

Journal

RWANDA

STANDARDS

ISSUE 15-FEBRUARY 2019 | NOT FOR SALE

FOCUS ON MOSQUITO REPELLENTS STANDARDS

RSB: MOSQUITO REPELLENTS STANDARDS

TO STREAMLINE THE
SECTOR AND PROMOTE
MADE IN RWANDA MOSQUITO
REPELLENTS

MINISANTE:

MOSQUITO REPELLENTS
TO COMPLIMENT EXISTING
MALARIA CONTROL
INITIATIVES





MOSQUITO REPELLENT COIL



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RSB CERTIFICATION MARKS



FOREWORD



Malaria remains the primary mosquito borne disease, especially in Rwanda. Unfortunately, the major indoor interventions such as bed nets and indoor residual spraying deployed for malaria prevention showed limitations in curbing malaria transmission. Residual transmission result from change in vector species mainly due to the ecological and climate changes.

To tackle the challenges, the Ministry of Health in collaboration with partners has approved the introduction of mosquito repellents as supplement of vector control interventions.

Mosquito Repellents are currently part of the National list of essential medicines published in 2015 and were also included in the malaria contingency strategy developed by the Ministry of health in January 2016 and thereafter in the extended malaria strategic plan 2013-2020 as vector control interventions at community level and to prevent outdoor malaria transmission.

In order to facilitate the registration of mosquito repellents, Rwanda Standards Board (RSB) and Rwanda Biomedical Center in collaboration

with other stakeholders have undertaken the development of national standards for mosquito repellents.

To this end, thirteen (13) mosquito repellents standards have been developed and published. We are grateful for the support and collaboration of our esteemed Stakeholders in the development of these standards.

In this issue you will find the central role of mosquito repellents in complimenting other existing Malaria Control tools.

We are thankful to the valuable support from the Rwanda Biomedical Center/ Malaria and other Parasitic Diseases Division (RBC/ MOPDD), Society for Family Health (SFH) – Rwanda, National Industrial Research and Development Agency (NIRDA), National Pharmacy Council (NPC), Rwanda Development Board (RDB), Rwanda Social Security Board (RSSB), University of Rwanda/College of Medicine and Health Sciences (UR/CMHS), University of Rwanda/College of Sciences and Technology (UR/CST), Institut d'Enseignement Supérieur de Ruhengeri (INES – RUHENGERRI), Agropy Ltd, Horizon/Sopyrwa, Ikirezi Natural Products, Pharmacie NOVA, Pharmavie to mention but a few.

Enjoy reading this issue for more updates on mosquito repellents standards and other initiatives aimed at fighting malaria, thus promoting public health.

Raymond Murenzi

Director General Rwanda Standards Board

MOSQUITO REPELLENTS STANDARDS

TO STREAMLINE THE SECTOR, COMPLIMENT THE FIGHT AGAINST MALARIA AND PROMOTE MADE IN RWANDA MOSQUITO REPELLENTS.



RSB Staff in the chemical laboratory analyzing mosquito repellents sample

QN: Why has RSB developed Mosquito Repellent standards?

DG: Malaria remains the primary mosquito borne disease, especially in Rwanda. Unfortunately, the major indoor interventions such as bed nets and indoor residual spraying deployed for malaria prevention showed limitations in curbing malaria transmission. This phenomenon was also reported in many other malaria endemic countries.

The other contributing factor is associated with the residual transmission which resulted from change in mosquito behaviour. Studies have shown that mosquitoes have developed the ability to avoid the contact with insecticide-treated surfaces.

Other examples of behaviour change is earlier biting when people are not protected by nets, and the trends of outdoor biting and resting of malaria vectors that were formerly active inside houses.

Residual transmission resulting from change in vector species composition whereby secondary vectors acquire high transmission capacity and

replace the primary vectors, mainly due to the ecological and climate changes. Moreover, the recent scaling up of vector control interventions based on insecticides has contributed to the selection of resistant mosquito strains, which are not well killed by the standard dose of insecticides. This situation is alarming and has been spreading rapidly in a number of countries including in Rwanda.

To tackle the challenges of insecticide resistance, and the change of mosquito behaviour, the alternative interventions are clearly required to supplement the existing indoor vector control interventions and to control the outdoor malaria transmission.

The Rwanda Ministry of Health in collaboration with partners has already approved the introduction of mosquito repellents as supplement of vector control interventions. The promotion of mosquito repellents has been endorsed by different documents of policies and strategic plans of the Ministry of Health.

Mosquito Repellents are currently part of the National list of essential medicines published in 2015 and were also included in the malaria contingency strategy developed by the Ministry of health in January 2016 and thereafter in the extended malaria strategic plan 2013-2020.

The National Integrated Vector Management recommends the integration of mosquito repellents into the existing vector control interventions at community level and to prevent outdoor malaria transmission. In the framework to facilitate the registration of mosquito repellents, the Rwanda Standards Board (RSB) in collaboration with RBC and SFH-Rwanda and other stakeholders has undertaken the development of national standards for mosquito repellents.

QN: Who were the partners involved in this process?

DG: We have collaborated with a number of partners in the development of mosquito repellents standards.

They include;

- Rwanda Biomedical Center/ Malaria and Other Parasitic Diseases Division (RBC/ MOPDD)
- Rwanda Biomedical Center/Medical Procurement and Production Division (RBC/ MPPD)
- Society for Family Health (SFH) – Rwanda
- National Industrial Research and Development Agency (NIRDA)
- National Pharmacy Council (NPC)
- Rwanda Development Board (RDB)
- Rwanda Social Security Board (RSSB)
- University of Rwanda/College of Medicine and Health Sciences (UR/CMHS)
- University of Rwanda/College of Sciences and Technology (UR/CST)
- Institut d'Enseignement Supérieur de Ruhengeri (INES -- RUHENGRI)
- AGROPY LTD
- HORIZON/SOPYRWA
- IKIREZI NATURAL PRODUCTS
- Pharmacie NOVA
- Pharmavie



QN: What are the main aspects covered by these standards?

DG: The developed Standards cover mosquito repellents used in homes. They can be grouped into two general categories: **skin-applied repellents and spatial application repellents**. Within each category are different product types formulated with ingredients selected to perform broad repelling functions as well as deliver properties specific to that product.

According to various formulations of mosquito repellents, below are the 13 standards developed:

- a) **RS 392: 2018** Skin applied mosquito repellents – Specification
 - **Part 1:** Lotion, cream, gel and ointment
 - **Part 2:** Spray

b)

- **Part 3:** Wipes
- **Part 4:** Bathing Soaps
- **Part 5:** Bracelets
- RS 393: 2018**, Spatial application mosquito repellents – Specification
 - **Part 1:** Coils
 - **Part 2:** Spray (aerosol dispensers)
 - **Part 3:** Candles
 - **Part 4:** Papers
 - **Part 5:** Liquid vaporizers
 - **Part 6:** Vaporizing Matt
 - **Part 7:** Tablet
 - **Part 8:** Liquid detergents



All these 13 standards are for products commonly used in homes, in which one or many active ingredients are added in order to give the capacity of repelling mosquitoes. The active ingredient may be natural, synthetic or a combination of both.

The active ingredient in a mosquito repellent is primarily responsible for its usefulness. For a material to be valuable as a mosquito repellent, it must meet certain criteria:

- **First**, it must effectively discourage insect attack on the treated area for many hours and on many different types of surfaces.
- **Second**, it must work under a variety of different environmental conditions.
- **Next**, it must not be toxic or cause irritation when applied to human or animal skin. Additionally, it must be cosmetically acceptable, having a pleasant odour, taste, and feeling.
- It should also be harmless to clothing.
- **Finally**, it should have a relatively low cost and be effective against other common types of insects, such as flies.

QN: What is the RSB available capacity for conformity assessment?

DG: In addition to the above standards, two guidelines are developed for performance test of mosquito repellents:

RS 394, Mosquito repellents – Performance Test Guidelines

- **Part 1:** Skin applied repellents
- **Part 2:** Spatial repellents

Both standards will help to evaluate the efficacy of mosquito repellents by testing the repellency and protection time of the product.

QN: How do you think these standards will contribute in the process to fight against malaria?

DG: These standards will help ensure the quality, safety and efficacy of mosquito repellents in order to facilitate their manufacturing, importation and distribution at national level. This will lead to the integration of mosquito repellents into the existing vector control interventions at community level and prevent outdoor malaria transmission.



PRECAUTIONARY USE
HAZARD-BASED AEROSOL
KEEP OUT OF REACH OF CHILDREN AND PETS
DANGER
May be Present Acute Hazard in Normal Use
ACTIVE INGREDIENTS: Imipethrin 0.031% w/w, Prallethrin 0.03% w/w, Cypermethrin 0.03% w/w
NET WEIGHT: 99.83g w/w
TOTAL PETROLEUM DISTILLATES
NET CONTENTS 300ml (328g)

PRECAUTIONARY USE
HAZARD-BASED AEROSOL
KEEP OUT OF REACH OF CHILDREN AND PETS
DANGER
May be Present Acute Hazard in Normal Use
ACTIVE INGREDIENTS: Imipethrin 0.031% w/w, Prallethrin 0.03% w/w, Cypermethrin 0.03% w/w
NET WEIGHT: 99.83g w/w
TOTAL PETROLEUM DISTILLATES
NET CONTENTS 500ml (328g)

PRECAUTIONARY USE
HAZARD-BASED AEROSOL
KEEP OUT OF REACH OF CHILDREN AND PETS
DANGER
May be Present Acute Hazard in Normal Use
ACTIVE INGREDIENTS: Imipethrin 0.031% w/w, Prallethrin 0.03% w/w, Cypermethrin 0.03% w/w
NET WEIGHT: 99.83g w/w
TOTAL PETROLEUM DISTILLATES
NET CONTENTS 300ml (328g)

FOR A MATERIAL TO BE VALUABLE AS A MOSQUITO REPELLENT, IT MUST MEET CERTAIN CRITERIA:

- ✔ IT MUST EFFECTIVELY DISCOURAGE INSECT ATTACK ON THE TREATED AREA FOR MANY HOURS AND ON MANY DIFFERENT TYPES OF SURFACES.
- ✔ IT MUST WORK UNDER A VARIETY OF DIFFERENT ENVIRONMENTAL CONDITIONS.
- ✔ IT MUST NOT BE TOXIC OR CAUSE IRRITATION WHEN APPLIED TO HUMAN OR ANIMAL SKIN. ADDITIONALLY, IT MUST BE COSMETICALLY ACCEPTABLE, HAVING A PLEASANT ODOUR, TASTE, AND FEELING.
- ✔ IT SHOULD ALSO BE HARMLESS TO CLOTHING.
- ✔ IT SHOULD HAVE A RELATIVELY LOW COST AND BE EFFECTIVE AGAINST OTHER COMMON TYPES OF INSECTS, SUCH AS FLIES.



LIST OF STANDARDS

FOR MOSQUITO REPELLENTS

| N° | REFERENCE | SCOPE |
|----|---------------|---|
| 1 | RS 392-1:2018 | Skin applied mosquito repellents – Specification – Part 1: Lotions, creams, gels and ointments |
| 2 | RS 392-2:2018 | Skin applied mosquito repellents – Specification – Part 2: Sprays and roll-ons |
| 3 | RS 392-3:2018 | Skin applied mosquito repellents – Specification – Part 3: Wipes |
| 4 | RS 392-4:2018 | Skin applied mosquito repellents – Specification – Part 4: Bathing soaps |
| 5 | RS 392-5:2018 | Skin applied mosquito repellents – Specification – Part 5: Bracelets, wristbands and patches |
| 6 | RS 393-1:2018 | Spatial application mosquito repellents – Specification – Part 1: Coils |
| 7 | RS 393-2:2018 | Spatial application mosquito repellents – Specification – Part 2: Spray |

| | | |
|----|---------------|--|
| 8 | RS 393-3:2018 | Spatial application mosquito repellents – Specification – Part 3: Candles |
| 9 | RS 393-4:2018 | Spatial application mosquito repellents – Specification – Part 4: Papers |
| 10 | RS 393-5:2018 | Spatial application mosquito repellents – Specification – Part 5: Liquid vaporizers |
| 11 | RS 393-6:2018 | Spatial application mosquito repellents – Specification – Part 6: Vaporizing Mats |
| 12 | RS 393-7:2018 | Spatial application mosquito repellents – Specification – Part 7: Tablets |
| 13 | RS 393-8:2018 | Spatial application mosquito repellents – Specification – Part 8: Liquid detergent |



RSB/TC 015 ON PHARMACEUTICAL

PRODUCTS DEVELOPED MOSQUITO REPELLENTS STANDARDS



**Dr Justin Kabera Chairperson
RSB/TC015 on Pharmaceutical products**

Today, the Pharmaceutical Products industry is evolving into a truly international business delivering safe, high quality products to consumers within Rwanda and the rest of the world. While operating in a global environment, it offers many new benefits and challenges for industrial and economic development, poverty alleviation and improved social and environmental welfare.

In 2018, Rwanda Standards Board Technical Committee on Pharmaceutical Products (RSB/TC015) developed fifteen standards for mosquito repellents. Dr. Justin KABERA, the Chairman of

RSB/TC 015, is a researcher at National Industrial Research and Development Agency (NIRDA), a specialist in chemistry of natural product and Lecturer of Pharmacology at the University of Rwanda. He takes us through the mosquito repellents standards development process and enthuses on their relevancy.

The RSB/TC 015 work aims to develop relevant Rwanda Standards in order to promote the quality and safety of Pharmaceutical products



Since standards have now been published, and formulations of mosquito repellents are now complete what is remaining is for local manufacturers to acquire the RSB Standardization Mark(S-Mark)...



and drive the development of the pharmaceutical sector in Rwanda to make it a reliable source of products that fit the purpose and can access global markets. RSB/TC 015 standards are technical agreements that provide frameworks for compatible technology. They respond to market and regulatory needs in the domestic market and to scientific and technical development in the country.

RSB/TC 015 is a group of representatives of businesses, industry, Government, academia, consumers and other groups, brought together for the development of Rwanda Standards that reflect valid national interests within Pharmaceutical Products.

Dr. KABERA chaired the crucial Technical Committee during the development of standards for mosquito repellents. The exercise brought together officials from Rwanda Standards Board with representatives of the following institutions and companies:

- 1) Rwanda Biomedical Centre/ Malaria and Other Parasitic Diseases Division (RBC/ MOPDD)
- 2) Rwanda Biomedical Centre/Medical Procurement and Production Division (RBC/MPPD)
- 3) Society for Family Health (SFH) – Rwanda
- 4) National Industrial Research and Development Agency (NIRDA)
- 5) National Pharmacy Council (NPC)
- 6) Rwanda Development Board (RDB)
- 7) Rwanda Social Security Board (RSSB)
- 8) University of Rwanda/College of Medicine and Health Sciences (UR/CMHS)
- 9) University of Rwanda/College of Sciences and Technology (UR/CST)
- 10) Institut d'Enseignement Supérieur de Ruhengeri (INES – RUHENGERI)
- 11) AGROPY LTD
- 12) HORIZON/SOPYRWA
- 13) IKIREZI NATURAL PRODUCTS
- 14) Pharmacie NOVA
- 15) Pharmavie

Dr. Kabera stresses the importance of the idea of developing mosquito repellents standards which came up as a result of increased malaria prevalence:

'The exercise brought together officials from Rwanda Standards Board, Rwanda Bio Medical Centre, manufacturers, researchers and academia, importers of mosquito repellents, and SFH to mention a few. It began by reviewing of existing literature on mosquito repellents, and putting together basic information. It is important that among members of this TC are manufacturers and importers of mosquito repellents as it increases the uptake and adhering to standards hence ensuring that products manufactured and imported are of good quality. The development of these standards was not an easy task, it involved continual research, important debates on critical matters, experience and knowledge sharing to come up with sound documents that will serve the required cause.

Since standards have now been published, and formulations of mosquito repellents are now complete what is remaining is for local manufacturers to acquire the RSB Standardization Mark(S-Mark) and be able to favourably compete both on the local and international markets'.

The TC Chairman congratulates the collaboration of the Government and stakeholders in setting and enforcing national standards. He also encourages manufacturers to produce repellents that can be applied to bed nets to reduce on costs that come with importation of treated mosquito nets.

Thirteen (13) developed standards cover mosquito repellents used home that can be grouped into two general categories: skin-applied repellents and spatial application repellents. Within each category are different product types formulated with ingredients selected to perform a broad repellency function as well as to deliver properties specific to that product

TESTING SCOPE COVERED BY RSB LABORATORIES FOR MOSQUITO REPELLENTS

For conformity assessment purposes, RSB Organic Chemistry Laboratories offer testing services covering the scope below and future plans consider continual upgrade:



| N° | Scope |
|-----|----------------------------|
| 1. | pH range |
| 2. | Thermal stability |
| 3. | Total residues |
| 4. | Non – volatile matter |
| 5. | Total fatty matter |
| 6. | Total alkalinity |
| 7. | Free caustic alkali |
| 8. | Lead |
| 9. | Arsenic |
| 10. | Mercury |
| 11. | Microbiological parameters |
| 12. | Total viable counts |
| 13. | E.coli |
| 14. | Pseudomonas aeruginosa |
| 15. | Staphylococcus aureus. |

MINISANTE: MOSQUITO REPELLENTS

TO COMPLIMENT EXISTING MALARIA CONTROL INITIATIVES.



Hon. Dr. Diane Gashumba, Minister of Health

Malaria remains the primary mosquito borne disease, especially in Rwanda. Unfortunately, the major indoor interventions such as bed nets and indoor residual spraying deployed for malaria prevention showed limitations to interrupt malaria transmission.

For instance, between 2012 and 2016, malaria prevalence increased from 400,000 cases to close to 6,000,000 cases in Rwanda. At the time, case management or treatment was being offered to those attacked particularly to the under-five while for prevention universal coverage of two bed nets to one person and indoor residual spraying was applied.

The major contributing factor was associated to the residual transmission which resulted from a change in mosquito behavior. Several studies demonstrated that mosquitos have developed the ability to avoid contact with insecticide-treated surfaces.

Other examples of behavioral change include biting when people are not protected by nets and trends of outdoor biting and residing of malaria vectors that were initially active inside the houses. Also malaria vectors have developed a habit of biting domestic animals and this they escape risk of contact with insecticide.



Residual transmission can also result from a change in vector species composition whereby secondary vectors acquire high transmission capacity and replace the primary vectors, mainly due to the ecological and climate change.

Also, studies indicate, the recent scaling up of vector control interventions based on insecticides has contributed to the selection of resistant mosquito strains, which are not well killed by the standard dose of insecticides.

According to Dr. Emmanuel Hakizimana, Director of Vector Control at Rwanda Biomedical Centre (RBC) this case has been spreading rapidly in Rwanda. He adds that normally mosquitos bite from inside and are attracted by carbon dioxide

and sweat from human beings but with indoor residual spraying and bed nets, they realized inside was unsafe so they started biting people from outside the houses.

More than 52% were feeding and resting outside so a new species had been born out of this situation. There was a shift in anopheles species; before there was anopheles funestus and anopheles gambiae that bite and resides indoor, then emerged anopheles arabiensis that bites and resides from outdoor or indoor.





Dr. Emmanuel Hakizimana, Director of Vector Control at Rwanda Biomedical Centre

Use of Mosquito Nets

According to Rwanda Demographic Health Survey 2014-15, use of Long Lasting Insecticidal treated Nets (LLINs) is the primary prevention strategy for reducing malaria transmission in Rwanda.

Since 2006, the insecticide-treated mosquito net policy has included free distribution of treated nets to all children under age 5 every three years during vaccination campaigns or maternal and child health weeks, to pregnant women at their first visit to an antenatal care (ANC) clinic, and to children during their final visit under the Expanded Program of Immunization for measles immunization.

In addition, there has been universal coverage of LLINs since 2010, with free distribution of one LLIN per two persons through household campaigns. To increase coverage, timely mass net distribution campaigns are conducted.

Since 2005, Rwanda has been moving to the use of LLINs, which are heavy duty and pretreated and are longer lasting than the older insecticide-treated nets (ITNs).

Malaria Treatment using appropriate and effective antimalarial drugs

According to Rwanda Demographic Health Survey 2014-15, malaria case management, including detection, diagnosis, and rapid treatment of all malaria cases with appropriate and effective antimalarial drugs, is one of the key strategic areas for malaria control in Rwanda.

Since 2006, ACT (commonly known as Coartem) has been widely available in public health and faith-based facilities, as well as in the community (Primo) via community health workers and private pharmacies.

In 2010, Rwanda achieved one of the highest parasitological diagnosis rates in Africa, with an estimated 94 percent of suspected malaria cases being parasitologically diagnosed (Malaria Program Review, 2011) and have reached 99 percent in 2014 (Rwanda HMIS, 2014).

The survey, shows that 19 percent of children under age 5 had a fever during the two weeks preceding the survey; the proportion was higher among children aged 12-23 months (24 percent) than among other children.

In line with the malaria treatment policy of the National Malaria Control Program, antimalarial medicines are given to children only after the presence of malaria parasites is confirmed by microscopy or a rapid diagnostic test.

Mosquito Repellents

According to Dr. Hakizimana, initially the Ministry of Health was deploying interventions for indoor alone. Mosquitoes were biting from 6pm but were now starting to bite from 8pm. Area night biting had changed so one of the solutions was encouraging the use of mosquito repellents before going to bed.

Responding to this challenge, the alternative interventions are clearly required to supplement existing core tools. The Ministry of Health in collaboration with partners has already approved introduction of mosquito repellents to supplement the core tools of bed nets and indoor residual spraying.

The National Integrated Vector Management recommended integration of mosquito repellents into existing vector control interventions at community level to prevent outdoor malaria transmission.

Mosquito Repellents are now part of the national list of essential medicines published in 2015 and were included in the malaria contingency strategy developed by the ministry in 2016 and extended into malaria strategic plan 2013-20.

But mosquito repellents were already on the market being imported by traders in a form that was not regulated which prompted RBC in collaboration Rwanda Standards Board, the lead Government agency in development of standards to help develop standards for the repellents.

“With RSB and other partners we went to the market and found various types of repellents. The challenge was that traders did not have standards to regulate them, ascertain their quality, transportation, storage, distribution and even how they are procured” Dr. Hakizimana adds.



The other challenge was that people did not know how to use them; for instance those using the candle form would lit them throughout the night, yet a mosquito repellent effect remains active for 6 to 8 hours.

Do Mosquito Repellents replace other Vector Control tools?

Dr. Hakizimana emphasizes that mosquito repellents are supplemental vector control tools to the core tools of bed nets and indoor residual spraying.



“They [mosquito repellents] are replacing none of these [core tools],” he advises.

Target Group

According to Dr. Hakizimana, mosquito repellents are not tools for universal outreach. They are mostly distributed through pharmacies and are most helpful to groups such as students at boarding schools, farmers, security forces, health centres, people residing near wetlands, and bars among others.

Repellents are meant to control night and outdoor transmission, they are supplemental tools. Currently, the Government is not directly involved with supplemental tools but is promoting them through partners like SFH.

“Area night and outdoor transmissions also called residual transmission must be targeted as we move towards elimination of malaria,” Dr. Hakizimana emphasises.



THE OTHER CHALLENGE WAS THAT PEOPLE DID NOT KNOW HOW TO USE THEM; FOR INSTANCE THOSE USING THE CANDLE FORM WOULD LIT THEM THROUGHOUT THE NIGHT, YET A MOSQUITO REPELLENT EFFECT REMAINS ACTIVE FOR 6 TO 8 HOURS.





ENHANCING THE WHOLE VALUE CHAIN

HORIZON SOPYRWA; A GIANT IN PYRETHRUM VENTURES INTO MOSQUITO REPELLENTS



SOPYRWA laboratory that ensures product quality assurance

Sopyrwa engages in the production, processing and marketing of pyrethrum; a natural botanical insecticide derived from the chrysanthemum flower, essential oils and greenhouse products.

Established in 2008, Sopyrwa as a subsidiary of Horizon Group, with a factory capacity of 3,000 tons of dry flowers per year, processing 10% of the global production of pyrethrum pale extract.

Since the take over from Office du Pyrethrum du Rwanda (OPYRWA) to SOPYRWA by Horizon Group, the plant utilization has grown from under 10% to over 60 %, hence greatly increasing the volume of pyrethrum produced in Rwanda.

Horizon SOPYRWA has transformed the pyrethrum sub sector in Rwanda, and made the country a regional leading exporter of this cash crop.



SOPYRWA Plant

Pyrethrum is a natural plant product that is produced by the pyrethrum daisy. The flowers contain pyrethrins, which are natural properties capable of protecting people, crops and animals from insect damage.

Pyrethrum and mosquito repellents

Pyrethrin contain insecticide that on contact immediately attacks the nervous system of insects. In the lowest concentration, this affects insect behaviour, producing a so called avoidance reaction, which results in insects fleeing the source of the chemicals.

Importantly, pyrethrum induces abnormal behaviour in female mosquitoes, making them unable to exhibit their normal biting behaviour of seeking blood meals.

At slightly greater concentration, pyrethrins make insects lose normal behavioural patterns. Hence they abandon their hiding places and are flushed

out into the open, coming into contact with larger quantities of pyrethrins which destroys them.

It has a low mammalian toxicity with proven safety towards humans and other warm blooded animals. It is an effective insect repellent and is by far the most widely used natural insecticide.

Unique Factor of Pyrethrum

When pyrethrum is processed, a refined concentrate known as pyrethrum pale is extracted. This is then used in the manufacture of pesticides and insecticides. Compared to many other synthesized pesticides – such as synthetic pyrethroids – pyrethrins have a favourable profile.

While all pesticides can be toxic to aquatic and other organisms, pyrethrins are ten to over hundred times less toxic than synthetic pyrethroids and are rapidly eliminated from the environment.



Rwanda among few world producers

There are a few major world producers of pyrethrum. Rwanda is the second largest producer of pyrethrum after Australia. In the Northern Province where it is grown, the volcanic soils, high altitudes and good distribution of rainfall give pyrethrum a superior quality worldwide.

Supporting Rwandan Farmers

Horizon Sopyrwa works with farmer cooperatives that grow aromatic crops. The cooperative farming model is a valuable social arrangement that fosters strong relationships among farmers and ensures enough and reliable supplies.

Pyrethrum farming has helped improve the livelihoods of farmers, who in turn transform their communities and standards of living.

According to Mr. Victor Hirwa, the Manager Essential Oils, Sopyrwa extends seeds and fertilisers to farmers, and offers extension services to farmers to ensure best practices in planting, harvesting and post-harvest handling of the pyrethrum.

About Essential Oils

An essential oil is a pure concentrated liquid containing the aromatic compounds found in plants. Essential oils are categorised according to the distinctive plant from which they were extracted.

Rwanda is regarded as a favourable location for producing essential oils because of the good soils and weather conditions that favour growth of the plants from which the oil is extracted.

Horizon Sopyrwa began growing aromatic plants in response to the increasing demand for essential oils.

The company's objective is to produce world class essential oils products, that not only keep customers happy, but also contribute to Rwanda's economy through diversification of exports.

Sopyrwa produces semi-finished oils most of which are supplied to Agropy, another subsidiary of Horizon Group to produce finished products. However, the company is looking forward to venturing into production of finished products, particularly mosquito repellents.

They not only produce pyrethrum but also own farms of aromatic plants such as rosemary, eucalyptus, lemongrass, geranium, patchouli, tegetes and Artemisia spread all over the country and with some like lemongrasses growing on hills hence helping in the fight against soil erosion.

Quality assurance in processing

The company has the latest technology equipment to extract the oil. The main machines are Steam Boiler, Tank, Condenser, and Oil Separator.

The plant is composed of sections; grinding, extraction and refining. Essential oils are extracted from aromatic plants such as Lemongrass, Patchouli, Tagetes minuta, Lemon verbena, Geranium, Eucalyptus and Rosemary. Other natural oils extracted from Artemisia annua and Tetradenia riparia.

Sopyrwa boasts of a state of art laboratory which ensures that products are tested for quality control purpose. Tests are done at all stages from raw form, processing, production and during value addition.

There is optimism that with industry standards in place the industry will perform better as there are guidelines. Also, processors will venture into a wide range of products since it is a matter of working on formulations.

Future plans

Sopyrwa is looking forward to creating partnerships with districts with conditions that favour growth of aromatic plants and pyrethrum. This will not only increase production but also create employment and improve peoples' livelihoods.

The company targets in future to produce mosquito repellents in form of soap, wipes, spray, candle, tablets, liquid vaporisers liquid detergents, coils, liquid detergents, to mention a few.



There are repellents on the market which use synthetic as ingredient but we shall use organic material. We are venturing into end use products specifically using essential oils," says Hirwa.

development and environmental protection. Bi-products are used as sources of energy to run factory operations hence cutting on operating costs.

Environmental Considerations

Sopyrwa adheres to the highest environmental standards to ensure products do not negatively impact the natural environment during production and use.

Steam is used instead of firewood to power the processing machines and use UN recommended aluminum bottles for packaging.

Plantations are protected with integrated erosion control methods, by-products and waste are turned into organic fertilisers and later distributed to farmers to provide a natural alternative to chemical fertilisers.

These efforts are all made in line with Horizon Sopyrwa's commitment to sustainable

Sopyrwa range of Essential Oils:

Lemon Verbena Oil: Lemon verbena has a wide variety of uses, especially in culinary practices. Tea becomes more flavourful when lemon verbena leaves are added. The leaves of the plant, when sliced, give a lemony flavour to drinks, confectionery, fruit puddings, cakes, and even to homemade ice cream. It is also commonly used in perfumes and cosmetics for an additional citrusy scent.

Geranium Oil: Horizon Sopyrwa specialises in the growing and steam distillation of geranium plants for the production of organic geranium oil. The oil is 100% pure and wholly derived from *Pelargonium graveolens*. Geranium oil is one of the key ingredients in many cosmetics and perfumes and has a fantastic scent.



Inside SOPYRWA plant

Patchouli Oil: Patchouli oil is known mostly for its use for medicinal purposes and in aromatherapy. The health benefits can be tied to its properties as a sedative, antiseptic, fungicide, insecticide and antidepressant.

Tetradenia Riparia Extract: This oil is used for medicinal purposes and has been found to be an effective cure for bacterial diseases. Due to increasing antibiotic resistance in microorganisms and the side effects of synthetic antibiotics, this medicinal plant is now gaining popularity in the treatment of bacterial infections and is considered as a clinically effective and safer alternative to antibiotics.

Lemongrass Oil: Lemongrass oil can be used in aromatherapy to relieve muscle pain, kill bacteria, ward off insects, and reduce body aches. It can also help your digestive system. It can be used to flavour tea and soups, and it adds fragrance to cosmetics, soaps, and deodorizers. Lemongrass tea is known to help women with menstrual cramps and it can also help relieve nausea.



Artemesia Annu Extract: The extract of *Artemesia annua* has been found to be effective against malarial vectors. Today, malaria is still a major health challenge, killing more than one million people around the globe.

Eucalyptus Oil: Eucalyptus oil helps cleanse the body of toxins and harmful microbes that can make you feel unwell. The oil is also an excellent cleanser to remove grease and grime and can relieve sore hands and feet when mixed into a salt bath.

Eucalyptus oil has also been found to be useful in treating sinusitis. Moreover, the oil can be used for natural home care as an odour remover, air cleanser, and spot remover.





SOPYRWA PROVIDING READY AND RELIABLE MARKET;

LEON MUBERA A FARMER WITH A PASSION FOR AROMATIC PLANTS.



Mr. Mubera in his lemongrass plantation

Mr. Leon Mubera talks about aromatic plant farming with excitement and passion. A resident of Rugarika sector in Kamonyi, his portfolio of plants include rosemary, geranium, menthe, arethemisia and aneth among others. He supplies his harvest to Sopyrwa for produce of essential oils.

The 56 year old says he is passionate about the trade in which he has spent 10 years doing research, farming and helping fellow farmers with a desire to venture in it.

"I have a 5 hectare plantation of lemongrasses. I extend inputs and extension services to out growers whose produce I buy and sell to Sopyrwa," he says.



Mr. Mubera owns three demonstration farms that help him make trials, teach and offer advise to fellow farmers.

His future plan is to plant aromas around Nyabarongo belt; in order to expand his farm size and fight mosquitos in the swampy area.

Mr. Mubera testifies that, aromas are highly profitable, thanks to Sopyrwa which provides ready market for his harvest. Annual yields for aromatic plants are about 10 times more profitable than beans, 10 times more profitable than maize and three times more profitable than cassava.



AGROPY LTD PRODUCING QUALITY RELIABLE

MOSQUITO REPELLENTS



AGROPY Products

Agropy Ltd has built a solid reputation in production of high quality bio pesticides thanks to pale extracts from pyrethrum most of which is grown around the Volcanoes.

Agropy Ltd produces mosquito repellent called Bireti repel with repelling capacity of 4-6 hours. Bireti repel is made out of Bio materials and is on market for the last three years.

Mr. Harelimana Pierre Chrysologue the Formulation Chemist at Agropy notes that there are other repellents on the market some of them



produced out of sythetic hence the development of mosquito repellents standards was timely.

“The industry had to be regulated to curtail unfair competition and application of substandard ingredients,” he emphasises.

Agropy Ltd has completed formulations for cream repellents and is planning to produce liquid vaporisers among others. Standards have been developed for all these thus paving way for their production.

Quality Assurance

The whole process begins with developing formulations after which small quantities for use in efficacy tests are produced;

- Laboratory Bio ASSAYS applied on mosquitos and observe the effect.
- Outdoor application on the mosquito habitants
- When the products pass these efficacy tests they are taken to RSB for further conformity tests prior to registration.
- AGROPY products have acquired RSB Standardization Mark which attest their compliance with quality standards

List of mosquito repellents produced by AGROPY:

Bireti Repel: Made from natural pyrethrum produced from African Chrysanthemum flowers, Bireti Repel repels and inhibits the insect biting mechanism and kills insects offering greater protection against mosquitoes, and a wide range of biting insects. Under a normal setting 10 metered doses of Bireti Repel gives seven hours of protection.

It is pocket size, each 30ml bottle easily fits in a pocket or purse. It is environmental friendly.

Currently, Bireti repel is available in three different scents, all from Rwandan essential oils, that is; eucalyptus, geranium blend, geranium and patchouli.

It can be used for outdoor protection against mosquitoes when walking, camping or sitting outdoors. Bireti repel can also be used to clear rooms and tents of mosquitos and other insects

hence making it an invaluable travel companion.

TUUZA Insect Killing Spray: Was developed to provide solution to common home and garden pests such as mosquitos and cockroaches.

TUUZA Natural Spray: Contains 0.25 percent of pyrethrins and does not contain hydrocarbon solvents. It is environmentally friendly product used to kill insects on contact, has a repellent effect and is excellent at flushing insects from hidden places.

Tuuza Long Lasting Spray: It contains natural pyrethrins at 0.2% w/w and permethrin at 0.1% w/w. It also kills on contact after flushing and repelling. It has additional feature of being long lasting. It is ideal for indoors in domestic premises, restaurants, bars, public hygiene, non-occupied wards of hospitals, kitchens.

It is also applicable to outdoor places; patios, hotels, paths, amenity areas, refuse vehicles, transit stations, cargo holds, farm buildings, milking parlours, among others.



Bireti repel is available in three different scents, all from Rwandan essential oils, that is; eucalyptus, geranium blend, geranium and patchouli.







IKIREZI NATURAL PRODUCTS; PRODUCING QUALITY

MADE IN RWANDA ESSENTIAL OILS USED TO FIGHT AGAINST MALARIA



IKIREZI Product

ikirezi Natural Products is a community-interest agribusiness which aims at holistically transforming lives of local rural small farmers and their communities. It is also involved with processing of mosquito repellents.

- The company partners with small farmers to produce and harvest essential oil crops from which they extract high quality essential oils. The main product being geranium which is 100 percent organic, wholly harvested from *Perlargonium graveolens*.

Other products are: lemongrass oil, distilled from *Cymbopogon citratus*; Eucalyptus oil

distilled from *Eucalyptus globulus* and Patchouli oil, distilled from *Pogostemon cablin*, Tagetes oil a volatile oil, distilled from *Tagetes minuta*, Rosemary oil distilled from *Rosemarinus officinalis* and insect repellents for which geranium and lemongrass oils are the main ingredients.

Background of essential oils in Rwanda

During Rwanda's colonial period, Belgian farmers introduced essential crops such as geranium, eucalyptus and vetiver. Vestiges of distillation units exist until now especially in northern Rwanda.

Following Rwanda's independence in 1962, geranium fields were converted to grow other crops, and distillation equipment fell into disrepair. Several small-scale efforts to revive the essential industry occurred prior to the Genocide against Tutsi in 1994 but failed to achieve commercialization.

In 2002, Agribusiness in Sustainable Natural African Plant Products (ASNAPP) performed product and market studies to assess the potential of natural plant products in Rwanda.

ASNAPP recommended essential oils, explicitly organic geranium among others, as an attractive agribusiness opportunity. Shortly thereafter, a joint project between ASNAPP and World Relief Rwanda (WRR) was established to study the viability of commercializing geranium oil.

Following successful completion of the ASNAPP/WRR project, Ikirezi was founded as a community-interest company in August 2005.

The project's major accomplishments include

- Sourcing of South African Bourbon-type geranium
- Mobilization of 100 farmers into two associations, and successful training to grow and cultivate healthy geranium plants
- Construction of two 200-kilogram capacity distillation units to produce international quality oil
- ECOCERT organic certification for land and facilities
- Establishment of a network of domestic and international partners with technical expertise in essential oils

Benefiting from the country's excellent growing conditions, Ikirezi continued to mobilize and train willing farmers and farmers' associations/cooperatives to grow essential oil plants.

Currently farming activities concentrate on our main farm in Gahara Sector, Kirehe District in Rwanda's Eastern Province. Operations also extend to a few committed out growers who supply Ikirezi. Ikirezi distills the essential oils that are sold on local and international markets.

Ikirezi achieved its first organic certification in 2006. Since then, ECOCERT, an international certifying organization has been inspecting Ikirezi's operations every year and has always been issued with an organic compliance certificate valid both in European Union and North America.

The firm works primarily with widows, adult orphans and very poor people in a holistic effort to restore their dignity, improve their livelihoods, and rebuild their communities.

Our partners

In our efforts to help small farmers get out of poverty and live a dignified life, we partner with a number of businesses and organizations with a strong social focus or that share our social mandate.

These businesses and organizations include but are not limited to:

Thistle Farms whose mission is to HEAL, EMPOWER, AND EMPLOY women survivors of trafficking, prostitution, and addiction.



ikirezi
Natural Products
LEMON GRASS OIL
Specially produced in Rwanda
3 ml

ikirezi
Natural Products
EUCALYPTUS OIL
Specially produced in Rwanda
3 ml

ikirezi
Natural Products
LEMON GRASS OIL
Specially produced in Rwanda
3 ml

ikirezi
Natural Products
LEMON GRASS OIL
Specially produced in Rwanda
3 ml

ikirezi
Natural Products
Patchouli Oil
Produced in Rwanda
www.ikirezi.com

ikirezi
Natural Products
Essential Oil
Rwanda

They do this by providing safe and supportive housing, opportunity for economic independence, and a strong community of advocates and partners.

The 7Virtues with a mission to Make Perfume Not War. To make rebuilding more exciting than destruction.

Ikirezi Natural Products and mosquito repellents

Dr. Nicolas Hitimana is the promoter of the company. He says the repellents are oils and thus falls under the core business of his company – producing essential oils.

Ikirezi in development of standards

Ikirezi participated in the weeklong workshop developing standards for mosquito repellents. A Specialist in Insect Plant Interaction, Dr. Hitimana says it was very important that industry experts were called upon to join hands with Rwanda Standards Board to develop the standards.

“Standards reassure the consumer. They check claims by manufacturers. For instance, it is critical that this product really repels the mosquitos. To be a repellent it must meet some standards; in case you smear it on your body a mosquito should not come to you. And this must be confirmed by an independent body,” he says.

Also, by involving stakeholders, means that RSB acknowledges there is expertise that manufacturers possesses and had to be taped into. It also increases uptake and reduces on theory as it boosts realism – stakeholders commend this approach.

Quality Assurance

Dr. Hitimana sums it up:

Our mission is to become a leading producer of essential and natural oils, therefore quality is at that heart of who we are. And we are competing worldwide, to go to international arena you must ensure highest quality. We are pioneers in this sector of essential oils.

We have been partnering with RUTGERS University in the United States of America who are helping in quality assurance. Quality improvement to us is a continuous exercise. That tells you how quality is at the centre of what we are doing”.

He says the beauty with mosquito repellents is that they are derived from natural ingredients, have a good scent and can be formulated in different forms but with a single ingredient.

“Standards reassure the consumer. They check claims by manufacturers. For instance, it is critical that this product really repels the mosquitos. To be a repellent it must meet some standards; in case you smear it on your body a mosquito should not come to you. And this must be confirmed by an independent body.







FROM QUALITY ASSURANCE TO DISTRIBUTION

**SOCIETY FOR FAMILY HEALTH AT THE FOREFRONT
OF CURBING MALARIA IN RWANDA THROUGH THE
DISTRIBUTION OF MOSQUITO REPELLENTS.**



Mr. Manasseh Gihana Wandera, SFH Executive Director

Society for Family Health (SFH) Rwanda is a Non-Government Organization that was established out of Population Service International (PSI) Rwanda, with a desire to ensuring sustainability and ownership of interventions previously conducted by PSI.

SFH major interventions are centered on promotion of behavior change practices through improved communication techniques and social marketing of health products and services.

Such products and services are related to HIV and AIDS, Malaria control and prevention, Family Planning, Water, Sanitation and Hygiene (WASH) Maternal and Child Health (MCH) and Nutrition.

Thus, SFH is driven by the steadfast commitment to use evidence based approaches to meet needs of the most vulnerable people of Rwanda. SFH Rwanda's head office is located in Gasabo District in Kigali and carries its programmatic operations countrywide.



It also operates five regional offices in the districts of Gasabo (Central Region), Kayonza (Eastern Region), Musanze (Northern Region), Huye (Southern Region) and Karongi (Western Region) – all offices are situated in town centres.

With its chain of offices across the country and other networks, the organization has unique and exceptionally designed models of implementation and works closely with its targeted audiences to understand and address the critical issues they face.

It disseminates the most relevant behavior change messages, gathers and analyzes the most relevant information, asks and develops innovative strategies for passing such messages to the community in each health intervention.

Therefore, SFH understands the challenges and opportunities its target audiences face in real life and provides the best approach out of them. Ultimately, it matches and hones its interventions with the most appropriate fit for the target audiences.

SFH engages communities and district leaders through various approaches and strategies which include but not limited to; mid and mass media, interpersonal and communications sessions (IPCs).

Others include meetings, sketch and drama sessions, special events (such as football & cycling), roadshows and concerts, mobile video units (MVUs), community dialogues, door to door sessions and many more.

In addition, SFH has one of the strongest chains of Community Based Organizations (CBOs) that are well equipped and supported to implement country wide and far reaching health interventions for healthier living.

SFH SUPPORTS PROMOTION OF COMPLEMENTARY INTERVENTIONS AGAINST MALARIA

Mr. Manasseh Gihana Wandera is SFH Executive Director. He says his organization is involved with mobilization of citizens to clear bushes, behavior change, sleeping under bed nets, identifying mosquito breeding grounds and destroying them and testing and treatment of malaria.



He says mosquito repellents are complementary interventions to existing tools in the fight against malaria particularly in avoiding outdoor mosquito biting since mosquitos have developed a tendency of biting people while outside – before going to bed.

“And, already we can see significant progress. For example, in Nyanza where we are having these repellents at health posts we can see that malaria death is really reducing.

Not necessarily because of our work but our work is supplementing existing efforts,” Mr. Gihana says.

Mr. Gihana says standards for mosquito repellents are significantly useful because they ensure everyone is playing by the rules. Everyone knows dos and don'ts and unlike before now players have a point of reference in the developed Standards, RSB.

“So we are excited with the standards...as civil society our biggest interest is to support the population and a healthy population is enough profit for us,” he adds.

On distribution, he says it is grass root based; repellents are distributed through wholesalers, retailers up to health community health advisors where the ratio of one health advisor to residents is 1:40.

SC JOHNSON & SON. INC, A FAMILY COMPANY AT WORK FOR A BETTER WORLD THAT MAKES PRODUCTS TO IMPROVE LIVES.

The company manufactures insecticides products for mosquito bites and control and prevent malaria.

The Government of Rwanda, through the Ministry of Health in partnership with SC Jonson and Society for Family Health (SFH) Rwanda have introduced vector control products (Repellents) such as Baygon, OFF Lotion Tube and OFF Lotion Sachet, to prevent mosquito bites and malaria in the community. These products will support/ complement to the existing malaria prevention interventions and approaches that the Ministry together with its partners and stakeholders have been using to ensure the eradication of malaria in Rwanda.

This partnership started in 2016, with Five districts as project pilot, later the partnership had a targeted expansion and implemented countrywide. Community Based Organization

and CHWs were trained on the use of malaria repellents, and now are the key implementers to promote these products. We believe that once properly used, the products will significantly contribute to the reduction of malaria disease and prevent the mosquito bites in the community.

In addition to the malaria prevention project, SC Johnson recently has expanded the partnership with the Ministry of Health and SFH Rwanda, whereby 13 Health Posts were built and more

40 new health posts will be built in rural areas to increase access to health care services. This is under the global health coverage program where Rwanda is also among other countries with the target of increasing access to health care services. The HPs will be a hub of MNCH services including malaria prevention education, services and products.

SFH RWANDA WORKING HAND IN HAND WITH COMMUNITY HEALTH ADVISORS TO PROMOTE THE UPTAKE OF MOSQUITO REPELLENTS AND CURB MALARIA.

SFH has over the years worked with community health workers in order to easily reach target communities and easily distribute mosquito repellents. We talked to Community Health workers in Bugesera District and below are their testimonies

MS. NYIRABAGENZI CATHERINE:

She is a community health advisor based in Ruhuha sector, Bugesera District. The 51-year-old is in this service since 2007, particularly mobilizing residents in the fight against malaria.

She asserts that Bugesera District is among parts of Rwanda with high presence of mosquitoes, thus her work has not been an easy one. But with the advent of mosquito repellents, she says things have changed for good.

“Residents have embraced use of mosquito repellents. They are harmless to newly born babies hence mothers like them a lot. A coil burnt indoors helps repel mosquitoes that were biting people from outdoors,” she says.



With a single coil costing Frw500, Ms. Nyirabagenzi says it is affordable to residents and has never heard them complain about the price,



SC Johnson
A Family Company

Baygon

10
Nights

Without
mosquitoes



Scented
Mosquito
Coil

Floral

10 Coils
Net Weight: 125g

KEEP OUT OF REACH OF CHILDREN AND PETS

Active Ingredient: d-Allethrin 0.20% w/w
HSR No.: 5354

10 Coils
Net Weight: 125g

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10
Nights

Without
mosquitoes

Mr. Safari Bosco:

Safari Bosco has been a community health advisor in Nyamigende cell, Ruhuha sector in Bugesera district since 2009.

He says his cell borders a swamp, in the past residents suffered from malaria disease immensely.

“Before introduction of mosquito repellents we were attending to 100 malaria patients in a month. Today, those figures do not exceed 30.

We advise people to use repellents up to when they go to bed where they must sleep under bed nets,” Mr. Safari adds.

As a community health worker, Mr. Safari is all thanks to SFH for not only contributing to curbing Malaria in his cell but also positively impacting



his economic life; he buys a coil at Frw400 and sells it at Frw500 which has enabled him buy two broiler chicken and looks forward to acquiring a goat

Nturanyenabo Jacques 39:

Nturanyenabo Jacques is 39years old. He is a community health advisor in Musenyi sector in Bugesera District.

Jacques says the use of mosquito repellents particularly Baygon in his cell is high. People know how to use them. Those I have taught have taught others.

According to him, Musenyi sector is heavily infested with mosquitos since it is close to a swamp but with use of Baygon repellents malaria is down.

He testifies that in his sector, cases of malaria infection have tremendously reduced. Bar operators are placing orders, they want patrons to have their drinks without disturbance from mosquito nuisance.



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