https://doi.org/10.22370/pe.2022.13.3444

Exploring the reasons behind the Belgian prohibition of the commercialization of the plant Artemisia annua.

Explorando razones detrás de la prohibición belga de la comercialización de la planta Artemisia annua.

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Abstract
This paper explores the prohibition of the commercialization of the plant Artemisia annua for fighting malaria through three political ecology concepts. Firstly, from the perspective of epistemic coloniality, the power/knowledge dimension is highlighted as key to understand how the scientific knowledge produced in the West renders invisible whatever is outside that canon (among which the Artemisia annua tea infusion). Secondly, using a technocratic lens, I identify a techno-elite composed by companies and individuals which intensively promote the standard drugs (ACTs) at the expense of the traditional tea infusion, and that for profitability reasons. Finally, through the logic of commodification of nature, I argue that the Artemisia annua tea infusion struggles to reach scientific validity because it is not (yet) profitable enough to acquire that status.
Keywords: epistemic coloniality, technocracy, commodification of nature, traditional Chinese medicine, Artemisia annua. JEL: F54, I18, K32, P16

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Resumen

Este artículo explora la prohibición de la comercialización de la planta Artemisia annua para combatir la malaria a través de tres conceptos de la ecología política. En primera instancia, desde la perspectiva de la colonialidad epistémica, la dimensión poder/conocimiento es relevada como clave para comprehender cómo el conocimiento científico producido en Occidente invisibiliza cualquier conocimiento que se encuentre fuera de ese canon (entre los cuales se ubica la infusión de té proveniente de la Artemisia annua). En segundo lugar, usando el lente de la tecnocracia, se identifica una tecno-elite compuesta por compañías e individuos que promueven intensamente los medicamentos estándar (ACTs) en detrimento de la infusión de té tradicional, y esto meramente por razones de rentabilidad económica. Finalmente, a través de la lógica de mercantilización de la naturaleza, se argumenta que la infusión de té Artemisia annua no logra conseguir validez científica toda vez que (aún) no es suficientemente rentable para adquirir ese status.

Palabras clave: colonialidad epistémica, tecnocracia, mercantilización de la naturaleza, medicina tradicional China, Artemisia annua.

1. Introduction

The knowledge-producing domains are multiple and together condition our understanding of nature. But how complete is that understanding when, as philosopher Ludwig Wittgenstein quotes, "the limits of my language are the limits of my world" (Castree, 2005, p.xviii). Knowledge is always a matter of perspective and thus functions as a filter, focusing attention and validity on some claims while casting out some others. Thus, to the question 'what is nature?', it is my limited conventional understanding of nature that is on display. And even then, are they mine or are they mediated for us? And who mediates that experience of nature? Castree (2005) argues that it comes down to a high-stakes contest in which various knowledge systems seek to be heard on their views of nature.

The knowledge systems covered in this paper are traditional knowledge in relation to Western science[1], in the realm of medicine more specifically. Western scientific knowledge is referred to as "knowledge that relies on the established laws through the application of a scientific method to the phenomena. Its method begins with an observation and is followed by a prediction or hypothesis that has to be tested" (Gumbo, 2017, n.d.). Regarding the domain of medicine, this is the dominant system in the developed world (Abbott, 2014). Traditional medicine (TM), instead, is defined by the World Health Organization (WHO hereafter) as:

"the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement, or treatment of physical and mental illness" (Abbott, 2014, p.3).

While the former is knowledge based on a scientific method, the latter adopts a more intuitive and holistic approach. Both are distinct in their features, but appeal to the same category of knowledge systems, which is what this paper puts forward.

Among the traditional medicine systems figures traditional Chinese medicine (TCM hereafter) and the case of the Artemisia

annua tea infusion is a TCM that wants to be heard in the fight for eradicating malaria. However, it has not been given much consideration. Instead, it is the artemisinin combination therapies (ACTs hereafter) -deriving from the millenia-old plant Artemisia *annua* as well- that is the most common conventional treatment for malaria today. Moreover, Belgium has prohibited the manufacturing and the commercialization of the Artemisia *annua* plant since 1997[2], declaring it as a "dangerous plant", and the WHO does not recommend the consumption of the Artemisia *annua* tea infusion (Gruessner *et al.*, 2019). However, it has recently proven to be therapeutically effective against malaria (Weathers *et al.*, 2014 ; Gruessner *et al.*, 2019). Indeed, its success stories highlight the merit and the promising future ahead of the Artemisia *annua* tea infusion as a global alternative against malaria. Illustratively, among these stories there are the Artemisia *annua* tea trials (Weathers *et al.*, 2014), a recent case report stating that Artemisia *annua* dried leaf tablets saved patients resistant to ACT (Daddy *et al.*, 2017) and two double-blinded tea trials conducted in 2015 (Gruessner *et al.*, 2019). In the fight for eradicating malaria, however, the traditional knowledge of the Artemisia *annua* tea infusion struggles to be recognized by Western science as an effective treatment. Consequently, it encounters barriers when attempting to make its way into scientific validity and the market economy. One can say this position has been taken following the precautionary principle, referring to how a certain treatment cannot be recommended for use "before having enough strong evidence about their effectiveness and safety" (Hausse, 2019, p.23). But there is also a growing debate that highlights other reasons why Artemisia *annua* tea infusion struggles to reach scientific validity.

This paper analyzes the case of the Belgian prohibition of the commercialization of Artemisia *annua* through the lens of three political ecology concepts. Firstly, with the epistemic coloniality perspective, I aim to assert the power/knowledge dichotomies between Western and traditional science. Secondly, through the technocratic lens, I examine who is behind such a prohibition, and argue for the

existence of a techno-elite deciding unilaterally about the future of health. Finally, through the angle of the commodification of nature, I contend that Artemisia *annua* has not seen its commodification potential blossom (yet) for the simple reason that it is not profitable enough to be considered in the market economy.

2. Epistemic coloniality

Through epistemic coloniality, it is the power/knowledge dimension of coloniality that is approached when considering the Artemisia case. To acknowledge this dimension of coloniality, De Sousa Santos (2012) argues for the construction of an Epistemology of the South, in which new processes for producing and valorizing valid knowledges -scientific or nonscientific- would be retrieved, and new relations built among these different types of knowledge. The two premises on which De Sousa Santos' (2012) Epistemology of the South is grounded are the following: Firstly, "the understanding of the world is much broader than the western understanding of the world" (p.51) and secondly, "the diversity of the world is infinite" (p.51). These premises encompass an immensity of alternatives that unfortunately are not (enough) identified by the academic world in the global North. However, an alternative thinking of alternatives is needed. To construct epistemologies of the South, De Sousa Santos (2012) acknowledges the ''sociology of absences", depicting how a certain knowledge -e.g., the non-pharmaceutical Artemisia form of tea infusion- is actually actively produced as non-existent or "as an unbelievable alternative to what exists" (p. 52). This logic of non-existence can be explained by a monoculture of knowledge, consisting in turning Western science as the sole determinant of truth and aesthetic quality, respectively. Conversely, all that is not recognized by this canon of knowledge production is simply declared non-existent (De Sousa Santos, 2012). This section identifies traditional antimalarial knowledge as a victim of monoculture of knowledge.

Acknowledging the existence of traditional medicine in itself is one thing but acknowledging its existence as a knowledge system is another. Through this monoculture, the rule of Western scientific

knowledge is erasing other forms of knowledge systems. In that sense, discourses "constructing certain understandings of what science 'is' and what science 'does'" (Ideland, 2018, p. 784) are still very much alive. By simultaneously casting out what deviates from these geographical places and their inhabitants, the other parts of the world, by default, are presented as underdeveloped and lacking scientific rationality and modernity (Ideland, 2018). Everything cannot be said, but it is crucial to find out what stories are missing as those ones do tell a story as well (Ideland, 2018). More interestingly, analyzing why those stories are missing or who actually writes the existing stories might reinforce this argument, as it is often the stories of the more marginalized groups that are left untold, or are told from a hegemonic perspective (Ideland, 2018).

Artemisia *annua* has been within the traditional Chinese ethnopharmacopeia for 2000 years as its tea treated fever successfully (Weathers *et al.*, 2014). More recently, during the Vietnam War, the therapeutic efficacy of the tea for treating malaria came under the spotlight. However, it is not the Artemisia *annua* tea infusion that eventually conquered the market but rather the ACTs. This thanks to an agreement WHO signed with ACT producers in 2001 in which it was agreed ACTs would be introduced as a requirement and displayed as a front-line treatment in all countries strongly affected by malaria (Lutgen, 2015). Personally, it is still unclear as to why -with the undeniable fact that the infusion worked wonders against malaria back in the Vietnam War- the story of the Artemisia *annua* tea infusion was left untold. When consulting the more conventional channels of information, the plant in its non-pharmaceutical form is considered too "dangerous", "potentially toxic" and "likely to cause serious damage to the health of consumers" (Arrêté Royal, 1997). Moreover, as mentioned above, the WHO does not, in the name of the precautionary principle, recommend the non-pharmaceutical form of tea infusion and wants to see "extensive fundamental and clinical research" (Gruessner *et al.*, 2019, p. 1522) before considering the tea infusion as a global alternative for eradicating malaria (Crutzen, 2017).

The results of the Artemisia tea infusions have not only shown to be effective to treat malaria, but even shown to be more effective than the standard drugs (ACTs), sometimes even more benign than some types of ACTs (Gruessner *et al.*, 2019). Moreover, it is a cheap and accessible herb that, unlike other antimalarials, has never undergone the phenomena of resistance[3] (Lutgen, 2015). As we can see, when searching beyond the discourse of Artemisia as a "dangerous plant", the dissonant voices are numerous[4], claiming the wonders of Artemisia tea, displaying scientific evidence (Daddy *et al.*, 2017 ; Gruessner *et al.*, 2019 ; Weathers *et al.*, 2014) and promoting the cultivation and use of the plant worldwide. Drawing on this evidence, health organizations and institutions in Belgium and beyond are invited to reconsider their position on Artemisia's use and commercialization.

Summarizing, the (untold) story of the Artemisia *annua* tea infusion illustrates an "unequal distribution of power - the power to determine whose knowledge counts and for what purpose -" (Jasanoff, 2016, p.100). Thus, if we consider how the monoculture of knowledge operates, the precautionary principle might simply be an excuse used to avoid exploring further this alternative in the fight for eradicating malaria. Depicted as something for which not much knowledge is gathered yet, this lack of understanding on the Artemisia *annua* tea infusion struck deep chords of anxiety within a society that is dependent on knowledge as the basis for any decisive action (Jasanoff, 2016). In the name of the precautionary principle, such unknowns can be more easily outcasted from scientific agendas, but the question is to whom is it unknown? It might be unknown by some due to a lack of perspectives. In fact, history points towards those in positions of power that would ignore, or reject as unfounded or lacking scientific validity, claims deviating from the conventional frameworks of thought (Jasanoff, 2016). Unlike the ACTs as the standard drug for eradicating malaria, the Artemisia *annua* tea infusion has not been given such attention, confirming the theory around the monoculture of knowledge. This case underlines how every single narrative sheds light on some (wanted) aspects and casts

(unwanted) others into darkness. The next section further explores why some narratives are told, or untold, by identifying who might be behind them.

3. Technocracy

ACTs is strongly recommended because of the existing evidence with regards to their effectiveness and safety. The Artemisia infusion, instead, lies beyond -if even considered as a scientific knowledge- the limits of scientific inquiry. But how come ACTs have entered that realm and the Artemisia infusion has not? Through a technocratic lens, an attempt is made to answer this question.

A technocratic approach recognizes that "technological inventions are managed and controlled by human actors, but presumes that only those with specialist knowledge and skills can rise to the task" (Jasanoff, 2016, p. 19). Besides the federal political power declaring Artemisia *annua* as a "dangerous plant unsuitable for human consumption" (Arrêté royal, 1997, art. 2), from a broader perspective, a World Health Organization's statement is clearly against it as well (WHO, 2012). Although WHO only gives recommendations, its Member States -including close to all countries worldwide- work in collaboration with such organism (Ingabire, 2021), thus support from the WHO is crucial. Notwithstanding the effectiveness of the traditional tea has been proven several times since the WHO's statement, its position has still not been reconsidered since then. The question remains as to why that would be. When analyzing the political relations behind the scenes, I argue for the presence of a techno-elite, representing only certain interests, and putting together policies, or administrative bureaucracies. This hinders the expansion of the Artemisia tea infusion for treating malaria while effectively promoting the more profitable standard drugs.

The business runs as follows: the WHO establishes administrative costs of a certain percentage (3%) for every sale of a certain pharmaceutical treatment. Moreover, until very recently, it established a situation of monopoly with a producing laboratory granting an exclusive qualification in the market for fixed doses of

ACTs (Lutgen, 2015). This sort of collusion between the WHO and the pharmaceutical industry calls to reconsider the global health body's neutrality. Indeed, the voices of experts might well be influenced by conflicts of interest, hindering such a body to have the necessary independence to consider alternative solutions against malaria. Arguably, it looks like the WHO is the promoter and intermediary between the pharmaceutical industries and the developing countries (Lutgen, 2015) rather than the neutral organization putting as a priority the health of people, regardless whether with conventional or traditional medicine.

Therefore, public policies in the hands of a techno-elite arrive to contradictory results. The WHO could help in setting up extensive fundamental and clinical research in order to better explore these recent results in favor of the Artemisia *annua* tea infusion as treatment for eradicating malaria (Gruessner *et al.*, 2019). But instead, it is not recommended and, in the name of the precautionary principle, simply argues for more scientific evidence to be gathered without actually financing such clinical research (Ingabire, 2021). All of this happening while it continues to support pharmaceutical companies and promote the conventional ACT drug in various developing countries.

4. Commodification of nature

This section reflects on why Artemisia infusions would not be considered as knowledge that counts. In our capitalist societies, a commodity entering the market with its price tag appears perfectly obvious. In fact, nature-as-commodity has existed since the pioneering stage of capitalism (Peluso, 2012). A commodity can be defined as something that is useful and can be turned to commercial advantage, and when analyzing the market economies we inhabit, virtually everything is a commodity (Watts, 2013). Commodification refers to "the process by which more and more of the material, cultural, political, biological and spiritual world is rendered as something for sale" (Watts, 2013, p.393).

The therapeutic efficacy of artemisinin -active component

from the plant Artemisia *annua-* was discovered in 1972 thanks to the professor Tu YouYou, expert in TCM. In 2015, Tu Youyou was awarded the Nobel Prize in Physiology or Medicine for those antimalarial discoveries (Czechowski, 2020). It is one of the few substances from TCM that found a way to enter Western medicine (WHO, 2012). If we apply the same logic -i.e. usefulness, scientific evidence- the tea infusion would perfectly fit in that logic of commodification, even so when it is said to have appealingly promising results against malaria. Moreover, the cost for Artemisia *annua* production is six times less expensive than the cost of ACTs (CHU, 2018), while Ginsburg & Deharo (2011) confirm that the road to antimalarial development, with such natural compounds, "could be shortened considerably, since it is much easier to approve the use of extracts than that of their active ingredients" (p.4). But despite all these appealing and conclusive points of attention, the Artemisia *annua* tea infusion has not been recognized by the WHO as an antimalarial drug to be researched.

Considering the latter, it is hard to explain why a natural element -a crude extract of a plant, not even an active component like artemisinin- have not undergone the logic of commodification? Arguably, the answer to this question lies in the fact that the "business" of the pharmaceutical companies is under threat when such a simple, accessible, and cheap alternative is suggested for the antimalarial market. ACTs, although unaffordable for most of the malaria patients (Weathers *et al.*, 2014), entered the market in the countries affected by malaria thanks to the increased financial support by the Global Fund (GFATM) (Ingabire, 2021). Consequently, with the introduction of the Artemisia *annua* tea infusion, pharmaceutical companies would lose an important amount of 'market share' as their client population would drop with the reduction in the amount of sick people (Ingabire, 2021). This argument can be reinforced with the comments of an ex-director of the WHO, German Velasquez, in the documentary "Malaria Business" (Crutzen, 2017), revealing what I would call programmed obsolescence applied to human health. He states: "For the last twenty years or so, the pharmaceutical

industry has been producing drugs to treat diseases, but not to cure, perhaps because it is much more profitable to have a patient who is a customer" (Crutzen, 2017). In the words of Phillips & Rozworski (2019): "it is the long-term therapy -not cures- that drives interest in drug development" (p.6).

Indeed, "capitalist firms are primarily interested in the exchange value of the commodities they produce rather than their use value" (Castree, 2005, p.159), so if something is useful but not profitable, it will not be produced (Phillips & Rozworski, 2019). From this analysis, and when comparing to other treatments, it can be assumed that the plant Artemisia, at least for its tea infusions, is not circulating in the market because there is no (enough) profit behind it. When analyzing its role within the logic of commodification, it could be argued that as long as that plant cannot be profitable enough for pharmaceutical companies and health organizations (WHO), it will (consciously) be given a hard time to reach scientific validity.

5. Conclusion

Although Belgium has displayed the Artemisia *annua* as a "dangerous plant", studies have shown that the tea infusions from that plant, as an alternative towards eradicating malaria, deserves more attention. With regards to the power/knowledge dimension of coloniality, there is an evident monoculture of knowledge in which the spread of Western scientific knowledge is erasing other forms of knowledge systems, among which the Artemisia *annua* tea infusion within traditional medicine. From the perspective of technocracy, the promotion of more profitable standard drugs in fighting malaria and the hinder for such a traditional knowledge to blossom, questions the presence of a techno-elite as the locomotive of the health system. Following up on the previous concept, within the logic of commodification of nature, it could be argued that because the Artemisia *annua* tea infusion would not be profitable enough, it is given a hard time to reach scientific validity.

All in all, it can be concluded that more attention should be

given to this traditional knowledge, and the power dynamics behind it, realizing that the prohibition of the commercialization of the Artemisia *annua* plant is more than purely a question of precautionary principle. In the fight for eradicating malaria, the pharmaceutical companies promoting conventional drugs rather than the, equally deserving, Artemisia *annua* tea infusion, means basically putting business on top of public health.

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Notas

[1] Various adjectives exist to describe this medicinal system of knowledge (conventional, allopathic, modern, mainstream, orthodox, biomedicine, etc.). For the purpose of this paper, western science/medicine is used.

[2] Arrêté royal relatif à la fabrication et au commerce de denrées alimentaires composées ou contenant des plantes ou préparations de plantes, 1997.

[3] Referring to the ability to withstand something (e.g. a bacteria resistant to a treatment).

[4] See for instance the work done by la Maison de l'Artemisia https://maison-artemisia.org/, or the Belgian NGO IDAY https://iday.org/

Recepción: 11 de abril 2022
Aceptación: 23 septiembre 2022
Versión Final: 27 septiembre 2022