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Patent rights and misappropriation of traditional knowledge: the case of the Amazonian *Mirantã*

By Marcos Vinício Chein Feres

This article aims to understand whether there are any signs of misappropriation enabled by the international patent system in the case of associated traditional knowledge to *Mirantã*, a plant (genetic resource - GR) found in the Amazon Basin. There is clear correspondence between the traditional uses of *Mirantã* and patent claims found, which are, or may at least hint at, evidence of the misappropriation of traditional knowledge. More generally, this confirms the perspective of the existence of a coloniality of knowledge as in many jurisdictions, due to the lack of measures to protect traditional knowledge against misappropriation (e.g., via a disclosure requirement in patent applications), these patents are for now deemed valid.

*Cet article vise à comprendre s'il existe des signes de détournement permis par le système international des brevets dans le cas des connaissances traditionnelles associées au *Mirantã*, une plante (ressource génétique - RG) présente dans le bassin de l'Amazonie. Il existe une correspondance évidente entre les utilisations traditionnelles du *Mirantã* et les revendications de brevet trouvées, qui sont, ou peuvent au moins suggérer, des preuves de l'appropriation illicite des connaissances traditionnelles. Plus généralement, cela confirme la perspective de l'existence d'une colonialité des connaissances, car dans de nombreuses juridictions, en raison de l'absence de mesures visant à protéger les connaissances traditionnelles contre l'appropriation illicite (par exemple, par le biais d'une obligation de divulgation dans les demandes de brevet), ces brevets sont pour l'instant considérés comme valides.*

*Este artículo pretende entender si existen indicios de apropiación indebida posibilitada por el sistema internacional de patentes en el caso de los conocimientos tradicionales asociados a *Mirantã*, una planta (recurso genético - RG) que se encuentra en la cuenca*

amazónica. Existe una clara correspondencia entre los usos tradicionales de *Mirantã* y las reivindicaciones de patentes encontradas, que son, o al menos pueden insinuar, pruebas de apropiación indebida de los conocimientos tradicionales. En términos más generales, esto confirma la perspectiva de la existencia de una colonialidad del conocimiento, ya que en muchas jurisdicciones, debido a la falta de medidas para proteger el conocimiento tradicional contra la apropiación indebida (por ejemplo, a través de un requisito de divulgación en las solicitudes de patentes), estas patentes son por ahora consideradas válidas.

1. Introduction

This article is part of a long-term research project which searches for empirical evidence regarding the misappropriation enabled by the patent system of traditional knowledge associated to natural genetic resources.[1] So as to continue elucidating whether there are signs of this sort of (mis)appropriation, the purpose here is to carry out a qualitative study on the case of a specific natural genetic resource from the Amazon region, known as *mirantã*. *Mirantã* is the name given to the *Ptychopetalum* plant species, belonging to the *Olacaceae* family, a tree native to the tropical forests of the Amazon Basin, especially in Brazil and French Guyana (Pinto, 2012). It is also known by other names and is used by Amazonian indigenous peoples as a “nerve tonic” (Elisabetsky, Figueiredo, and Oliveria, 1992). During a field trip to the Brazilian Amazonian city of Manaus, this was confirmed to us by an indigenous person descendent of the *Desana* people, Mr. Jayme Diakara, who was responsible for then taking us on a tour to the Ducke Reserve in the Amazon Forest.

[1] I have already published a specific article with some preliminary results, regarding the case of the *Kampô* frog, in which I try to point out indicators concerning the possible appropriation of traditional knowledge associated with a natural genetic resource: the biochemicals extracted from the secretion of the tree frog (Feres, 2022).

In this research, the World Intellectual Property Organization (WIPO)-administered *Patentscope* database was selected as the main source of information on the international patent system, as the platform receives filings referring to inventions from countries that are signatories to the Patent Cooperation Treaty (PCT), covering more than 150 offices around the globe (WIPO, 2023b).

Utilizing grounded theory as a method[2], this paper compares the patents which mention *mirantã* in various ways with the traditional uses by (and roles to) indigenous peoples and traditional communities of this specific plant variety. By searching the keyword “*Ptychopetalum*” in *Patentscope*, we found 9 (nine) patents, which actually directly refer to *Muirapuama* in their specifications. We discarded the results in which the word was used only as an example and equally the applications which were not granted patent rights protection in at least one country.

Concomitantly, data about the traditional use of the plant were coded from ethnographic reports and other academic articles which describe the various uses of *mirantã*. [3] Thus, this methodological tool permitted the organization of Table 1, which shows relevant information on the patents which were granted with *mirantã* as one of the main ingredients of the invention.

[2] The grounded theory is a methodological tool, which consists in this case of extracting from the empirical data (patent specifications and the traditional uses of *mirantã*) a theoretical hypothesis to confirm the appropriation of traditional knowledge associated with the natural genetic resource.

[3] This stage of the research represented the initial codification which, as Charmaz (2014) explains, seeks to find provisional data, and keep the researcher open to possibilities, with the objective of selecting the information which can really address the research question.

The most relevant data were categorized on the basis of the most frequent codes collected, leading to Table 2, which demonstrates and abstracts what the traditional uses are. In addition, the specifications, claims, and summaries of the patents were also read to pinpoint the announced purposes of each application. This enabled a later comparison between the purpose of selected patents and the specific traditional uses.

Finally, the conclusion argues that the final results showed correspondence with the use of traditional knowledge in some of the patents analyzed. Accordingly, adopting the theoretical approach suggested by Aníbal Quijano (2000), this can be understood as (or at least an indication of) misappropriation of traditional knowledge associated to the use of *mirantã*, which is enabled by the patent system.

2. The use of *Mirantã* by traditional peoples in the Amazon region

As noted in the Introduction, the term *mirantã* is used to refer to the tree, whose straight trunk is brown in color with few branches, with dark green leaves and green fruit (Pinto, 2012). It is also popularly known as *muira puama*, *mairantã*, *marapuã*, *miripuama*, *muirapama*, *muirantã*, *pau-homem* and *murapuama* (Pinto, 2012).

It is used by indigenous Amazonian peoples as a “nerve tonic” in a treatment to cure ailments related to depression, anxiety and psychomotor agitation (Elisabetsky, Figueiredo and Oliveria, 1992). This tonic consists of an alcoholic solution, in which *mirantã* bark and branches are mixed with cachaça (Brazilian sugarcane liquor) or wine and is used to treat what traditional Amazonian communities understand

as “nerve weakness”, in which the individual is affected by weakness, laziness, lack of interest, sexual impotence and tremors (Elisabetsky, Figueiredo and Oliveria, 1992). This tonic is mainly consumed by the elderly or convalescents from illnesses in general, specifically those who have an affected central nervous system, with strokes, concentration difficulties or lack of attention; it can also be beneficial for patients of different ages who have had long periods of physical or mental stress (Piato, 2009).

Mirantã is also sold in local markets, especially in the interior of the state of Pará and in the metropolitan region of its capital, Belém, in the stalls of local markets (Bitencourt, Lima and Barros, 2014). Another way of using such plant resource is by bathing oneself with fresh *mirantã* bark to treat paralysis (idem). In addition to the aforementioned functions, the families of *Ptychopetalum* are best known for their aphrodisiac properties, in particular *Apocynaceae*, *Convolvulaceae*, *Euphorbiaceae*, *Loganaceae*, *Malphigiaceae* and *Rubiaceae* (Piato, 2009).

The traditional use of *mirantã* has also been observed in Amazonian communities in decoction of the roots and branches of *mirantã* as a stimulant and antidiarrheal, as well as a neuromuscular tonic, for the treatment of ataxia, facial paralysis, sexual neurasthenia, circulatory and gastrointestinal asthenia (Pinto, 2012).

Therefore, the traditional knowledge associated with the use of *mirantã* has several functions, normally linked to aspects of the human nervous system, being used mainly in liquid form for ingestion or bathing, by both in urban and rural communities.

3. The international patent system

As also briefly mentioned above, the data collection from the international patent system carried out for this research used *Patentscope*. The PCT, in accordance with its objectives, is expected to: assist applicants in seeking potential international patent protection for their inventions, assist national patent offices with decisions to grant patents, and facilitate public access to a large amount of technical information concerning patents (WIPO, 2023b). In fact, the main advantage of the treaty, from the perspective of applicants, is that it facilitates the filing of a patent application in several countries at the same time and to later initiate the national phase of examination in the locations chosen by the applicant, although it does not create a global patent nor covers all jurisdictions.

When the search was initially carried out, in 2019, it was possible to find, approximately, 217 results which mentioned the keyword in patent applications from different countries.[4] In each of these results, *Patentscope* provides a variety of information, such as, official documents, patent specifications, grant dates, application numbers, drawings, etc. First of all, those inventions whose patents had not been granted were discarded. Secondly, among the discarded inventions, there were those which did not include the *mirantã* plant as the main resource in the patent claims. Finally, all the patents that utilized the *mirantã* only as an example, without actually integrating the plant in the claims, were also discarded. Thus, the

final result is a sample of 9 patents, as shown in Table 1. Importantly, because the *Patentscope* is not comprehensive nor gives a full account of all patents filed around the world (many may have simply not referred to *mirantã* explicitly but have based themselves on them), the present analysis only highlights the most visible patents, and many more may have been filed and granted.

To be considered a patentable invention, the claims in an application should sufficiently describe and comply with the patentability criteria of being (i) new vis-à-vis the state of the art, (ii) have inventive step (or non-obviousness) to a skilled person in this specific art (Spence 2007), and (iii) industrial applicability. Thus, by reading the claims, as well as the specification and the abstract of these nine granted patents, it is possible to verify whether *Ptychopetalum* is, in fact, part of the invention. The use of the *mirantã* plant is extracted from the description provided on the invention, which usually informs the state of the art before the patent, its purpose, how it works, whether it is a product or process, and its field of application, which could be the pharmaceutical or the cosmetic sectors, for example.

This information reveals why the product or process is protected and what influence *mirantã* may have on the claimed invention. Then, it is necessary to compare these data with the traditional uses of *mirantã* found depicted in the literature review.

[4] The platform is available on <https://patentscope.wipo.int/search/en/search.jsf>. The keyword *Ptychopetalum*, which consists of the name of the genus referring to the plant resource of *Mirantã*, was inserted for the purposes of this research.

Table 1 - Patents related to *Mirantã*

Title	Designated Country	Grant Date
<u>1. Composition Containing An Extract From Muirapuama Root And Plant Worm Extract</u>	US CN SG VN	15.02.2000 03.04.2002 21.09.1999 31.07.2000
<u>2. Use Of A Vegetable Extract Of The Family Of Compositae Or Asteraceae, Preferably Cichorium Intybus, To Tinge Cutaneous Tissue, Preferably To Color The Tissue To Increase The Bronzed Or Gilded Aspect Of The Cutaneous Tissue</u>	FR	22.08.2014
<u>3. Erectile Dysfunction Phyto-nutraceutical Synergistic Composition</u>	US	09.02.2010
<u>4. Slimming Agent Containing Plant Extract And Fat Lysis Agent And Cosmetic, Food, And Pharmaceutical Composition Containing The Same</u>	KR	12.12.2011
<u>5. Compositions And Methods For Promoting Weight Loss And Increasing Energy.</u>	US	12.02.2013
<u>6. Composición para elaborar chicles</u>	ES	24.06.2015
<u>7. Composition A Base De Plantes Medicinales Toniques Et Stimulantes Pour Le Traitement Des Dysfonctions Sexuelles Liees A La Baisse De La Libido</u>	MA	31.10.2016
<u>8. Uso de um produto de extrato de catuama</u>	BR	03.04.2018
<u>9. Processo de extração e identificação de marcador químico pov-2</u>	BR	25.09.2018

Source: Elaborated by the author (the title of the patent whose language was the one in accordance with the *Patentscope* information is hyperlinked to the WIPO's website)

4. The traditional use of *Mirantã* and patent rights: evidence of misappropriation

The core of this research is the comparison between the uses of *mirantã* by traditional peoples and the disclosed purposes in the patent applications that refer to the *Ptychopetalum* family in their applications (use of *mirantã* in the inventions). Table 2 is presented to facilitate the visualization of the main purposes of the traditional uses of *mirantã*, as described in published academic literature.

This analysis does not necessarily argue that there was misappropriation of traditional knowledge in each of the patent described in Table 1. Nevertheless, due to the similar functions identified and the patent's disclosed purposes, which are recurrent in some of them, it is possible to select some of the aforementioned patents and their written specifications so as to mark the indicators (traits of significance) that corroborate the fact that patents over the traditional knowledge were granted by different intellectual property rights agencies in various countries, as depicted in Table 1.

The first patent (HANAWA, KITAJIMA and TSUNODA, 1999), presented in Table 1, has as its major purpose the use of *mirantã* "to relief physical and mental fatigue, without any side effects, even if administered for a long period" – the written description and the claim of this patent confirm that it is indeed the case. Furthermore, the patent has only one claim on a composition that contains an organic solvent with extract from the roots of *muirapuama*. By observing the traditional uses identified from the literature review on *mirantã*, codified in Table 2, it is clear that there is an evident correspondence between the information in the claim in question and the use of *muirapuama* (another indigenous denomination for *mirantã*) by traditional Amazonian peoples as a "nerve tonic" (Piato, 2009), since one of its functions is exactly to relieve mental and physical stress. It is important to ponder that the inventors justify the novelty and the inventiveness of their application by mixing extracts from *mirantã* with plant worms, as depicted in their claim. In order to fulfill the legal requisites of inventiveness and novelty (Spence, 2007), this mixture ought not to be obvious to a skilled person in the field and must demonstrate some distinction in the final product from the prior art. In fact, however, this is a frivolous

Table 2 - The use of *Mirantã* by traditional communities

Paralysis (Bitencourt, Lima and Barros, 2014)
Anxiety (Elisabetsky, Figueiredo and Oliveria, 1992)
Psychomotor Agitation (Elisabetsky, Figueiredo and Oliveria, 1992)
Weakness (Elisabetsky, Figueiredo and Oliveria, 1992)
Tremors (Elisabetsky, Figueiredo and Oliveria, 1992)
Sexual Impotence (Siqueira <i>et al.</i> , 1998); (Elisabetsky, Figueiredo and Oliveria, 1992)
Strokes (Piato, 2009)
Difficulty in Concentration (Piato, 2009)
Physical and Mental Stress (Piato, 2009) (Pinto, 2012)

patent application seeking exclusivity for a routine mixing which, as shown above, involves (or perhaps even replicates) the traditional use of *mirantã* widely disseminated among indigenous peoples in the Amazon. From a broader perspective, this shows the mismatch between the idea of innovation from a legal perspective (i.e., to simply comply with the legal requirements of a patent application), and what can be deemed as social innovation (the idea of incorporating the traditional knowledge in the state of the art) (Howaldt *et al.*, 2019; Banerjee, Santos and Hulgård, 2021).

The third invention (Olalde Rangel, 2010) and the seventh invention (EL ISMAILI, EL IDRISSE and LALA MERIEM, 2016), both shown in Table 1, mention *muirapuama* as one of the compounds in the formulae of their inventions. It is true that there are other components that may have facilitated the approval of the application and the granting of the patent. The mixing of different plants might give the idea of a nonobvious invention in a jurisdiction with lax patentability criteria. However, even in those cases, some of the plants in both compounds have been used as a treatment for sexual disfunctions by traditional peoples all over the world (for example, *maca*, *ginseng*, etc.), constituting clear prior art. In the case of *mirantã*, there is a confirmed traditional use as a cure for sexual impotence, not only as widely stated by literature review (Siqueira *et al.*, 1998), but also as orally explained by Jayme Diakara during the aforementioned field trip to the Amazon Forest.

The fifth patent (Doherty *et al.*, 2013) in Table 1, known as “compositions and methods for promoting weight loss and increasing energy” is described on the *Patentscope* as an invention that “relates to novel methods and compositions comprising chlorogenic acids for promoting weight loss, for the treatment of obesity, managing weight gain, or maintenance of normal body weight and for increasing energy of an individual participating in a weight loss regimen”(Doherty *et al.*, 2013). Most of the components of the formulae, presented in the claims as well as in the specification, refer to diverse natural products, which may be related to various types of traditional knowledge (as *yacon*, *maca*, etc.). There may be some level of technical contribution in the application, but not necessarily to meet the inventive step required to grant a patent. This is particularly true as most of the components themselves have long been used by traditional peoples all over the Global South. This patent happens to claim an obvious solution to a problem which already has a remedy in traditional peoples’ medicine, that is, the increase of energy levels (Elisabetsky, Figueiredo and Oliveria, 1992; Siqueira *et al.*, 1998).

5. Final remarks

Colonialism, as described by Quijano (2000), is a multi-faceted concept and long-lasting practice, which may be intentionally inconspicuous. This paper is part of the construction of a theory that expresses the correlation between codes from the *Patentscope* database and the ethnobotanic literature review (which actually describes traditional knowledge). This is significant as such entanglement can be interpreted as an iteration of colonialism.

A huge effort must be made in order to unveil the subtle practices under the auspices of legal orders which may purposefully organize the system so as to facilitate the appropriation of traditional knowledge associated with certain natural genetic resources, such as, but not exclusively, *mirantã*.

In the case of *mirantã*, the patenting of different inventions whose components are natural genetic resources endemic of the Global South, as well as whose use and functions are widely disseminated among traditional peoples in the Amazon region, are part of a global standard of assigning industrial property rights which is still a reproduction of well-established colonial behavior.

Consequently, it is evident that patent applicants can, without effective free, prior and informed consent from traditional peoples, easily claim traditional knowledge associated with natural genetic resources. In fact, this conclusion highlights the importance of having a binding international agreement on the protection of genetic resources, traditional knowledge associated and folklore (WIPO, 2023a).

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Author: Marcos Vinício Chein Feres is Full Professor at the Faculty of Law and Professor of the Graduate Program in Law and Innovation at UFJF, Brazil. Visiting Professor of the Graduate Program in Law at UERJ. Master and PhD in Economic Law from UFMG. CNPq Level 2 Productivity Researcher. Orcid: <https://orcid.org/0000-0001-5045-3436>.

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For more information, please contact Anna Bernardo of the South Centre: Email abernardo@southcentre.int, or telephone +41 22 791 8050.

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