PQT/VCP Executive Summary of Prequalification Decision

Tsara

(Deltamethrin Insecticide Treated Net)

Prequalification Unit – Vector Control Products Assessment (PQT/VCP)

Regulation and Prequalification Department (RPQ)

Access to Medicines and Health Products (MHP)

World Health Organization (WHO)

1 Introduction

WHO's Prequalification Unit, Vector Control Product Assessment team (PQT/VCP) assesses vector control products and public health pesticide active ingredients to determine their acceptability and that they can be used safely, effectively and are manufactured to a high-quality standard. This is done by assessing product dossiers, inspecting manufacturing sites, and supporting quality-control testing of products. Products that meet prequalification requirements are added to the WHO list of vector control products.

WHO prequalification of vector control products primarily benefits populations most affected by vector-borne diseases by facilitating access to these prevention focused tools. The vector-borne diseases include malaria, and neglected tropical diseases such as Dengue, Chikungunya, Zika, Chagas, Lymphatic filariasis, Leishmaniasis, Human African trypanosomiasis, Onchocerciasis and Schistosomiasis.

This Executive Summary document conveys the decision for prequalification of the product Tsara (PQ Ref# 028-002) in conjunction with the Letter of Prequalification. The PQT/VCP Decision Document presents the complete assessment. In some cases, the PQT/VCP Executive Summary may be published in advance of the PQT/VCP Decision Document.

2 Product Identification

Tsara is an insecticide treated net (ITN) incorporated with deltamethrin. The insecticidal treatment is incorporated into the polyethylene monofilament yarn during the extrusion process by addition of a proprietary deltamethrin masterbatch. The product is available in 120D yarn and has a declared fabric weight of 37 GSM. The product has a declared deltamethrin concentration of 2.5 g/kg net which corresponds to 92.5 mg/m^2.

3 Assessment of Quality

3.1 Chemical and Physical Properties

Data on the chemical and physical properties of the active ingredient and the product Tsara were provided. These data were obtained from studies conducted according to established standards and/or Good Laboratory Practices (GLP) and are complete. Product specific properties are summarized in Table 1. The information in this table should be relied upon as the WHO Specification for this product for the purpose of product identification and QA/QC testing.

The source of active ingredient is supported by existing WHO specifications.

Data on the manufacturing process and product composition for Tsara have been provided and are adequate. The product is formulated in Jiangsu, China.

The identified reference methods in Table 2 are appropriate for the determination of the active ingredient and synergist content of the product. These methods were validated through the inter-laboratory CIPAC process.

The quality component of the dossier is considered complete, and the assessment of the submitted information on quality supports the prequalification of the product.

Table 1. Chemical & Physical Properties - Tsara

Title	Study Number	Test method ID	Result
Active ingredient content before washing (5 replicates were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	CIPAC N 333/LN/M2/3	Batch:1 2.55 g/Kg Batch: 1901-002TS: 2.54 g/Kg Nominal content of Active Ingredient: 2.5 g/Kg Acceptable range Deltamethrin: 1.875-3.125 g/Kg
Active ingredient content after storage stability data (5 replicates were tested) 54 °C for 14 days	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	MT 46.3.4 CIPAC N 333/LN/M2/3	Batch:1: More than 95% of Active ingredient remaining Batch: 1901-002TS: More than 95% of active ingredient remaining Requirement: More than 95% of active ingredient remaining.
Wash resistance index (after 4 washing, 1 batch in 1 replicates)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	MT 195 CIPAC N 333/LN/M2/3	Batch 1: 97.1% Batch 1901-002TS: 97.5% Requirement: 94% to 100%.
Wash resistance index (after storage at 54 °C for 14 days and after 4 washing, 1 batch 1 replicates)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	MT 195 CIPAC N 333/LN/M2/3	Batch 1 : 96.8 % Batch 1901-002TS: 97.5% Acceptable range: 94-100%.
Mass per unit area (5 replicates were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	ISO 3801 EN 12127	Batch 1 : 36.9 g/m^2 Batch 1901-002TS: 37.7g/m^2 Acceptable range: 33.3-40.7 g/m^2
Mesh size (5 replicates were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	ISO 139	Batch 1 : 20.0 holes/cm^2 Batch 1901-002TS: 20.0 holes/cm^2 Acceptable value: Minimum average 17holes/cm^2 No less than 16 holes/cm^2
Bursting strength of fabric (before storage stability, 3 replicates were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	ISO 13398-2:1999 (pneumatic method)	Batch 1 : 477 kPa Batch 1901-002TS: 470 kPa Requirement: not less than 380kPa
Bursting strength of fabric (after storage stability, (3 replicates were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	ISO 13398-2:1999 (pneumatic method)	Batch 1: 464.8 KPa Batch 1901-002TS: 466.5 kPa Requirement: not less than 380kPa
Dimensional stability (before storage stability. 2 replicates were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	ISO 3759 ISO 6330 ISO 5077	Batch 1 : -2.5%/-2.7% Batch1901-002TS : -1.2%/-0.8% Requirement shrinkage values: less than 10% expansion values: less than 5%

Table 1. Chemical & Physical Properties - Tsara			
Title	Study Number	Test method ID	Result
Dimensional stability (after storage stability at 54±2 °C for 2 weeks, 2 samples were tested)	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	ISO 3759 ISO 6330 ISO 5077	Batch: 1: -2.0%/-2.3% Batch: 1901-002TS: : -1.7%/-1.3% Requirement: shrinkage values: less than 10% expansion values: less than 5%
Flammability	IIBAT 18116: Batch 1 IIBAT 19247: Batch 1901-002TS	EN 1102	Batch 1 : Not flammable Batch 1901-002TS: Not flammable

Table 2. Details of the analytical method used to determine deltamethrin in Tsara	
Method ID	**Deltamethrin** CIPAC N 333/LN/M2/3 for quantification in LLIN

4 Assessment of Safety

The applicant submitted an exposure and risk assessment for Tsara, conducted by an independent consultant. The submitted risk assessment was conducted according to the WHO "A Generic Risk Assessment Model for Insecticide Treated Nets, 2nd edition, 2018".

PQT/VCP conducted its own hazard, exposure and risk assessments of the active ingredient deltamethrin when formulated as a bednet using the WHO "A Generic Risk Assessment Model for Insecticide Treated Nets, 2nd edition, 2018". This assessment was conducted using the highest concentration of deltamethrin found in a currently prequalified ITN (3 g/kg: 120 mg/m2 assuming 40GSM). In line with the GRAM, the value used for assessing the exposure and risk was 125% of the target value:

> *"The concentration of the active ingredient in the net (TC) is derived from the WHO (2018) specification of the net (default variability of the concentration being +/- 25%).*
>
> *TC = 125% X concentration of the a.i. mg/kg net X Weight of the net kg/m2.*
>
> *Since the highest concentration of Deltamethrin is 3.0 g/ kg or 120 mg/m2 net and the weight of the net is 40 g/m2, the TC is as follows:*
>
> *TC = 125% X 3.0 g Deltamethrin/kg net X 40 g/m2 = 150 mg/m2"*

This assessment was considered supportive of the safe use of the product Tsara, based on the declared deltamethrin concentration of 2.5 g/kg.

4.1 Safety Conclusions

The potential health risk is acceptable for all populations (adults, children, infants and children) sleeping under, for adults and children washing as well as for adults and children sleeping under and washing the

treated nets. The risk ratios are < 1 for all populations, routes of exposure (inhalation, dermal and oral) and all activities (sleeping under, washing and sleeping under and washing).

Table 4. Summary of Risk Characterization for Deltamethrin as LLIN (up to 3 g/kg or 120 mg/m2 declared content)	
Activity/Population	Risk Acceptable / Not acceptable
Sleeping Under Net: Inhalation Exposure	
Adult	Acceptable
Children	Acceptable
Toddlers	Acceptable
Infants	Acceptable
Washing of Nets - Acute	
Adult	Acceptable
Children	Acceptable
Washing of Nets - Repeated Conditions	
Adult	Acceptable
Children	Acceptable
Sleeping Under and Washing of Nets - Acute Condition	
Adult	Acceptable
Children	Acceptable
Sleeping Under and Washing of Nets - Repeated Conditions	
Adult	Acceptable
Children	Acceptable
Exposures via Breast Milk from Mothers Exposed to Deltamethrin	
Infants (acute and chronic)	Acceptable
Newborns (acute and chronic)	Acceptable
Combined: Sleeping Under Net and Breast Milk	
Infants (acute and chronic)	Acceptable
Newborns (acute and chronic)	Acceptable

The safety component of the dossier is complete. The assessment of the submitted information on safety supports the prequalification of the product.

5 Assessment of Efficacy

5.1 Background

The primary purpose for the use of a pesticide is the control of a pest, which can include a disease transmitting vector. Vector control tools, including formulated pesticides which provide effective management/control of vectors, may be used as part of a resistance management program. Vector control products for use in public health are a component of an Integrated Vector Management program (IVM). IVM relies on a suite of diverse interventions and implementation of best practices to manage the vector and chemical/behavioral resistance.

5.2 Efficacy Conclusions

Assessment of all the submitted efficacy studies performed in lab and semi-field settings revealed that there is sufficient evidence to demonstrate that Tsara meets the efficacy requirements for

prequalification. These efficacy studies were performed according to standard protocols for testing in laboratory and semi-field conditions. Various mosquito species and strains were tested in the studies.

6 Labelling

The proposed Declaration of Labelling has been reviewed by PQT/VCP and found to be consistent with the supporting information.

7 Post-Prequalification Commitments

As per the existing WHO Guidelines on the testing of LLINs, the applicant is required to submit results from long-term field trials.

8 Pre-Qualification Listing Decision

The review of the dossier submitted for the product Tsara has been completed by PQT/VCP. The results of the assessments show the product is safe and effective when used according to the directions for use on the label. The product is allowed inclusion on the list of prequalified vector control products.