The Madagascar Protocol (Artemisia annua) & Ivermectin for the Treatment of COVID-19: It is not a Miracle, it is Plain Science

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Abstract. African countries such as Madagascar, Senegal, Burkina Faso, Liberia, and Tanzania are showing death per million rates caused by COVID-19 lower than the rest of the countries in the world. This has been called the "African Miracle". If other countries do what they are doing in Africa, would the pandemic be reduced? This study is an attempt to present another window of opportunity in the search for the solution of the COVID-19 pandemic. It is worth it to do some comparative research and benchmarking studies. If the hypotheses discussed here are right, then, deaths could potentially be reduced significantly or completely stopped. There is a high probability that it is a matter of science and not a miracle! This study attempts to discuss basic data based on a logical analysis.

Keywords. COVID-19, Coronavirus, Ivermectin, Madagascar Protocol, Africa, Artemisia annua.

INTRODUCTION

The Who (2020) assures that there are no medicines that have been shown to prevent or cure the disease. They have claimed that WHO is helping to accelerate research and development efforts with a range or partners. However, The WHO excluded Ivermectin from its cosponsored Solidarity Trial for COVID-19 treatments, a global effort to find an effective treatment for COVID-19.

The Pan American Health Organization (PAHO, 2020) is the specialized international health agency for the Americas. It works with countries throughout the region to improve and protect people's health. PAHO wears two institutional hats: it is the specialized health agency of the Inter-American System and serves as Regional Office for the Americas of the World Health Organization (WHO), the specialized health agency of the United Nations.

On June 22, 2020, PAHO published a two pages public letter that concluded: 1. Ivermectin is incorrectly being used for the treatment of COVID-19, without any scientific evidence of its efficacy and safety for

the treatment of this disease. 2. In accordance with the Organization's position on use of medicines without scientific evidence of their benefit for COVID-19 (10), PAHO advises against using Ivermectin for any purposes other than for those for which use is authorized.

On the other hand, as an example of the benefits of Ivermectin, and there are many examples and scientific evidence already published and made public in different communication networks. A group of senior doctors with vast clinical experience met on 19th July'20 under the aegis of Academy of Advanced Medical Education (Bombay, India). The panel looked at Ivermectin, one of the old molecules and evaluated it's use in COVID 19 (Novel Coronavirus Disease 2019) management. After critical panel discussion, all the attending doctors came to a conclusion that Ivermectin can be a potential molecule for prophylaxis and treatment of people infected with Coronavirus, owing to its anti-viral properties coupled with effective cost, availability and good tolerability and safety (Vora, Arora, and Behera, 2020).

Additionally, TrialSite (2020) recently communicated that the president of one of Dominican Republic's largest private health systems (Rescue Group), Dr. José Natalio Redondo, reported that at least 6,000 COVID-19 positive patients have been treated with excellent results with Ivermectin.

African countries such as Madagascar, Senegal, Burkina Faso, Liberia, and Tanzania are showing death per million rates caused by COVID-19 lower than the rest of the countries in the world. This has been called the "African Miracle". If other countries do what they are doing in Africa, would the pandemic be reduced? This study is an attempt to present another window of opportunity in the search for the solution of the COVID-19 pandemic. It is worth it to do some comparative research and benchmarking studies. If the hypotheses discussed here are right, then, deaths could potentially be reduced significantly or completely stopped. Probably, it is a matter of science and not a miracle! This study attempts to discuss data based on a logical analysis.

THE PARALLELISM BETWEEN MALARIA AND COVID-19

The worldwide spread of the COVID-19 pandemic has prompted clinical testing of existing drugs with indicated activity against the SARS-CoV-2 virus. Among antimalarial drugs and treatments of such potential are Ivermectin and Artemisia annua. Others including chloroquine (CQ), hydroxychloroquine (HCQ), azithromycin (AZ) and doxycycline, which have also exhibited inhibitory activity in vitro against SARS-CoV-2,3,7,8 SARS-CoV-19-13 and other viruses (Scheim, 2020).

Studies of CQ and HCQ related to these clinical applications have revealed connections between COVID-19 and malaria, that in turn offer insights into potential biological mechanisms of Ivermectin (Scheim, 2020), Artemisia annua and other antimalarial treatments.

Scheim (2020) was the first scientist that compared, explained, and connected the dots between the behavior of COVID-19 and that of malaria. He has explained that the abundant distribution of CD147 receptor on red blood cells (RBCs) suggests a hypothesized “catch” and “clump” framework whereby virally-mediated bindings of RBCs to other RBCs, platelets, white blood cells and capillary walls impede blood flow, which in turn may underlie key morbidities of COVID-19.

Some enigmatic facets of COVID-19 compound the puzzle of key blood-related morbidities being associated with this respiratory-based disease. By Circulating through lung alveolar tissue about once per minute, blood cells can indeed efficiently spread the virus. An investigator from the Marseille research team observed blood-related characteristics of the disease and that most of the antimalarial drugs tested in vitro were found active against the SARS-CoV-2 virus (Scheim, 2020).

It has been reported by Scheim (2020) that there is a specific connection between COVID-19 and malaria that centers around the CD147 transmembrane receptor, which is densely distributed on blood cells, especially on the RBC. In contrast to the ACE2 receptor, which provides a locus for both binding and penetration of the SARS-CoV-2 into a host cell, the CD147 receptor (also designated as basigin, BSG, or EMMPRIN) may enable the virus to wreak havoc in the vasculature through binding alone.

For Scheim (2020), the main key to the infectious activity of malaria is the penetration of the host’s RBCs by plasmodium falciparum in its merozoite form, facilitated by surface proteins on this tiny one-celled organism. For all strains of P. falciparum tested, a particular ligand-receptor pair, the parasite ligand pfRh5 and the transmembrane receptor CD147 on the RBC, was found essential to the binding of parasite to host RBCs that preceded its subsequent penetration. In vitro, CD147 antagonists blocked parasite invasion of RBCs, and in vivo, a recombinant anti-CD147 antibody cleared established malarial infections with no overt toxicities.

For SARS-CoV-2 spike protein, this same transmembrane receptor, CD147, has been identified, along with ACE2, as a key binding site. The binding of virus to CD147 was shown by surface plasmon resonance and ELISA assays and by the competitive inhibition of SARS-CoV-2 in vitro by an anti-

CD147 antibody. Cyclophilin A and B, molecules that bind with and activate CD147, can also serve as binding partners for CD147 in its attachment to SARS-CoV-2 spike protein. Although the binding affinity of molecules of SARS-CoV-2 spike protein to CD147 is 12-fold weaker than to ACE2, the surface density of CD147 on host cells would allow multiple bonds with significant combined affinity (Scheim, 2020).

The role of CD147 in the clinical course of COVID-19 has been tested. A humanized monoclonal antibody against CD147, meplazumab, was used to treat 17 hospitalized COVID-19 patients. These patients, 6 with severe disease and 7 in critical status, had an average time to viral clearance of 3 days vs. 13 days for 11 controls. Similar statistically significant improvements versus controls in case severity and time to hospital discharge were achieved in the treated group. Although the small number of cases and lack of randomized controls precludes firm conclusions as to clinical efficacy, these clinical findings align with multifaceted in vitro indications of CD147 as a clinically relevant binding site for the SARS-CoV-2 virus (Scheim, 2020).

For a better understanding of the parallelism between malaria and COVID-19, it is strongly suggested to read entirely the research paper published by Dr. David E. Scheim titled “Ivermectin for COVID-19 treatment: clinical response at quasi-threshold doses via hypothesized alleviation of CD147-mediated vascular occlusion”.

THE MADAGASCAR PROTOCOL

Malaria Operational Plan

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Madagascar to end malaria (MOP, 2020).

This Malaria Operational Plan (MOP) outlines planned PMI activities in Madagascar for Fiscal Year 2020. Developed in consultation with the National Malaria Control Program (NMCP) and key stakeholders, proposed activities reflect national and PMI strategies, draw on best-available data, and align with the country context and health system. Proposed PMI investments support and build on those made by the Government of Madagascar, as well as other donors and partners (MOP, 2020).

PMI organizes its activities and planning levels around the activities, in line with the national malaria strategy. One of the activities has to do with Diagnosis and Drug-Based Prevention. The treatment for malaria includes Artemisinin-Based Combination Therapies (ACT) plus primaquine (MOP, 2020). ACTs are the mainstay of recommended treatment for P. falciparum malaria (WHO, 2020). Artemisinin is isolated from the plant **Artemisia annua**, sweet wormwood, a herb employed in Chinese traditional medicine to treat malaria. According to MOP (2020) the first-line treatment is **artesunate**-amodiaquine (ASAQ), and second-line treatment is **artemether**-lumefantrine (AL). According to the country's case management guidelines, P. vivax malaria should be treated with ASAQ followed by a 14-day course of primaquine. Severe malaria cases are treated with injectable artesunate followed by ACT. Rectal artesunate was recently introduced at the community level for pre-referral treatment of children less than five years of age (CU5) with severe disease. It is important to keep in mind that artesunate and artemether are semisynthetic derivatives of artemisinin, an antimalarial drug.

The Malaria Operational Plan operates both nationally and in support of the National Malaria Control Program planning, policies, and malaria commodities and with direct program support in 10 regions of the country covering a population of approximately 12,500,000 (MOP, 2020). This is what is known as Mass Drug Administration (MDA).

Here is a valid research question: Is this Mass Drug Administration to treat malaria unintentionally and in a parallel way contributing to fight the COVID-19?

Artemisia annua

In addition to the Malaria Operational Plan to fight malaria. The President of Madagascar, Andry Rajoelina, officially launched a natural medicine he believes can prevent and cure patients suffering from COVID-19. Developed by the Malagasy Institute of Applied Research and branded COVID Organics, President Rajoelina presented the remedy to the press. It contains Artemisia, a plant cultivated and exported on the Big Island to fight against malaria. "All trials and tests have been conducted and its effectiveness in reducing the elimination of symptoms has been proven for the treatment of patients with COVID-19 in Madagascar," the president said. Humanity is living an ongoing dramatic story where its survival is at risk. Can we have the luxury of turning our backs to a healing plant that already has shown excellent medicinal properties for thousands of years? (Abreu, 2020).

In a research titled “In-silico Studies of Antimalarial-agent Artemisinin and Derivatives Portray More Potent Binding to Lys353 and Lys31-Binding Hotspots of SARS-CoV-2 Spike Protein than Hydroxychloroquine: Potential Repurposing of Artenimol for COVID-19”, Sehailia and Smain Chemat (2020) from the Research Centre in Physical and Chemical Analysis (Tipaza, Algeria), and supported by the Directorate General of Scientific Research and Technological Development of the Ministry of High Education and Scientific Research in Algeria, demonstrated how hydroxychloroquine can act as a good inhibitor of SARS-CoV-2 Spike protein receptor-binding-domain using molecular docking studies. They also unveiled how hydroxychloroquine can interfere in the prevention of Lys353 in hACE2 from interacting with the corresponding binding hotspot present on the Spike protein. Further screening of artemisinin & derived compounds produced better Vina docking score than hydroxychloroquine (-7.1 kcal mol-1 for the best scoring artemisinin derivative vs. -5.5 kcal mol-1 for hydroxychloroquine). Artesunate, artemisinin and artenimol, showed two mode of interactions with Lys353 and Lys31 binding hotspots of the Spike protein. Given that these molecules are effective antivirals with excellent safety track records in humans against various ailment, they recommend their potential repurposing for the treatment of SARS-CoV-2 patients after successful clinical studies. In addition, an extraction protocol for artemisinin from Artemesia annua L. is proposed by them in order to cope with the potential urgent global supplies.

ANALYSIS

The Age Factor. It has been reported that trends in coronavirus deaths by age have been clear since early in the pandemic. Research teams looking at the presence of antibodies against SARS-CoV-2 in people in the general population — in Spain, England, Italy, and Geneva in Switzerland — have now quantified that risk. It gives us a much sharper tool when asking what the impact might be on a certain population that has a certain demographic (Mallapaty, 2020).

For every 1,000 people infected with the coronavirus who are under the age of 50, almost none will die. For people in their fifties and early sixties, about five will die — more men than women. The risk then climbs steeply as the years accrue. For every 1,000 people in their mid-seventies or older who are infected, around 116 will die. These are the stark statistics obtained by some of the first detailed studies into the mortality risk for COVID-19 (Mallapaty, 2020).

Cambaza (2020) discussed why COVID-19 seems to spread slowly in Sub-Saharan Africa. COVID-19 is not spreading quickly in Sub-Saharan. COVID-19 is not spreading quickly in Sub-Saharan Africa perhaps due to a combination several factors, one of them being the predominance of younger populations.

The countries compared in the study are:

The United States of America (USA), Mexico, Canada, Madagascar, Senegal, Burkina Faso, Liberia, and Tanzania.

Age structure of the USA: (Population: 329,256,465)

- 0-14 years: 18.62% (male 31,329,121 /female 29,984,705)
- 15-24 years: 13.12% (male 22,119,340 /female 21,082,599)
- 25-54 years: 39.29% (male 64,858,646 /female 64,496,889)
- 55-64 years: 12.94% (male 20,578,432 /female 22,040,267)
- 65 years and over: 16.03% (male 23,489,515 /female 29,276,951) (2018 est.)

Age structure of Mexico: (Population: 125,959,205)

- 0-14 years: 26.61% (male 17,143,124 /female 16,378,309)
- 15-24 years: 17.35% (male 11,072,817 /female 10,779,029)
- 25-54 years: 40.91% (male 24,916,204 /female 26,612,272)
- 55-64 years: 7.87% (male 4,538,167 /female 5,375,867)
- 65 years and over: 7.26% (male 4,079,513 /female 5,063,903) (2018 est.)

Age structure of Canada: (Population: 35,881,659)

- 0-14 years: 15.43% (male 2,839,236 /female 2,698,592)
- 15-24 years: 11.62% (male 2,145,626 /female 2,023,369)
- 25-54 years: 39.62% (male 7,215,261 /female 7,002,546)
- 55-64 years: 14.24% (male 2,538,820 /female 2,570,709)
- 65 years and over: 19.08% (male 3,055,560 /female 3,791,940) (2018 est.)

Age structure of Madagascar: (Population: 25,683,610)

- 0-14 years: 39.55% (male 5,119,804 /female 5,037,438)
- 15-24 years: 20.23% (male 2,608,996 /female 2,587,745)
- 25-54 years: 32.42% (male 4,160,278 /female 4,166,538)
- 55-64 years: 4.45% (male 560,072 /female 581,963)
- 65 years and over: 3.35% (male 390,094 /female 470,682)

Age structure of Senegal: (Population: 15,020,945)

- 0-14 years: 41.15% (male 3,106,942 /female 3,074,740)
- 15-24 years: 20.33% (male 1,521,868 /female 1,531,484)
- 25-54 years: 31.45% (male 2,176,052 /female 2,547,566)
- 55-64 years: 4.05% (male 261,682 /female 347,374)
- 65 years and over: 3.02% (male 200,079 /female 253,158) (2018 est.)

Age structure of Burkina Faso: (Population: 19,742,715)

- 0-14 years: 44.28% (male 4,434,908 /female 4,307,438)
- 15-24 years: 20.19% (male 1,980,755 /female 2,004,763)
- 25-54 years: 28.82% (male 2,639,235 /female 3,051,333)
- 55-64 years: 3.55% (male 304,642 /female 396,072)
- 65 years and over: 3.16% (male 273,031 /female 350,538) (2018 est.)

Age structure of Liberia: (Population: 4,809,768)

- 0-14 years: 43.72% (male 1,062,766 /female 1,040,211)
- 15-24 years: 19.9% (male 478,041 /female 478,999)
- 25-54 years: 30.1% (male 711,963 /female 735,878)
- 55-64 years: 3.43% (male 84,474 /female 80,410)
- 65 years and over: 2.85% (male 67,229 /female 69,797) (2018 est.)

Age structure of Tanzania: (Population: 55,451,343)

- 0-14 years: 43.4% (male 12,159,482 /female 11,908,654)
- 15-24 years: 20.03% (male 5,561,922 /female 5,543,788)
- 25-54 years: 30.02% (male 8,361,460 /female 8,284,229)
- 55-64 years: 3.51% (male 872,601 /female 1,074,480)
- 65 years and over: 3.04% (male 706,633 /female 978,094) (2018 est.)

Age structure of the world: (Population: 7,503,828,180)

- 0-14 years: 25.29% (male 981,129,427/female 916,864,766)
- 15-24 years: 15.77% (male 611,245,863/female 572,115,168)
- 25-54 years: 41.03% (male 1,559,197,242/female 1,519,386,627)
- 55-64 years: 8.84% (male 324,134,030/female 339,551,038)
- 65 years and over: 9.06% (male 303,788,086/female 376,415,933) (2018 est.)

In the study, Madagascar showed the highest percentage of youngest population, while Canada showed the lowest percentage. For this reason, to minimize the impact of the factor age in the comparative analysis of this study, the factor age was standardized in the countries analyzed to a population of 25 years and over.

In table 1, based on data from WHO and the World Factbook (2020), Madagar´s Deaths per Million (22) is compared with the World (232), the USA (919), Mexico (1,106) and Canada (356). The calculated differences that significantly surpass Madagascar in number of deaths per million are:

- World: 232-22= +210
- USA: 919-22= +897
- Mexico: 1,106-22= +1,084
- Canada: 356-22= +334

Table 1. Comparative Analysis. COVID-19 Impact. Population 25 years and over.

	WORLD	USA	Mexico	Canada	Madagascar
Total Population*	7,503,828,180	329,256,465	125,959,205	35,881,659	25,683,610
Population** (25 years and over)	58.93% 4,422,005,946	68.26% 224,750,463	56.04% 70,587,538	72.94% 26,172,082	40.22% 10,329,948
Total Cases	34,495,176	7,206,769	748,315	160,535	16,493
Deceased	**1,025,729**	**206,558**	**78,078**	**9,319**	**232**
Cases per Million*	4,597	21,888	5,941	4,474	642
Deaths per Million**	**232**	**919**	**1,106**	**356**	**22**

Reference: Data from WHO and World Factbook (2020)
Updated 03/10/2020

MASS ADMINISTRATION OF IVERMECTIN

The well-respected Australian researcher Dr. Thomas Borody, who is the developer of the world's first cure for peptic ulcers, which saved millions of lives worldwide has proposed a Triple Therapy (Ivermectin, Zinc, Doxycycline) for COVID-19. Based on existing research and his analysis of therapeutic results using Ivermectin in combination with 2 other widely available generic drugs – Doxycycline and Zinc -, Dr. Thomas Borody asserts that COVID-19 is now curable and even easier to treat than the flu (Bona, 2020).

TrialSite (2020) has been tracking the use of Ivermectin since researchers at Australia's Monash University and Peter Doherty Institute found that in the lab's cell culture the anti-parasitic absolutely destroyed the pathogen. TrialSite found and interviewed doctors from Bangladesh and India to the Dominican Republic, Peru, Columbia and Iraq to the United States where Broward County Health approved an Ivermectin-based protocol with successful outcomes. A French company called Medincell even announced it would work on commercializing an ivermectin-based COVID-19 therapy. Search TrialSite for what are now many dozens of relevant real-world data points.

Mass Drug Administration (MDA) consists in administering at regular intervals a full antimalarial treatment to the whole population, in this case several African Countries that follow MDA of Ivermectin will be analyzed for the COVID-19 impact.

Dihydroartemisinin (also known as dihydroqinghaosu, artenimol or DHA) is a drug used to treat malaria. Dihydroartemisinin is the active metabolite of all artemisinin compounds (artemisinin, artesunate, artemether, etc.) and is also available as a drug in itself. It is a semi-synthetic derivative of artemisinin and is widely used as an intermediate in the preparation of other artemisinin-derived antimalarial drugs (Woo, 1998). It is sold commercially in combination with piperaquine and has been shown to be equivalent to artemether/lumefantrine (Arinaitwe et al, 2009). African countries such as Senegal, Burkina Faso, Liberia, Tanzania, etc. have achieved excellent coverage with Ivermectin and dihydroartemisinin-piperaquine (Foy et al. 2019; Romani et al. 2019; Alout, Haoues. 2014).

The WHO (2016) reported that in 2014 alone, more than 260 million people were treated with ivermectin for onchocerciasis/ Lymphatic Filariasis (LF). Due to its success, the LF programme has been downscaled in 11 countries. The global demand for Ivermectin is expected to grow due to additional indication for scabies and new evidence that a single dose of Ivermectindiethylcarbamazine (DEC)-albendazole can accelerate LF elimination. Ivermectin is currently donated to countries' NTD programmes through the Mectizan® donation programme. The main delivery strategy is through community volunteers annually, semiannually, or quarterly.

Table 2 shows data about the impact of COVID-19 on four African Countries: Senegal, Burkina Faso, Liberia and Tanzania. In the analysis it can be observed that the four African Countries (Senegal, Burkina Faso, Liberia, and Tanzania) show the lowest Deaths per Million Rates. The average Death per Million Rate for the four African Countries is 27.51.

Table 2. Comparative Analysis. MDA (Ivermectin). COVID-19 Impact. Population 25 years and over.

	WORLD	USA	Senegal	Burkina Faso	Liberia	Tanzania
Population*	7,503,828,180	329,256,465	15,020,945	19,742,715	4,809,768	55,451,343
Population** (25 years and over)	58.93% 4,422,005,946	68.26% 224,750,463	38.52% 5,786,068	35.53% 7,014,587	36.38% 1,749,794	36.57% 20,278,556
Total Cases	34,495,176	7,206,769	15,019	2,088	1,343	509
Deceased	**1,025,729**	**206,558**	**311**	**58**	**82**	**21**
Cases per Million*	4,597	21,888	1,001	106	280	9
Deaths per Million**	**232**	**919**	**53.62**	**8.27**	**47.13**	**1.04**

Reference: Data from WHO and World Factbook (2020)
Updated 03/10/2020

In a conservative approach, using the average of the four African Countries and not the lowest indicator of Tanzania (1.04), the calculated differences that significantly surpass the average of the four African Countries (27.51) in number of deaths per million are:

- World: 232-27.51= +204
- USA: 919-27.51= +891

Caly et al (2020) in March 18, 2020 announced to the world, that Ivermectin, an FDA-approved anti-parasitic previously shown to have broad spectrum anti-viral activity in vitro, is an inhibitor of the causative virus (SARS-CoV-2), with a single addition to Vero-hSLAM cells 2 hours post infection with SARS-CoV-2 able to effect ~5000-fold reduction in viral RNA at 48 h. Ivermectin therefore warrants further investigation for possible benefits in humans.

Now, let´s construct a hypothetical scenario in which Ivermectin and other antimalarial treatments work efficiently to prevent deaths, and that the global institutions (WHO and others) had decided to establish those treatments as standard protocols since April 2020. How many lives would have been saved? (Table 3).

For the calculation, it is necessary to establish the number of global deaths in the world from the period of April 2020 (after the publication of Caly et al) to the date in which this article is being written (03/10/2020).

Number of deaths from January 2020 to March 2020= 67,464

Number of Deaths from January 2020 to October 10, 2020= 1,025,729

Number of Deaths from April 2020 to October 10, 2020= 958,265

Number of Deaths per million from April 2020 to October 2020= 217

If we use the Madagascar Factor (22 deaths per million) and apply this to the world case scenario, we have: 97,284 calculated deaths.

Number of lives that could have been saved (hypothesised) = 958,265 - 97,284= 860,981

Table 3. Hypothetical scenario in which Ivermectin was prescribed globally from April 2020 to October 03, 2020

Population ≥ 25 years	# Deaths April –Oct 10	Death/Million April-Oct 10	Calculated Deaths (Madagascar Rate)	Lives Saved (Hypothesised)
58.93% 4,422,005,946	958,265	217	97,284	**860,981**

Reference: Data from WHO and World Factbook (2020)
Updated 03/10/2020

FINAL REMARKS

D'Alessandro et al (2020) have reported that in recent decades, drugs used to treat malaria infection have been shown to be beneficial for many other diseases, including viral infections. In particular, they have received special attention due to the lack of effective antiviral drugs against new emerging viruses (i.e., HIV, dengue virus, chikungunya virus, ebola virus, etc.) or against classic infections due to drug-resistant viral strains (i.e., human cytomegalovirus). They reviewed the in vitro/in vivo and clinical studies conducted to evaluate the antiviral activities of four classes of antimalarial drugs: Artemisinin derivatives, aryl-aminoalcohols, aminoquinolines, and antimicrobial drugs.

Antimalarial drugs are usually divided based on the chemical structure or the source of the drugs. Most of them derive from traditional medicine and plants. They present different modes and various mechanisms of action, which are often still not elucidated, against malaria parasites. Furthermore, due to the complexity of these molecules, additional side activities have been reported. For these reasons, antimalarial drugs have been studied, proposed, and sometimes used for the treatment of other pathologies, such as cancer, autoimmune diseases, and nonmalaria infectious diseases. Moreover, the geographical overlaps between malaria and viral-related diseases have led to the consideration of possible use of antimalarial drugs as new antiviral drugs. Finally, the lack of new effective antiviral drugs and vaccines against many viral infections has strengthened interest in the potential antiviral activity of antimalarial drugs (D'Alessandro et al 2020).

In their study, D'Alessandro et al (2020) presented the use and the efficacy against human viruses of the principal antimalarial drugs, divided into four main groups: Artemisinin derivatives, aryl-aminoalcohols, aminoquinolines, and antimicrobial drugs.

Based on a detailed documentary research D'Alessandro et al (2020) concluded that the use of antimalarial drugs might be useful, especially in cases of antiviral resistance and in light of the emergence of many viruses against which effective drugs are not available.

Departing from the hypothesis of Dr. Scheim and the current African Parallel Protocols:

Is it possible that the same parallelism that occurred in the lab of a Marseille research team is present in communities of several African Countries?

Are African Countries showing the path to the solution of the COVID-19 problem?

Are there occurring unnecessary deaths in the world?

A Personal Note

Something difficult for me to understand is that a book that I wrote in May 2020, titled **Madagascar´s COVID-19 Protocol: Artemisia annua treatment**, was banned by Amazon. They did not allow me to use the term COVID-19 or Coronavirus.

This was their response to my request to publish my book:

22 may. 2020 9:26

Alert from Amazon KDP Content Review

Hello,

We're contacting you regarding the following book(s):

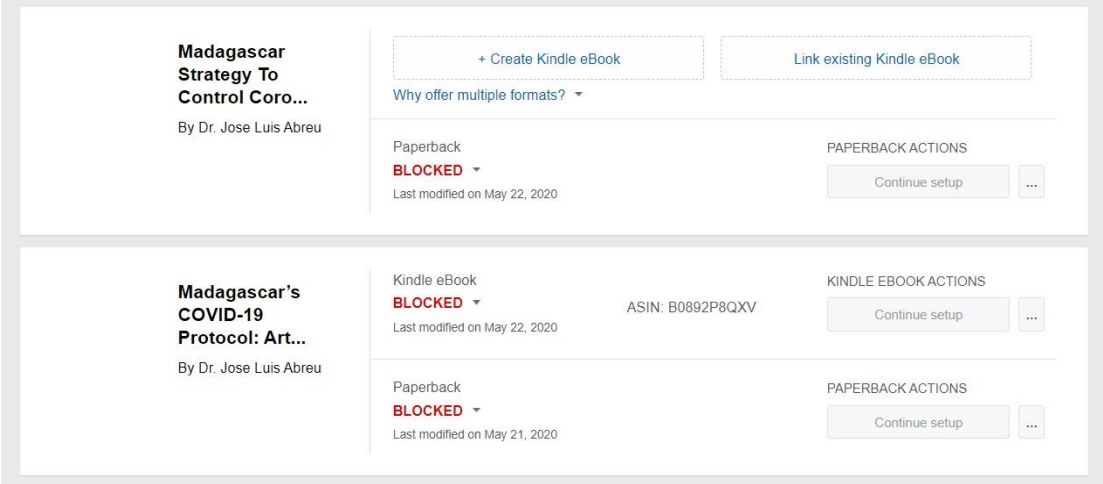
***Madagascar's COVID-19 Protocol: Artemisia annua Treatment** by Dr. Jose Luis Abreu (AUTHOR) (ID: PRI-TJF8DS39BCY)*

Due to the rapidly changing nature of information around the COVID-19 virus, we are referring customers to official sources for health information about the virus. As a result, we are not offering your book for sale.

Amazon reserves the right to determine what content we offer according to our content guidelines.

You can find our content guidelines on the KDP website:
https://kdp.amazon.com/help/topic/G200672390

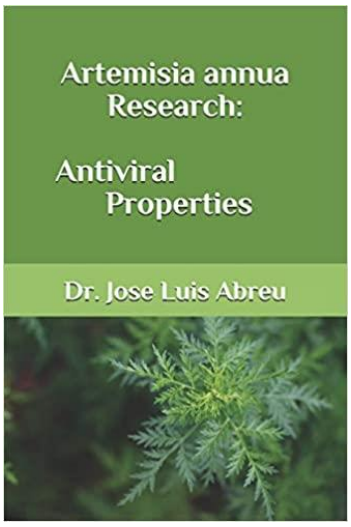
Amazon KDP



Later, as a strategy to camouflage my book to get the approval for the publication and distribution of my book I changed the terms COVID-19 and Coronavirus into Severe Acute Respiratory Syndrome. In addition, I was not able to write about the specific case of Madagascar facing and successfully controlling the Coronavirus with a mass Artemisia annua treatment.

The new name of my book is: Artemisia Annua Research: Antiviral Properties. It is available in Amazon. Here is the link:

https://www.amazon.com/Artemisia-Annua-Research-Antiviral-Properties/dp/B089M1H7WJ/ref=sr_1_1?dchild=1&keywords=Abreu+artemisia+viral&qid=1601521814&sr=8-1



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This study was funded with independent resources. There is not conflict of interest in this publication.

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