FINAL REGISTRATION REPORT

Part B

Section 5

Analytical Methods

Detailed summary of the risk assessment

Product code: SHA 9700 B

Product name: RULER 10 EC

Chemical active substance:

Fenazaquin, 100 g/L

Interzonal

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

Applicant: Sharda Cropchem España S.L.

Submission date: July 2019

Update date: May 2020

Finalisation date: 09/2020; 03/2023

Version history

When	What
May 2020	Applicant update
September 2020	ZRMs evaluated version of dRR.
March 2023	Final Registration Report

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5 Analytical methods

5.1 Conclusion and summary of assessment

Sufficiently sensitive and selective analytical method is available for the active substance in the plant protection product Ruler 10 EC.

Sufficiently sensitive and selective analytical methods are available for all analytes included in the residue definitions.
Noticed data gaps are: none

Commodity/crop	Supported/ Not supported
Melon	Supported
Ornamentals	Supported
Tomato	Supported
Strawberry	Supported

5.2 Methods used for the generation of pre-authorization data (KCP 5.1)

5.2.1 Analysis of the plant protection product (KCP 5.1.1)

5.2.1.1 Determination of active substance and/or variant in the plant protection product (KCP 5.1.1)

~~Study on going.~~
An overview on the acceptable methods and possible data gaps for analysis of fenazaquin in plant protection product is provided as follows:

Reference:	KCP 5.1.1
Report	Accelerated storage stability test by heating at elevated temperature of fenazaquin 100 g/L EC. Deepthi Prakash, 2019. Study No. G13905.
Guideline(s):	Yes SANCO/3030/99 rev.4
Deviations:	No
GLP:	Yes
Acceptability:	Yes/No/Supplementary

Materials and methods

Chromatographic conditions

Instrument:	High Performance Liquid Chromatograph (HPLC) equipped with Diode Array Detector (DAD) and PC based data system.
Column:	Zorbax RX-C18, 5 µm, 250 mm long, 4:6 mm i.d.
Column Temperature:	30°C
Mobile Phase:	0.1% Orthophosphoric acid in Milli-Q water (% v/v) (A): acetonitrile (B), 20:80 v/v respectively
Solvent Flow Rate:	1.0 mL/min
Detector Wavelength:	210 nm
Injection Volume:	10 µL
Run Time:	12 min

- All the parameters were maintained constant throughout the analysis for active ingredient.
- For every 3 sample injections and after the last sample injection, an injection of a reference standard (active ingredient) solution was injected.
- Fenazaquin peak in the sample and in the standard, was identified by comparing the retention times with those obtained through separate injections of test item solutions
- Peak area of fenazaquin in test item solution will be recorded
- The calibration (standard) solution peak area (injections before and after the sample injections) was averaged and used for calculating the present active ingredient (a.i.) of fenazaquin in the samples.

Validation - Results and discussions

Table 5.2-1: Methods suitable for the determination of active substances fenazaquin in plant protection product SHA 9700 B

	fenazaquin
Author(s), year	Deepthi Prakash, 2019
Principle of method	HPLC- DAD
Linearity (linear between mg/L / % range of the declared content) (correlation coefficient, expressed as r)	Y= 65710.157 x +544478.200 Range : 99.10 – 495.50 µg/mL (3 - 16%) R= 1.000
Precision – Repeatability Mean n = 5 (%RSD)	0.41 Horovitz <1.90 H_3< 1 (0,21)
Accuracy n = 6 (% Recovery)	100.27 ± 0.20
Interference/ Specificity	accepted
Comment	Accepted RMS Comments: Analytical method and validation criteria for acceptance of the analytical method were based on SANCO /3030/99 rev 4, because of the starting experimental phase on April 2019.

Conclusion

The analytical method used for active ingredient analysis was validated by establishing linearity, range, precision, accuracy and specificity.

5.2.1.2 Description of analytical methods for the determination of relevant impurities (KCP 5.1.1)

Not relevant, not necessary.

5.2.1.3 Description of analytical methods for the determination of formulants (KCP 5.1.1)

Not relevant.

5.2.1.4 Applicability of existing CIPAC methods (KCP 5.1.1)

A CIPAC method No. 693 is available for Fenazaquin.

5.2.2 Methods for the determination of residues (KCP 5.1.2)

Please refer to post-registration methods.

5.3 Methods for post-authorization control and monitoring purposes (KCP 5.2)

5.3.1 Analysis of the plant protection product (KCP 5.2)

Analytical methods for the determination of the active substance and relevant impurities in the plant protection product shall be submitted, unless the applicant shows that these methods already submitted in accordance with the requirements set out in point 5.2.1 can be applied.

5.3.2 Description of analytical methods for the determination of residues of Fenazaquin (KCP 5.2)

5.3.2.1 Overview of residue definitions and levels for which compliance is required

Compared to the residue definition proposed in the Draft Assessment Report (incl. its addenda) the current legal residue definition is identical.

Table 5.3-1: Relevant residue definitions for monitoring/enforcement and levels for which compliance is required

Matrix	Residue definition	MRL / limit	Reference for MRL/level Remarks
Plant, high water content	Fenazaquin	0.01 mg/kg	Regulation (EU) No. 2019/50
Plant, high acid content		0.01 mg/kg	Regulation (EU) No. 2019/50

Matrix	Residue definition	MRL / limit	Reference for MRL/level Remarks
Plant, high protein/high starch content (dry commodities)		0.01 mg/kg	Regulation (EU) No. 2019/50
Plant, high oil content		0.01 mg/kg	Regulation (EU) No. 2019/50
Plant, difficult matrices (hops, spices, tea)		0.01 mg/kg	Regulation (EU) No. 2019/50
Muscle	Fenazaquin	0.01 mg/kg	Regulation (EU) No. 2019/50
Milk		0.01 mg/kg	Regulation (EU) No. 2019/50
Eggs		0.01 mg/kg	Regulation (EU) No. 2019/50
Fat		0.01 mg/kg	Regulation (EU) No. 2019/50
Liver, kidney		0.01 mg/kg	Regulation (EU) No. 2019/50
Soil (Ecotoxicology)	Fenazaquin	0.05 mg/kg	common limit
Drinking water (Human toxicology)	Fenazaquin	0.1 µg/L	general limit for drinking water
Surface water (Ecotoxicology)	Fenazaquin	0.96 µg/L	Lowest NOEC from *Oncorhynchus mykiss* study
Air	Fenazaquin	3 µg/m^3	AOEL sys: 0.01 mg/kg bw/d
Tissue (meat or liver)	Fenazaquin	0.1 mg/kg	classified as T / T+
Body fluids		0.05 mg/L	classified as T / T+

5.3.2.2 Description of analytical methods for the determination of residues in plant matrices (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of Fenazaquin in plant matrices is given in the following tables.

Table 5.3-2: Validated methods for food and feed of plant origin (required for all matrix types, "difficult" matrix only when indicated by intended GAP)

Component of residue definition: Fenazaquin				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
High water content	Primary	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
	ILV	0.01 mg/kg	HPLC-MS/MS	Knoch (2012) / EU agreed
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
High acid content	Primary	0.01 mg/kg	HPLC-MS/MS	Lakaschus, S (2006) / EU agreed
	ILV	0.01 mg/kg	HPLC-MS/MS	Wolf (2007) / EU agreed
	Confirmatory	0.01 mg/kg	HPLC-MS/MS	Lakaschus, S (2006) / EU agreed

Component of residue definition: Fenazaquin				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
	(if required)			
	Primary	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
	ILV	-	-	-
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
High oil content	Primary	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
	ILV	0.01 mg/kg	HPLC-MS/MS	Knoch (2012) / EU agreed
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
High protein/high starch content (dry)	Primary	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
	ILV	-	-	-
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed

Table 5.3-3: Statement on extraction efficiency

	Method for products of plant origin
Required, available from:	-
Not required, because:	Not provided during EU review.

5.3.2.3 Description of analytical methods for the determination of residues in animal matrices (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of Fenazaquin in animal matrices is given in the following tables.

Table 5.3-4: Validated methods for food and feed of animal origin (if appropriate)

Component of residue definition: Fenazaquin				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Milk	Primary	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
	ILV	0.01 mg/kg	HPLC-MS/MS	Knoch (2012) / EU agreed
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed

Component of residue definition: Fenazaquin				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Eggs	Primary	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
	ILV	-	-	-
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	Wiesner, F & Breyer N. (2012) / EU agreed
Muscle	Primary	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx
	ILV	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx
Fat	Primary	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx
	ILV	-	-	-
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx
Kidney, liver	Primary	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx
	ILV	-	-	-
	Confirmatory (if required)	0.01 mg/kg	HPLC-MS/MS	xxxxxxxxxxxxxxxxx

Table 5.3-5: Statement on extraction efficiency

	Method for products of animal origin
Required, available from:	-
Not required, because:	Not provided during EU review.

5.3.2.4 Description of methods for the analysis of soil (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of Fenazaquin in soil is given in the following tables.

Table 5.3-6: Validated methods for soil (if appropriate)

Component of residue definition: Fenazaquin			
Method type	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary	0.05 mg/kg	HPLC-MS/MS	Düsterloh, K. (2008) / EU agreed
Confirmatory	0.05 mg/kg	HPLC-MS/MS	Düsterloh, K. (2008) / EU agreed

5.3.2.5 Description of methods for the analysis of water (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of Fenazaquin in surface and drinking water is given in the following tables.

Table 5.3-7: Validated methods for water (if appropriate)

Component of residue definition: Fenazaquin				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Drinking water	Primary	0.05 µg/L	GC-NPD	Wolf, S. (2003) / EU agreed
	ILV	-	-	-
	Confirmatory	0.05 µg/L	GC-NPD	Wolf, S. (2003) / EU agreed
Surface water	Primary	0.05 µg/L	GC-NPD	Wolf, S. (2003) / EU agreed
	Confirmatory	0.05 µg/L	GC-NPD	Wolf, S. (2003) / EU agreed

5.3.2.6 Description of methods for the analysis of air (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of Fenazaquin in air is given in the following tables.

Table 5.3-8: Validated methods for air (if appropriate)

Component of residue definition: Fenazaquin			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary	0.15 µg/m^3	HPLC-MS/MS	Wolf, S. (2007) / EU agreed
Confirmatory	0.15 µg/m^3	HPLC-MS/MS	Wolf, S. (2007) / EU agreed

5.3.2.7 Description of methods for the analysis of body fluids and tissues (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of Fenazaquin in body fluids and tissues is given in the following table.

Table 5.3-9: Methods for body fluids and tissues (if appropriate)

Component of residue definition: Fenazaquin			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary	0.01 mg/kg / mg/L	HPLC-MS/MS	xxxxxxxxxxxx
Confirmatory	0.01 mg/kg / mg/L	HPLC-MS/MS	xxxxxxxxxxxx

5.3.2.8 Other studies/ information

No new or additional studies have been submitted.

Appendix 1 Lists of data considered in support of the evaluation

Tables considered not relevant can be deleted as appropriate.

MS to blacken authors of vertebrate studies in the version made available to third parties/public.

List of data submitted by the applicant and relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
KCP 5.1.1	Deepthi Prakash	2019	Accelerated storage stability test by heating at elevated temperature of fenzaquin 100 g/L EC. Eurofins Advinus Limited Study No. G13905 GLP Unpublished	N	Sharda

List of data submitted or referred to by the applicant and relied on, but already evaluated at EU peer review

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
	Wiesner, F. Breyer, N.	2012	FENAZAQUIN - VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF FENAZAQUIN IN CROPS WITH HIGH WATER CONTENT, HIGH ACID CONTENT, AND HIGH OIL CONTENT, AND IN DRY COMMODITIES Eurofins Agroscience Services Chem GmbH, Hamburg, Germany Doc No. 432-027 (Report No S11-03588 GOW-1107V) GLP, Unpublished		Gowan
	Knoch, E.	2012	INDEPENDENT LABORATORY VALIDATION OF AN ANALYTICAL METHOD FOR THE		Gowan

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
			DETERMINATION OF FENAZAQUIN IN TOMATO (FRUIT) AND OILSEED RAPE (SEED) SGS Institut Fresenius GmbH, Taunusstein, Germany Doc No. 432-030 GLP, Unpublished.		
	xxxxxxxxxxx	2012	FENAZAQUIN - VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF FENAZAQUIN IN ANIMAL PRODUCTS xxxxxxxxxxxx, Doc No. 433-004 (Report No S11-03591 GOW-1110V) GLP, Unpublished.		Gowan
	xxxxxxxxxxx	2012	INDEPENDENT LABORATORY VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF FENAZAQUIN IN MEAT AND MILK SGS xxxxxxxxxxxxxx Doc No. 433-005 GLP, Unpublished.		Gowan
	Lakaschus, S.	2006	Method development and validation for the determination of fenazaquin in citurs fruit and grapes Eurofins Analytik GmbH, Hamburg, Germany Report no. GOW-0602VG06-0110 Doc No. 432-018 GLP, Unpublished		Gowan
	Wolf, S.	2007	Independent laboratory validation (ILV) of an analytical method for the determination of fenazaquin in citrus fruit and grapes. Reaserch		Gowan
	xxxxxxxxxxx	2012	FENAZAQUIN - VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF FENAZAQUIN IN ANIMAL PRODUCTS xxxxxxxxxxxxxx Doc No. 433-004 (Report No S11-03591 GOW-1110V) GLP, Unpublished.		Gowan
	xxxxxxxxxxx	2012	INDEPENDENT LABORATORY VALIDATION OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF FENAZAQUIN IN MEAT AND xxxxxxxxxxxxx Doc No. 433-005 GLP, Unpublished.		Gowan
	Dusterloh, K.	2008	Fenazaquin-development and validation of a residue analytical method for the determination of fenazaquin in soil. Research and Consulting Company, Itingen, Switzerland Report No. B65744 Doc No. 434-005 GLP, Unpublished		Gowan

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
	Wolf, S.	2003	Development and validation of the residue analytical method for fenazaquin in drinking, ground and surface water (including amendment). Research and Consulting Company, Itingen, Switzerland Report No. 849768 Doc No.: 435-008 GLP, Unpublished		Gowan
	Wolf, S.	2007	Development and validation of the residue analytical method for fenazaquin in air. Research and Consulting Company, Itingen, Switzerland Report No.: A90055 Doc No.: 436-003 GLP, Unpublished		Gowan
	xxxxxxxxxx	2006	Development and validation of the residue analytical method for in liver human plasma and urine. xxxxxxxxxxxxxx Switzerland Report No.: A22487 Doc No.: 433-003 GLP, Unpublished		Gowan

The following tables are to be completed by MS

List of data submitted by the applicant and not relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

List of data relied on not submitted by the applicant but necessary for evaluation

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

Appendix 2 Detailed evaluation of submitted analytical methods

A 2.1 Analytical methods for Fenazaquin

A 2.1.1 Methods used for the generation of pre-authorization data (KCP 5.1)

No new or additional studies have been submitted

A 2.1.2 Methods for post-authorization control and monitoring purposes (KCP 5.2)

A 2.1.2.1 Description of analytical methods for the determination of residues in plant matrices (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.2 Description of analytical methods for the determination of residues in animal matrices (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.3 Description of Methods for the Analysis of Soil (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.4 Description of Methods for the Analysis of Water (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.5 Description of Methods for the Analysis of Air (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.6 Description of Methods for the Analysis of Body Fluids and Tissues (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.7 A.2.A.9 Other Studies/ Information

No new or additional studies have been submitted