

Beneficial Increase in Milk Yield and Weight of Bovines by using MozziQuit Mosquito Trap Device in Cow Sheds-Evaluation on Control of Mosquitoes and other Nematoceran Insects

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Abstract

Plasma biomarker assays have become a trend for risk evaluation in Alzheimer's disease. Several studies have been performed to explore their preclinical performance. However, there are very few studies on the storage stability of the reagents used in these assays. The determination of the storage stability of reagents is important because reagents may be stored for a few months prior to end use. In this work, the stability of the reagents used for assaying plasma amyloid β_{1-40} ($A\beta_{1-40}$), $A\beta_{1-42}$ and total tau protein (Tau) was assessed using immunomagnetic reduction. Reagents immediately after synthesis and reagents in opened vials were used to assay the concentrations of $A\beta_{1-40}$, $A\beta_{1-42}$ and Tau in human plasma samples. The recovery rates of the concentrations of biomarkers at different times after synthesis of open vial were calculated to determine the period of stability of reagents. The results showed that the reagents stored at 2°C-8°C were stable for at least 52 weeks. The reagents in open vials were stable for at least six weeks. These stabilities indicate that the reagents used to assay plasma $A\beta_{1-40}$, $A\beta_{1-42}$ and Tau levels are verifiably qualified for clinical use.

Keywords: Reagent stability • Plasma • Alzheimer's disease • Immunomagnetic reduction

Introduction

Mosquitoes are of major Veterinary and Medical importance due to their role as Vector for transmission of various parasitic, bacterial and viral diseases. Mosquitoes are distributed throughout the world. They are found at altitudes of over ~4700 m as well as in mines ~1250 m below sea level. Besides a worldwide distribution they are in general predominantly tropical pest. Mosquitoes usually travel a few hundred meters from their emergence sites. Generally, it is assumed that they do not fly further than 2km, but have been recorded to be dispersed 100 km or more, through wind.

Mosquitoes feed on fruit juices and sugar water and male Mosquitoes normally exist on such food, but the females are blood suckers and require a meal of blood in order to lay eggs. The females seem to be attracted by the warmth radiating from the skin of their host either people or animals. They are active at night and are attracted mainly by carbon dioxide emitted by their host, while during the day they hide in areas of darkness, behind hanged cloth or lofts or shoe racks etc.

The integrated pest management plays an important role in controlling larval and adult habitats. Management mainly involves altering water

bodies in order to reduce sources for larval development and egg laying. Biological control can be accomplished with the assistance of mosquito fish *Gambusia affinis* which feed on mosquito larvae but these methods have very less impact in Control of Mosquito population. Chemical control by use of insecticides is mostly employed but development of resistance and environmental pollution are a major issues of concern. Secondly, the application of larvicides must be repeated periodically during the breeding season, it is costly and requires personnel for application, supervision and also for evaluation. Cow owners use chemical based mosquito repellent coils and also burn coconut shells to spread smoke in cow shed to chase mosquitoes. In fact, Cows are more sensitive than people and they are in tied position inside cow shed as a result cow's kidney and liver get affected leading them to die earlier than their actual life span due to slow poison from chemical repellents and from the harmful smoke emitted by burning coconut shells. Hence, alternative methods to Control Mosquitoes like use of trapping and killing device like MozziQuit is very much needed.

In present study patented MozziQuit mosquito trap device developed by M/s Leowin Solutions Private Limited, Mangalore, Karnataka, India was evaluated on the effective performance of trapping of mosquito vectors in cow sheds, poultry farms and in livestock farms as well as the various

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benefits of using MozziQuit device [1-3].

Objectives

This To study the efficacy of MozziQuit (MQ-MAX and MQ-MINI) to trap mosquitoes and other Nematoceran Insects in cow sheds, Livestock Farms and Farm Premises.

To evaluate and validate MozziQuit (MQ-MAX and MQ-MINI) for Control of Mosquitoes and possibly other Nematoceran Flies.

Practical utility of the investigation including economic implication likely to achieved through the use of MozziQuit device - The menace of Mosquitoes and other Nematoceran Insects of smaller size can be effectively checked. Since they are both Pests and Vectors, their eradication by MozziQuit can have a good impact on general health and indirectly improves the productivity of milk and weight.

Location

Department of Parasitology,

Veterinary College, Hebbal

Bangalore-560 024

Techniques to be adopted for the Investigation in Brief

This MozziQuit traps will be placed in different cow sheds and in few livestock farms.

MozziQuit traps will be monitored on daily basis.

The efficacy of the MozziQuit trap in mosquito and fly control will be evaluated.

Milk Yield and Weight of Cows to be monitored to check the difference post using MozziQuit in cow sheds.

Duration of the Investigation

6 months

Facilities Available

All the infrastructure facilities required for the evaluation/project & technical expertise is available in the department.

Background and Status of the Problem as Related to the Proposed Study

Mosquitoes and Nematoceran Insects are very difficult to control in spite of a number of available methods being implemented, such as various insecticides/pesticides, barriers and repellents. Therefore novel approaches are highly essential.

Mosquitoes are everywhere. Female Mosquitoes bite people, animals and birds everyday again and again for blood meal required for their breeding. Female Mosquitoes lay 300 to 1000 eggs during their life span of 30 to 100 days depending upon the species as a result mosquito population multiply quickly in multi folds.

Practically it is not possible to restrict entry to female mosquitoes inside cow shed/animal farms and the density of mosquitoes is found is very huge. Cows are mostly tied up in cow sheds. Cow's precious energy is wasted by swinging their tail all around their body to chase biting mosquitoes. Mosquitoes get panic and restless as their tail cannot reach to their neck portion to chase biting mosquitoes as a result milk yield and weight of cows is reduced as they consume less feed.

Sir Ronald Ross, an Indian born British National was Awarded Nobel Prize in 1902 for his discovery that Malaria Parsite is been transmitted by Mosquitoes. Ref: http://www.nobelprize.org/nobel_prizes/medicine/

laureates/1902/ross-facts.html. Since then Governments of all the countries with the assistance from WHO and World Bank are spending millions of amount every year for eradication of Mosquitoes under National Vector Borne Disease Control Programme besides conducting Malaria Awareness Programme. In spite of this initiative since 118 years, as of date still Mosquito population is increasing every year [4-7].

According to WHO Report, About 3.4 billion people-Half of the World's Population are at risk of malaria. Every 2 minutes, a child dies of malaria. And each year, more than 200 million new cases of the disease are reported. Although countries have dramatically reduced the total number of malaria cases and deaths since 2000, progress in recent years has stalled. Worryingly, in some countries, malaria is on the rise. In 2013, 97 countries had on-going malaria transmission. Ref: <http://www.who.int/features/factfiles/malaria/en/>

The incidence of dengue has grown dramatically around the world in recent decades. Over 2.5 billion people-over 40% of the world's population-are now at risk from dengue. The incidence of dengue has grown dramatically around the world in recent decades. A vast majority of cases are asymptomatic or mild and self-managed, and hence the actual numbers of dengue cases are under-reported. Many cases are also misdiagnosed as other febrile illnesses.

One modelling estimate indicates 390 million dengue virus infections per year (95% credible interval 284-528 million), of which 96 million (67-136 million) manifest clinically (with any severity of disease). Another study on the prevalence of dengue estimates that 3.9 billion people are at risk of infection with dengue viruses. Despite a risk of infection existing in 129 countries, 70% of the actual burden is in Asia. The number of dengue cases reported to WHO increased over 15 fold over the last two decades, from 505,430 cases in 2000 to over 2,400,138 in 2010 and 3,312,040 in 2015. Ref: <http://www.who.int/mediacentre/factsheets/fs117/en/>

Material and Methods

Food Grade Powder Additives are added in the raw material of Polypropylene Plastic raw material while producing few of the plastic casing parts of MozziQuit device in Injection Molding Machine. Food Grade Powder Additives get dispersed all around within the said plastic parts by spreading everywhere 100% uniformly which remain forever intact in the said plastic parts beyond even 25 years. The light installed inside MozziQuit device in invisible mode without emitting any UV Radiation from the device releases luring effect with the combination of Food Grade Powder Additives dispersed everywhere in the said plastic casing parts. The Electronic Circuit Board (PCB) installed inside MozziQuit device to convert AC power to DC power generates required temperature (Figure 1).

Female Mosquitoes originally from the nearest external breeding locations enter inside houses/rooms and cow sheds mostly between 5 pm to 7 pm by detecting the smell of Carbon Dioxide exhaled by their hosts i.e. people and cows to extract blood required for their breeding process get attracted to MozziQuit device by the luring effect and the temperature emitted by MozziQuit device and start flying all around the openings particularly the trapping zone of the MozziQuit device. The fan installed inside MozziQuit device forcibly sucks/vacuum all Mosquitoes which fly around the trapping zone to enter into the MozziQuit device making them to pass forcibly through the perforated plate having holes slightly bigger than size of mosquitoes provided above the removable collection container. All trapped mosquitoes get collected in the removable collection container partially injured while passing through the perforated holes which die subsequently in some time.

MozziQuit was kept at a height between 2 to 4 feet height from ground level in cattle, poultry, piggery farms and human dwellings at various institutions of Karnataka Veterinary Animal & Fisheries Sciences University.

When this device MozziQuit was switched On most of the lights were switched off so that all the Mosquitoes present in the farms were attracted to MozziQuit. The MozziQuit was kept On from evening 6 pm to next day morning till 6 am. The Mosquitoes which were attracted, killed and collected in the container were counted on daily basis to evaluate the trapping efficiency of MozziQuit in control of Mosquitoes and other Nematoceran Insects [8-14].

Summary of the Results/Findings & Discussion

- The attracting, trapping and killing efficiency of MozziQuit was assessed during the period of May 2014 to October 2014.
- During this period of study, a number of biting insects were attracted, trapped and killed by this device MozziQuit.
- A large number of Mosquitoes were attracted, trapped and killed by MozziQuit along with the other harmful flies like Psychodida, moths, midges and Culiocoids.
- Among Mosquitoes, maximum number of Culex species were attracted and killed followed by Aedes and Anopheles species which were found in the vicinity.
- Maximum number of Mosquitoes were attracted, trapped and killed by MozziQuit device during the months of May and June. when the Mosquito population was high.
- MozziQuit, an electrical device was found to be very effective in attracting, trapping and killing the maximum number of Mosquitoes in livestock farms. This indicates that all the farm animals and poultry birds are devoid of annoyance caused by the Mosquitoes and as Mosquito Population reduces there are less chances of transmission of other parasitic and viral diseases to animals and people. MozziQuit indirectly helps to increase milk yield in bovines and weight of cows as well as birds in poultry because of proper feeding, sleep and no nuisance or irritability or waste of energy to chase biting mosquitoes.
- MozziQuit device is cost effective and eco-friendly, does not involve personnel for monitoring or supervision and also for evaluation. Daily operating cost claimed by the manufacturer is said to be at very lower level equivalent to 15 Watts for MQ-MAX and 3 Watts for MQ-MINI only for electricity consumption.
- MozziQuit device attracts, traps and kills mosquitoes in large numbers every day at lowest operating cost of less than 10 paise per day without use of any chemicals or liquids or refills or consumables or smell or smoke or ash or emission of any UV Radiation and very safe to use in cow sheds, animal livestock farms, poultry and in houses.
- More number of mosquitoes were attracted and trapped in MozziQuit device during the month of May and June compared to July and August. This variation could be probably due to the change in the environmental temperature. In later months, there was enough rain in Karnataka State where this device was assessed when the environmental temperature was reduced.
- Author/Innovator claims to have already demonstrated trapping of more than 100 million (10 crore) mosquitoes by One MozziQuit mosquito trap device in 3 months period installed in the cow shed having 17 cows belong to Mr. Clement Lobo at Kenjar, Near Mangalore International Airport in Mangalore. Number of 100 million (10 crore) mosquitoes were measured by checking the weight of counted 2000 dead mosquitoes in jeweller's weighing scale and by seeing the weight of dead mosquitoes filled in 10 PET JARs collected in 3 months by the cow owner. Dead mosquitoes in PET Jars do not rot instead they dry inside PET Jars (see video starting from 7 seconds to 59 seconds out of 6.54 minutes video) in <https://www.youtube.com/watch?v=BGFazFRDcwk&t=4s>

- This trap named MozziQuit can be used for effective control of mosquitoes and related insects in all farms, cow sheds, residential areas and institutions with no side effects and economically viable as well with increase in production levels from farm animals. Presently available mosquito repellents in the market made out of chemicals do not kill mosquitoes. Repelled mosquitoes lay 300 to 1000 eggs at their external breeding location and multiply into multi folds making it difficult to control mosquito population. It is possible to reduce mosquito population by use of MozziQuit Mosquito Trap device as it eliminates further multiplication of mosquitoes by attracting, trapping and killing of female mosquitoes (Figure 2).

Recognitions and Awards

- Following Prestigious Recognitions and Awards at National and International level have been obtained by the Author for MozziQuit mosquito trap device:
 - Summary of the FINAL REPORT of the Field Evaluation Report on MozziQuit mosquito trap device carried out by ICMR-NIMR from Dr. Manju Rahi, Scientist F, ICMR issued with the approval of Director General of Indian Council of Medical Research, New Delhi.
 - WHO has confirmed that MozziQuit is been considered for Prequalification Process under New Vector Control Tools.
 - MozziQuit displayed in 14th Annual Meeting of Roll Back Malaria Partnership to End Malaria-Working Group for Vector Control held in Geneva, Switzerland on 30 January to 1 February 2019.
 - Most Promising Startup MSME Award 2018 conferred at Hotel Ocean Pearl on 03/11/2018 organised jointly by MSME, MRPL, Karnataka Bank and NITTE University.
 - FICCI EXCELLENCE AWARDS 2018-HEALTHCARE STARTUP Award conferred by Lieutenant Governor of Delhi Shri. Anil Bajjal on 30/08/2018 at Delhi.
 - Test Certificate confirming Zero Percent Emission of UV Radiation from MozziQuit device Certified by Centre for Application of Radioisotones & Radiation Technology, University Science Instrumentation Centre of Mangalore University.
 - FINAL REPORT on Evaluation of MozziQuit a Medical Device made for Prevention of Diseases submitted on 21/02/2018 by Dr. S.K. Ghosh, Scientist-G of National Institute of Malaria Research (ICMR), Bangalore to Director of Indian Council of Medical Research, New Delhi.
 - National Agripreneurs Award 2017 on 26/08/2017 at New Delhi.
 - Millennium Alliance Round IV Award Grant of Rs. 15 Lakhs conferred by Dr. Harsh Vardhan, Union Minister for Science & Technology on 20 July 2017 at Delhi.
 - MozziQuit displayed in National Innovation Summit 2017 held at Hotel Lalit Ashok at Bangalore on 13 & 14 July 2017 organised by CII.
 - MozziQuit displayed in FICCI Global R&D Summit 2017 held at Bangalore on 5-6 May 2017.
 - Small Enterprise Startup Business Award 2016 conferred at Hotel Taj Vivanta, Bangalore on 15/02/2017.
 - Spandana Innovative Business Award 2016 conferred at The Gateway Hotel at Mangalore on 26/11/2016.
 - MozziQuit displayed in Festival of Innovations 2016 held at Rashtrapati Bhavan on 16/03/2016 jointly organized by Indian Council of Medical Research, Delhi and National Innovation Foundation, Gujarat as Medical Device made for Prevention of Mosquito Borne Diseases.
 - Evaluation Report issued on 21/10/2014 by Director of Research

of Karnataka Veterinary, Animal & Fisheries Sciences University of Bidar confirming Increase in Milk Yield as well as Increase in Weight of Cows after using MozziQuit in cow sheds.

- Certificate issued by Limca Book of Records confirming trapping of millions of mosquitoes by MozziQuit mosquito trap device in 2014.
- Validation Report issued on 08/02/2014 by Assistant Director of Veterinary Hospital, Mangalore confirming Increase in Milk Yield after using MozziQuit in cow sheds.
- Gold Medal Award in DST-Lockheed Martin India Innovation Programme at Delhi on 20/05/2010 organised by FICCI, DST & Lockheed Martin USA.
- Technology Commercialisation Report issued by IC2 Institute, Global Commercialisation Group-The University of Austin at Texas, USA the Programme Managers of DST-Lockheed Martin India Innovation Programme conducted due diligence.
- Technovation Award-ISA Best Electronic Product of the year 2010 under Healthcare Category held at Bangalore on 01/02/2010.

Recommendation & Conclusion

In 30% of India's present Agricultural GDP is from Dairy Industry. Increase in Milk Yield by using MozziQuit device in cow sheds will enable Women to earn more daily income who mostly work in cow sheds at the bottom of pyramid level. Increase in Milk Yield will also enable all Milk Collection Unions as well as all Dairies to earn more income. Increase in Milk Yield as well as Increase in Weight of Cows will also enable to improve the GDP of every Nation.

Malaria, Dengue, Chikun gunya, Lymphatic filariasis and Japanese encephalitis are the important mosquito borne diseases prevalent in India and pose an enormous burden to the public health system. An. stephensi is the vector for urban malaria, Cx. quinquefasciatus for lymphatic filariasis, Cx. tritaenorrhynchus for Japanese Encephalitis and Ae.aegypti and Ae. albopictus for ZIKA Virus/dengue/chikungunya. A higher number of mosquitoes and vector mosquitoes in MozziQuit traps were observed in the present study, recommending efficiency of this MozziQuit trap for use in houses, cow sheds, in animal farms, poultry farms, in cars, in volvo buses, aircrafts and at external mosquito breeding locations.

MozziQuit is a proven device to eliminate further multiplication of mosquito population/offsprings by attracting, trapping and killing of female mosquitoes in houses/cow sheds/external locations before they could lay thousands of eggs and multiply at their external breeding locations to enable eradication of all mosquito borne diseases in short span of time by implementing use of MozziQuit in every house, cow shed, poultry and at mosquito breeding locations under National Programmes in all 91 malaria infected countries already identified by World Health Organisation as well as through Ministry of Agriculture, Animal Husbandry and Ministry of Tourism.

Author is confident of his MISSION of Making India and the entire World Free of Mosquito Menace in short span of time achievable by using Innovative MozziQuit mosquito trap device in maximum houses, cow sheds, animal farms, buses, cars, aircrafts, street light poles and at external mosquito breeding locations with timely support from all people who have experienced free bites of female mosquitoes.

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