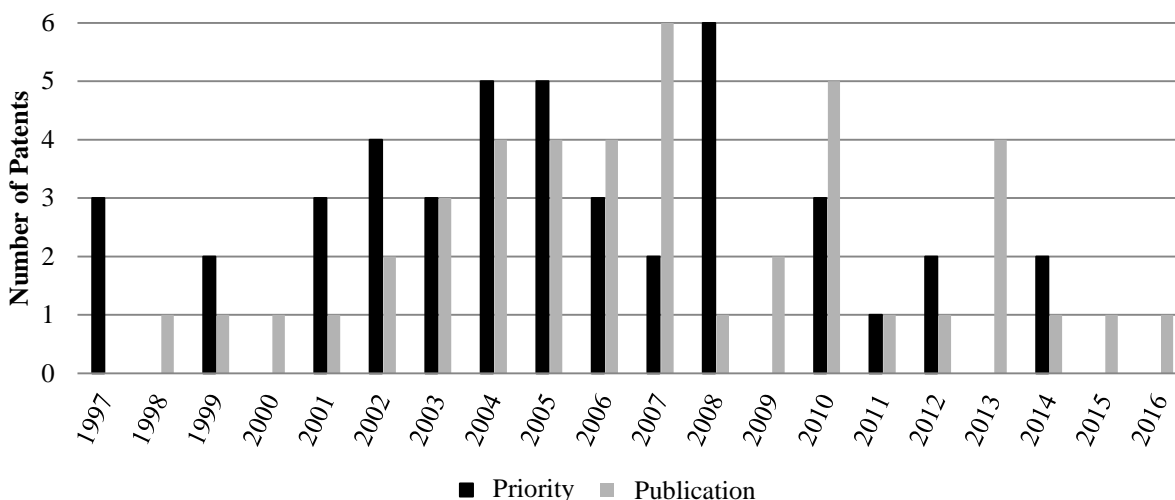
III. RESULTS AND DISCUSSION

The search associated with the key-word “aguardente” resulted in 44 registers of patents in Brazil. The first deposits of patents were done in 1997 and the latest in 2014, as it can be seen in Figure 1. It is noted that there were no patents deposits from 1998 to 2000, then in 2001 had an increase in the number of deposited patents until 2005, followed by a reduction of deposits. In 2008, there was the highest number of deposited patents associated with the word “aguardente”. There were no deposits in the latest two years.

It is observed that the first patent publication occurred in 1998, a year after the priority date. The first two published patents are related to the detection or reduction of copper in sugar cane spirits showing the beginning of pursuing the quality of spirits in Brazil. During the period from 2002 to 2007, the number of published patents increased being in accordance with number of deposited patents. The patents that were

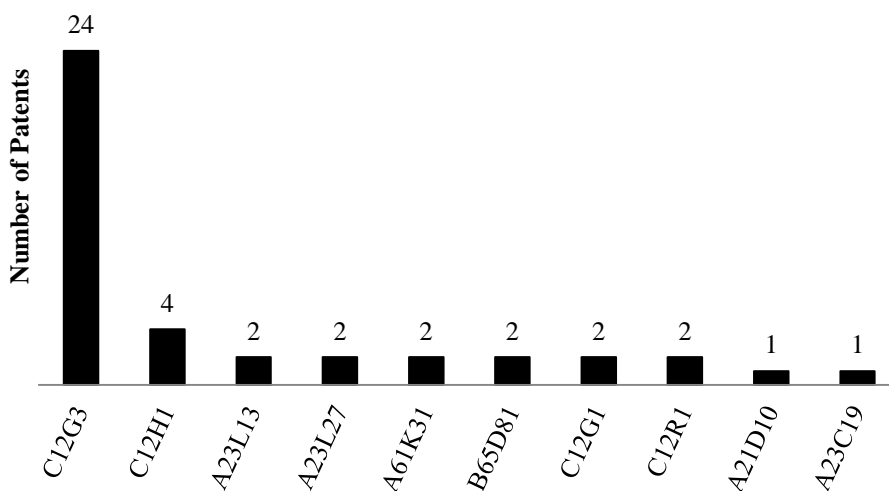
published in 2015 and 2016 relate the development of spirits using residues, such as banana residues and sweet potato.

Figure 1. Temporal evolution of the number of patents by priority and publication date.



As the Figure 2 illustrates, the major part of patents is part of the main group C12G3 with a total of 24 patents. This group is related to the production of alcoholic drinks indicating the development of new spirits. The group C12H1 obtained four deposits being related to processes that improve the quality of drink or promote its preservation. The other classes had a small number of patent deposits.

Figure 2. International Classification of Patents (ICP) of deposited patents associated with spirit.



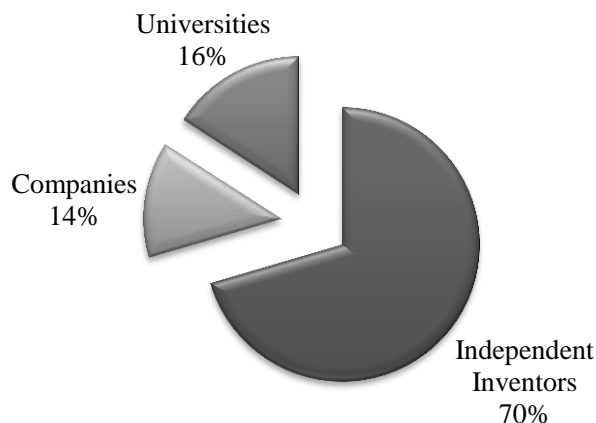
The analysis about the area of research and development of spirit in Brazil was conducted by the International Classification of Patents (ICP). The Table 1 shows the main groups of the patents studied. It is verified that the patent classifications range from production of foodstuffs and medicinal products to innovations related to packaging for storage and transportation. As expected, the majority of the patent classes is associated with the production of new kinds of spirits or new processes. Furthermore, it was noted some patents that bring methods for detection or reduction of undesirable substances in spirits.

TABLE I
MAIN CODES OF THE INTERNATIONAL CLASSIFICATION OF PATENTS ASSOCIATED WITH
“AGUARDENTE”

Code	Description
C12G3	Wine; other alcoholic beverages; preparation thereof > Preparation of other alcoholic beverages
C12H1	Pasteurization, sterilization, preservation, purification, clarification, ageing of alcoholic beverages or removal of alcohol therefrom > Pasteurization, sterilization, preservation, purification, clarification, or ageing of alcoholic beverages
A23L13	Foods, foodstuffs, or non-alcoholic beverages, not covered by subclasses A21D or A23B-A23J; their preparation or treatment, e.g. Cooking, modification of nutritive qualities, physical treatment; preservation of foods or foodstuffs, in general > Meat products; Meat meal; Preparation or treatment thereof.
A23L27	Foods, foodstuffs, or non-alcoholic beverages, not covered by subclasses A21D or A23B-A23J; their preparation or treatment, e.g. Cooking, modification of nutritive qualities, physical treatment; preservation of foods or foodstuffs, in general > Spices; Flavoring agents or condiments; Artificial sweetening agents; Table salts; Dietetic salt substitutes; Preparation or treatment thereof.
A61K31	Preparations for medical, dental, or toilet purposes > Medicinal preparations containing organic active ingredients
B65D81	Containers for storage or transport of articles or materials, e.g. Bags, barrels, bottles, boxes, cans, cartons, crates, drums, jars, tanks, hoppers, forwarding containers; accessories, closures, or fittings therefor; packaging elements; packages > Containers, packaging elements, or packages, for contents presenting particular transport or storage problems, or adapted to be used for non-packaging purposes after removal of contents
C12G1	Wine; other alcoholic beverages; preparation thereof > preparation of wine or sparkling wine
C12R1	Indexing scheme associated with subclasses C12C-C12Q, relating to micro-organisms > Micro-organisms
A21D10	Treatment, e.g. Preservation, of flour or dough for baking, e.g. By addition of materials; baking; bakery products; preservation thereof > Batters, dough or mixtures before baking
A23C19	Dairy products, e.g. Milk, butter, cheese; milk or cheese substitutes; making thereof > Cheese; cheese preparations; making thereof.

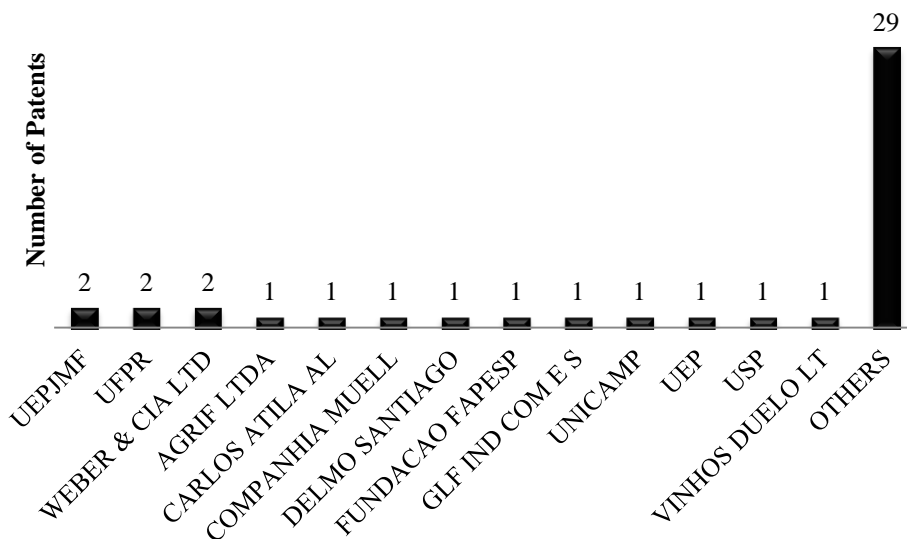
According to Figure 3, the independent inventors are the majority of the patent deposits associated with “aguardente” being 70% of the total. The universities have 16% of the patents, followed by the companies with 14% (Figure 3). This result shows that it is necessary more investments in technologies in universities in order to contribute to the development of new products and processes with the academic supports. Moreover, companies also could increase their portfolio of products or improve the efficiency of processes related to production of spirits. This would contribute to acquire new markets and, consequently increase theirs profits.

Figure 3. Types of patent assignees.



As it can be seen in Figure 3, the Júlio Mesquita Filho Paulista State University (UEPJM) and the Federal University of Paraná (UFPR) lead the number of patents with two deposits in each institution. These patents relate the processes to produce new spirits using byproducts from the fruit processing. The other assignees did one document deposit. It total was done 38 patent deposits related to spirits. In the Figure 4, “OTHERS” refers to other assignees that include universities, companies and independent inventors. Among the other universities are: State University of Campinas (UNICAMP), State University of São Paulo (UEP) and São Paulo University (USP).

Figure 4. Assignees of the deposited patents.



IV. CONCLUSION

The patent analysis associated with “aguardente” until the present year was fundamental to verify the trends of the technological development in this area. It was noted that there are 44 patents since 1997. The majority of the patents is about new products and processes to produce spirits and methods to detect contaminant substances in the drink. It reveals that Brazil is investing in research about this subject. This is really important because the country has a vast territorial extension with several raw materials that can be used to produce new spirits. Furthermore, it is important to keep developing techniques to improve the quality of Brazilian spirits because the country is one of the biggest consumers and exporters of spirits of the world.

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