

FINAL REGISTRATION REPORT

Part B

Section 5

Analytical Methods

Detailed summary of the risk assessment

Product code: -

Product name: Repentol 6 PA/ Repentol 6 PA Bis

Chemical active substance:

quartz sand, 300 g/kg

Central Zone

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

(authorization, renewal of authorisation)

Applicant: DCR ~~Sp. z o.o.~~ S.A.

Submission date: 27/11/2023, 14/07/2024

Finalisation date: 05/2025; 09/2025

Version history

When	What
27/11/2023	Update of dRR/RR including name of applicant, classification, extension of authorisation for non-professional uses, minor uses extension, dose reduction and label extension, change of packaging. Details in Part B0 point 0.1.
27/11/2023	Update of dRR/RR for renewal of PPP authorisation acc. to Art. 43 Reg. 1107/2023.
17/07/2024	Update of renewal dRR/RR after applicant's name change.
05/2025	zRMS assessment of dRR
09/2025	The final Registration Report

Table of Contents

5	Analytical methods.....	4
5.1	Conclusion and summary of assessment.....	5
5.2	Methods used for the generation of pre-authorization data (KCP 5.1).....	5
5.2.1	Analysis of the plant protection product (KCP 5.1.1)	5
5.2.1.1	Determination of active substance and/or variant in the plant protection product (KCP 5.1.1).....	5
5.2.1.2	Description of analytical methods for the determination of relevant impurities (KCP 5.1.1).....	9
5.2.1.3	Description of analytical methods for the determination of formulants (KCP 5.1.1)	9
5.2.1.4	Applicability of existing CIPAC methods (KCP 5.1.1).....	9
5.2.2	Methods for the determination of residues (KCP 5.1.2).....	10
5.3	Methods for post-authorization control and monitoring purposes (KCP 5.2)	10
5.3.1	Analysis of the plant protection product (KCP 5.2)	10
5.3.2	Description of analytical methods for the determination of residues of quartz sand (KCP 5.2).....	10
5.3.2.1	Overview of residue definitions and levels for which compliance is required	10
5.3.2.2	Description of analytical methods for the determination of residues in plant matrices (KCP 5.2).....	10
5.3.2.3	Description of analytical methods for the determination of residues in animal matrices (KCP 5.2).....	10
5.3.2.4	Description of methods for the analysis of soil (KCP 5.2).....	11
5.3.2.5	Description of methods for the analysis of water (KCP 5.2).....	11
5.3.2.6	Description of methods for the analysis of air (KCP 5.2).....	11
5.3.2.7	Description of methods for the analysis of body fluids and tissues (KCP 5.2)	11
5.3.2.8	Other studies/ information	11
Appendix 1	Lists of data considered in support of the evaluation.....	12
Appendix 2	Detailed evaluation of submitted analytical methods	14
A 2.1	Analytical methods for quartz sand	14
A 2.1.1	Methods used for the generation of pre-authorization data (KCP 5.1).....	14
A 2.1.2	Methods for post-authorization control and monitoring purposes (KCP 5.2)	19

5 Analytical methods

This document reviews the analytical methods for the product Repentol 6 PA / Repentol 6 PA Bis containing 300 g/kg quartz sand. Quartz sand was first included in Annex I to Directive 91/414/EEC by Commission Directive 2008/127/EC of 18 December 2008 and renewed as a low risk active substance in 2023 by Commission Implementing Regulation (EU) 2023/1488 of 6 July 2023 renewing the approval of the low-risk active substance quartz sand in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council, and amending Commission Implementing Regulation (EU) No 540/2011.

The EFSA Scientific report for quartz sand (EFSA Journal 2022;20(9):7552) is considered to provide the relevant review information or a reference to where such information can be found.

For the implementation of the uniform principles, as referred to in Article 29(6) of Regulation (EC) No 1107/2009, the conclusions of the renewal report on quartz sand, and in particular Appendices I and II thereof, shall be taken into account. Conditions of use shall include risk mitigation measures, where appropriate.

Information on the detailed composition of Repentol 6 PA / Repentol 6 PA Bis can be found in the confidential dossier of this submission (Registration Report - Part C).

5.1 Conclusion and summary of assessment

zRMS:

Methods for the determination of residues are not required

Commodity/crop	Supported/ Not supported
Not relevant.	

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)

An overview on the acceptable methods and possible data gaps for analysis of quartz sand in plant protection product is provided as follows:

zRMS comments:	The following analytical method and its valuation were assessed during the first registration of the product and found acceptable. Therefore, they were not assessed during this evaluation.
----------------	--

Reference:	KCP 5.1.1/01
Report	REPENTOL 06PA STAGE 1: DETERMINATION OF PHYSICOCHEMICAL PROPERTIES OF INITIAL PREPARATION, Zagórny J, 2015, Study code: 008/DPL/2015
Guideline(s):	No, no guidelines available
Deviations:	No, not applicable
GLP:	Yes
Acceptability:	Yes

Materials and methods

The method involves determination of the content of silicon in the form of silicic acid anhydride after isolation of it with an acid solution prepared alloy samples from carbonates of alkali metals using the process of dehydration by evaporation with hydrochloric acid. The silica content is determined gravimetrically as the loss of weight of the solid on treatment with hydrofluoric acid.

Apparatus

- pH-metr 780, Metrohm, AKP/04.
- Weight Technical, Sartorius, AKP/06.
- Simulation chamber technical conditions, Binder, WP/03.
- Sieve 75µm, WP/33.

- Pycnometer, POL-ZAF, WP/39.
- Pycnometer, POL-ZAF, WP/40.
- Thermostat, Lauda, WP/08.
- Water purification system, Milipore, WP/07.
- Magnetic Stirrer, Stuart, WP/32.
- Analytical balance with an accuracy of weighing $\pm 0,0001\text{g}$.
- Muffle Furnace 850°C i 1000°C .
- Measuring cylinder with a volume of 100ml.
- Pipette and basic laboratory glassware.

Reagents and materials

- Buffer solution pH 4
- Buffer solution pH 7
- Sodium bicarbonate, 99%
- Magnesium oxide, 98%
- Calcium carbonate, 99%
- Methyl red
- HCL, 0.1N
- HCL, 1N
- NaOH, 0.1N
- Deionized water
- HCL, 37%
- HF, 40%
- Potassium carbonate
- Quartz sand

Procedure

Perform alloy the test sample with alkali metal carbonates. For this purpose, a platinum crucible weighed with an accuracy of $\pm 0,0002\text{g}$ about 1g of test sample, and 5 g of a mixture of sodium carbonate and potassium. The crucible provided with a lid placed in a platinum furnace and melt at temperatures from 0 to 1000°C , maintained at a temperature of about 1000°C 1h. The crucible after removing from the oven and cooled, was placed in a beaker with a capacity 400mL and cover with a watch glass. The alloy leach cautiously with water, then dilute hydrochloric acid solution (1: 1, v/v) to dissolve. Then add 10 mL of concentrated hydrochloric acid and contents of the beaker slightly (stirring occasionally) evaporate to dryness. To the dried residue, add 10 mL of concentrated hydrochloric acid to total dehydration of silica and no odor of chlorine. Then add 10 mL of HCl and 100 mL of hot water, all filtered through a hard filter. Wash quantitatively the residue on the filter with hot water. The filtrate obtained was also evaporated to dryness. To the residue dry add 10 mL of concentrated HCl and again evaporated to dryness. Add 100 mL of hot water and filtered through a hard filter. Both filters with sediments were placed in a platinum crucible in which the sample was melted, dried, ashed and burned before in an oven at 1000°C for a period of 1 h. After cooling, weigh the crucible, then add hydrofluoric acid in an amount of about 1/3 volume of crucible and the contents again evaporated to dryness, and ignite in oven at 850°C for a period of 0.5h. After cooling weigh the crucible.

Validation - Results and discussions

Table 5.2-1: Methods suitable for the determination of quartz sand in plant protection product Repentol 6 PA

	quartz sand
Author, year	Zagórny J, 2015
Principle of method	gravimetric method

	quartz sand
	The method involves determination of the content of silicon in the form of silicic acid anhydride after isolation of it with an acid solution prepared alloy samples from carbonates of alkali metals using the process of dehydration by evaporation with hydrochloric acid. The silica content is determined gravimetrically as the loss of weight of the solid on treatment with hydrofluoric acid.
Linearity (linear between mg/L / % range of the declared content) (correlation coefficient, expressed as r)	Linearity determined in the range of 70 - 130% of the normal concentration of silica in the product. Correlation coefficient $R^2=0.9949$. Required: $R^2 \geq 0.99$
Precision – Repeatability Mean n = 6 (%RSD)	Repeatability RSD = 0.46%. Acceptable repeatability RSD=1.61%.
Accuracy n = 3 (% Recovery)	Recovery: 99.7% (range 98.35 ÷ 101.30) Acceptable recovery 100±2%.
Interference/ Specificity	The method is specific. Does not detect the content of silica in the placebo.
Comment	No.

Conclusion

The specificity of the method was demonstrated on the basis of a parallel analysis of the test material and placebo. Silica is not detected in the placebo. It confirms the ability of the method to the determination of an analyte in a formulation without interference from other components. The validation parameters (linearity, precision and accuracy) are within the acceptance range and fulfil EU requirements given in SANCO /3030 /99 rev.4.

zRMS comments:	The proposed analytical method is suitable for determining the active substance quartz sand in the plant protection product Repentol 6 PA. The proposed analytical method has been fully validated in terms of specificity, linearity, repeatability and accuracy. The proposed method and its validation fulfil the requirements of SANCO/3030/99 rev. 5 guidance. The method and its validation are accepted.
----------------	---

Reference:	KCP 5.1.1/02
Report	Determination of Silicon Dioxide in Repentol 6 PA product, Giorgi S, 2020, Study code: 20046-01C
Guideline(s):	SANCO/3030/99 rev.5 (22/03/19)
Deviations:	No
GLP:	Yes
Acceptability:	Yes

Materials and methods

The analytical method for determination of silica is based on spectrophotometrical determination with molybdenum blue complex obtained from a solution prepared by fusion of the quartz sample with sodium hydroxide. The yellow silico-molybdate complex is reduced to molybdenum blue and absorbance read at 816 ± 2 nm.

Apparatus

- Standard laboratory glassware and equipment
- Analytical Balance accurate to 0.1 mg, Sartorius model BP 210 S
- UV/vis spectrophotometer, Agilent mod. 8453

Reagents

- Hydrochloric acid 37 %
- Sulphuric acid
- Sodium hydroxide pellets
- Sodium molybdate ACS reagent grade
- Sodium bisulfite ACS reagent grade
- Sodium sulfite reagent grade
- DL-Tartaric acid reagent plus grade
- 4-Amino-3-hydroxy-1-naphthalenesulfonic acid (synonym: 1-amino-2 naphthol-4-sulphonic acid) for spectrophotometric determination
- Pure water HPLC grade
- Sodium hydroxide solution 15 % w/v
- Sodium molybdate solution 7.5 % w/v (7.5 g of sodium molybdate were diluted with 75 mL of pure water, 10 mL of H₂SO₄:H₂O 2:1 v/v were added, then diluted to 100 mL)
- DL-Tartaric acid solution 10 % w/v
- Reducing solution: the mixture of the below solutions A and B: Solution A = 0.7 g of sodium sulphite were dissolved in 10 mL of pure water, then 0.15 g of 4-Amino-3-hydroxy-1-naphthalenesulfonic acid were added and stirred until complete dissolution was reached + Solution B = 9 g of sodium bisulphite was dissolved in 90 mL of pure water

Validation - Results and discussions

Table 5.2-2: Methods suitable for the determination of quartz sand in plant protection product Repentol 6 PA

	quartz sand
Author, year	Giori S, 2020
Principle of method	Spectrophotometrical determination.
Specificity	The UV-Vis spectrum of the Molybdenum blue complex obtained from test item was compared with spectrum of the Molybdenum blue complex obtained from reference item; furthermore, the UV-VIS spectrum of the reagent blank solution showed no interference. The method is specific.
Linearity Duplicate determinations at four concentrations (n=8) (linear between mg/L / % range of the declared content) (correlation coefficient, ex-	Linearity determined in the range of 0.0029-0.0059 mg/mL (19.55-39.09% w/w). $y=145.4485x-0.0390$ Correlation coefficient $R^2=0.9938$ Required: $R^2 \geq 0.99$

	quartz sand
pressed as r)	
Precision – Repeatability Mean n = 5 (%RSD)	For the precision determination, five independent sample solutions were used. Repeatability RSD = 1.36% RSDr = 1.61% Horrat: 0.84 Required: Horrat ≤ 1
Accuracy n = 3 (% Recovery)	To determine the accuracy of the analytical method, recovery experiments were performed by fortification of the test item with analytical standard. Marginal Recovery: 97.7% (range 97.61-97.79%) Acceptable recovery $100 \pm 2.3\%$
Comment	No. Representative spectra of reagent blank solution, standard solution, and sample solution

Conclusion

The analytical method developed for the determination of Silica in Repentol 6 PA was validated with respect to specificity, linearity of detector response, accuracy and precision. Square correlation coefficient (r^2), recovery determination and modified Horwitz values (Horrat) fulfilled the requirements of SAN-CO/3030/99 rev. 5.

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

Comments of zRMS:	According to EFSA Conclusions (EFSA Journal 2022;20(9):7552), crystalline silica with a diameter $<10 \mu\text{m}$ is considered the relevant impurity of active substance quartz sand. The requirement for methods of analysis for monitoring the respirable crystalline silica in the representative formulations has been waived due to negligible inhalation exposure predicted for the proposed uses. Therefore, the lack of an analytical method for the determination of crystalline silica with a diameter $<10 \mu\text{m}$ in preparation should not be considered as a data gap.
-------------------	---

Not relevant. In accordance with EFSA Journal 2022;20(9):7552 The requirement for methods of analysis for monitoring the respirable crystalline silica with a particle diameter $\leq 10 \mu\text{m}$ in formulations has been waived due to negligible inhalation exposure predicted for the proposed uses.

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

Not relevant. No analytical methods for the determination of formulants is required.

5.2.1.4 Applicability of existing CIPAC methods (KCP 5.1.1)

CIPAC MT 185 is method that may be applicable for determination of the active ingredient quartz sand in

product Repentol 6 PA.

5.2.2 Methods for the determination of residues (KCP 5.1.2)

Not relevant. Active substance quartz sand naturally occurs in the environment. The proposed manner of use of Repentol 6 PA is on trees in forest and other plants so it is not expected that any residues in/on food or feed may occur. Thus, no analytical method for the determination of the residues of quartz sand in treated plant material, foodstuff of plant and animal origin as well as feeding stuff is required. Additionally, residues from plant protection product Repentol 6 PA would be indistinguishable from naturally occurring residues in any plant. Repentol 6 PA is a repellent so it will not be taken up by animals nor does it enter into fodder. Product Repentol 6 PA applied on trees will not translocate, it acts mechanically forming layer on the treated area.

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)

Not relevant. Analytical method for the determination of quartz sand in Repentol 6 PA was presented in point 5.2.1.1.

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

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

Active substance quartz sand is ubiquitous substance that naturally occurs in the environment. No residue studies and residue definition were provided because the intended use of Repentol 6 PA is application on trees in forest and other plants via coating thus no residues are expected to occur on/in feed or food. No MRL are considered necessary.

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

Active substance quartz sand is ubiquitous substance. It is impossible to distinguish between quartz sand applied in a form of Repentol 6 PA and quartz sand naturally occurring in the environment. No residue studies and residue definition were provided because the intended use of Repentol 6 PA is application on trees in forest and other plants via coating thus no residues are expected to occur on/in feed or food. No MRL are considered necessary. Regarding above analytical method for determination of quartz sand in plant matrices is not required.

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

Active substance quartz sand is ubiquitous substance. No residue studies and residue definition were provided because the intended use of Repentol 6 PA is application on trees in forest and other plants via coating thus no residues are expected to occur on/in feed or food. No MRL are considered necessary. Regarding above analytical method for determination of quartz sand in animal matrices is not required.

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

Active substance quartz sand is ubiquitous substance. It is impossible to distinguish between quartz sand applied in a form of Repentol 6 PA and quartz sand naturally occurring in the environment. Regarding above analytical method for determination of quartz sand in soil is not required.

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

Active substance quartz sand is ubiquitous substance. It is impossible to distinguish between quartz sand applied in a form of Repentol 6 PA and quartz sand naturally occurring in the environment. Regarding above analytical method for determination of quartz sand in water is not required.

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

Active substance quartz sand is ubiquitous substance. It is impossible to distinguish between quartz sand applied in a form of Repentol 6 PA and quartz sand naturally occurring in the environment. Quartz sand is also not volatile thus analytical method for determination of quartz sand in air is not required.

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

Active substance quartz sand is stable and insoluble in water. It does not degrade in the environment nor pass into plants, foodstuffs of plant or animal origin. Quartz sand is not classified as toxic, thus analytical method for determination of quartz sand in body fluids and tissues is not required.

5.3.2.8 Other studies/ information

Not relevant.

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 5.1.1/02	Giorgi S	2020	Determination of Silicon Dioxide in Repentol 6 PA product, Study code: 20046-01C Renolab S.r.l. GLP Unpublished	N	DCR Sp. z o.o. S.A.

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
KCP 5.1.1/01	Zagórny J	2015a	REPENTOL 06PA STAGE 1: DETERMINATION OF PHYSICOCHEMICAL PROPERTIES OF INITIAL PREPARATION Study code: 008/DPL/2015 Pestila Sp. z o.o. GLP Unpublished	N	DCR Sp. z o.o. S.A.

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 quartz sand

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

Comments of zRMS:	
-------------------	--

Reference:	KCP 5.1.1/01
Report	REPENTOL 06PA STAGE 1: DETERMINATION OF PHYSICOCHEMICAL PROPERTIES OF INITIAL PREPARATION, Zagórny J, 2015, Study code: 008/DPL/2015
Guideline(s):	No, no guidelines available
Deviations:	No, not applicable
GLP:	Yes
Acceptability:	Yes

Materials and methods

The method involves determination of the content of silicon in the form of silicic acid anhydride after isolation of it with an acid solution prepared alloy samples from carbonates of alkali metals using the process of dehydration by evaporation with hydrochloric acid. The silica content is determined gravimetrically as the loss of weight of the solid on treatment with hydrofluoric acid.

Apparatus

- pH-metr 780, Metrohm, AKP/04.
- Weight Technical, Sartorius, AKP/06.
- Simulation chamber technical conditions, Binder, WP/03.
- Sieve 75µm, WP/33.
- Pycnometer, POL-ZAF, WP/39.
- Pycnometer, POL-ZAF, WP/40.
- Thermostat, Lauda, WP/08.
- Water purification system, Milipore, WP/07.
- Magnetic Stirrer, Stuart, WP/32.
- Analytical balance with an accuracy of weighing $\pm 0,0001\text{g}$.
- Muffle Furnace 850°C i 1000°C.
- Measuring cylinder with a volume of 100ml.
- Pipette and basic laboratory glassware.

Reagents and materials

- Buffer solution pH 4
- Buffer solution pH 7
- Sodium bicarbonate, 99%
- Magnesium oxide, 98%
- Calcium carbonate, 99%

-Methyl red
-HCL, 0.1N
-HCL, 1N
-NaOH, 0.1N
-Deionized water
-HCL, 37%
-HF, 40%
-Potassium carbonate
-Quartz sand

Procedure

Perform alloy the test sample with alkali metal carbonates. For this purpose, a platinum crucible weighed with an accuracy of $\pm 0,0002\text{g}$ about 1g of test sample, and 5 g of a mixture of sodium carbonate and potassium. The crucible provided with a lid placed in a platinum furnace and melt at temperatures from 0 to 1000°C , maintained at a temperature of about 1000°C 1h. The crucible after removing from the oven and cooled, was placed in a beaker with a capacity 400mL and cover with a watch glass. The alloy leach cautiously with water, then dilute hydrochloric acid solution (1: 1, v/v) to dissolve. Then add 10 mL of concentrated hydrochloric acid and contents of the beaker slightly (stirring occasionally) evaporate to dryness. To the dried residue, add 10 mL of concentrated hydrochloric acid to total dehydration of silica and no odor of chlorine. Then add 10 mL of HCl and 100 mL of hot water, all filtered through a hard filter. Wash quantitatively the residue on the filter with hot water. The filtrate obtained was also evaporated to dryness. To the residue dry add 10 mL of concentrated HCl and again evaporated to dryness. Add 100 mL of hot water and filtered through a hard filter. Both filters with sediments were placed in a platinum crucible in which the sample was melted, dried, ashed and burned before in an oven at 1000°C for a period of 1 h. After cooling, weigh the crucible, then add hydrofluoric acid in an amount of about 1/3 volume of crucible and the contents again evaporated to dryness, and ignite in oven at 850°C for a period of 0.5h. After cooling weigh the crucible.

Results and discussions

Determination of the content of silicon in the form of silicic acid anhydride after isolation of it with an acid solution prepared alloy samples from carbonates of alkali metals using the process of dehydration by evaporation with hydrochloric acid was performed using analytical procedure developed and validated in Analytical Department of IPO. It was confirmed that the method is specific. Does not detect the content of silica in the placebo.

Table A 1: Recovery results from method validation using the analytical method

No.	Level	Mass added SiO ₂ 99,8%, g	Mass added SiO ₂ 100%, g	Mass of the placebo, g	Mass of test item, g	The theo- retical con- tent of sili- ca, %	The silica content indicated, %	RECOVERY, %
1	1	0.2040	0.2036	0.8319	1.0359	19.65	19.33	98.35
2		0.2063	0.2059	0.8598	1.0661	19.31	19.40	100.50
3		0.2075	0.2071	0.8101	1.0176	20.35	20.62	101.30
4	2	0.3038	0.3032	0.7655	1.0693	28.35	28.19	99.42
5		0.3059	0.3053	0.7255	1.0314	29.60	29.45	99.50
6		0.3006	0.3000	0.7288	1.0294	29.14	29.34	100.70
7	3	0.4109	0.4101	0.6387	1.0496	39.07	38.14	97.62

No.	Level	Mass added SiO2 99,8%, g	Mass added SiO2 100%, g	Mass of the placebo, g	Mass of test item, g	The theo- retical con- tent of sili- ca, %	The silica content indicated, %	RECOVERY, %
8		0.4065	0.4057	0.6819	1.0884	37.27	37.25	99.94
9		0.4137	0.4129	0.6741	1.0878	37.95	37.99	100.10
AVERAGE RECOVERY %								99.70
SD								1.15
RSD								0.012

Table A 2: Characteristics for the analytical method used for validation

	nicosulfuron
Specificity	The method is specific. Does not detect the content of silica in the placebo.
Calibration (type, number of data points)	Linearity was determined in the range of 70 - 130% of the normal concentration of silica in the product. Calibration line equation presented: $y=0.9826X + 0.3945$ ($R^2 \geq 0.99$) Number of data points = 6
Calibration range	Accepted calibration range: 0.0603 mg/ml – 0.1658 mg/ml. Corresponding calibration range in mass ratio units for the sample: 60.3 % to 165.8 % of declared concentration in the sample.
Assessment of matrix effects is presented	Yes.
Limit of determination/quantification	Not relevant.

Conclusion

The specificity of the method was demonstrated on the basis of a parallel analysis of the test material and placebo. Silica is not detected in the placebo. It confirms the ability of the method to the determination of an analyte in a formulation without interference from other components.

Comments of zRMS:	
-------------------	--

Reference:	KCP 5.1.1/02
Report	Determination of Silicon Dioxide in Repentol 6 PA product, Giorgi S, 2020, Study code: 20046-01C
Guideline(s):	SANCO/3030/99 rev.5 (22/03/19)
Deviations:	No
GLP:	Yes
Acceptability:	Yes

Materials and methods

The analytical method for determination of silica is based on spectrophotometrical determination with molybdenum blue complex obtained from a solution prepared by fusion of the quartz sample with sodium hydroxide. The yellow silico-molybdate complex is reduced to molybdenum blue and absorbance read at 816 ± 2 nm.

Apparatus

- Standard laboratory glassware and equipment
- Analytical Balance accurate to 0.1 mg, Sartorius model BP 210 S
- UV/vis spectrophotometer, Agilent mod. 8453

Reagents

- Hydrochloric acid 37 %
- Sulphuric acid
- Sodium hydroxide pellets
- Sodium molybdate ACS reagent grade
- Sodium bisulfite ACS reagent grade
- Sodium sulfite reagent grade
- DL-Tartaric acid reagent plus grade
- 4-Amino-3-hydroxy-1-naphthalenesulfonic acid (synonym: 1-amino-2 naphthol-4-sulphonic acid) for spectrophotometric determination
- Pure water HPLC grade
- Sodium hydroxide solution 15 % w/v
- Sodium molybdate solution 7.5 % w/v (7.5 g of sodium molybdate were diluted with 75 mL of pure water, 10 mL of H₂SO₄:H₂O 2:1 v/v were added, then diluted to 100 mL)
- DL-Tartaric acid solution 10 % w/v
- Reducing solution: the mixture of the below solutions A and B: Solution A = 0.7 g of sodium sulphite were dissolved in 10 mL of pure water, then 0.15 g of 4-Amino-3-hydroxy-1-naphthalenesulfonic acid were added and stirred until complete dissolution was reached + Solution B = 9 g of sodium bisulphite was dissolved in 90 mL of pure water

Procedure

Preparation of Test Item Solutions

10 mL of NaOH solution at 10 % were transferred to a nickel crucible of 55 mL capacity. (The crucible was cleaned with dilute HCl before using). The solution was evaporated to dryness over gas burners. After cooling, about 150 mg accurately weighed (to the nearest 0.1 mg) of sample were added to crucible containing NaOH. The crucible was covered and heated to dull redness for about 5 minutes. The gas burner was removed and the crucible was swirled in order to push the melt around the sides. The melt was allowed to cool. Approximately 40 mL of pure water was added, and the crucible was covered and left to stand overnight. The content was then transferred to a volumetric 1 L flask, containing 400 mL of pure water and 20 mL of H₂O:HCl (1:1), then finally diluted to volume. 10 mL of the above solution was transferred to a 100 mL volumetric flask, then 1 mL of sodium molybdate solution, 4 mL of tartaric acid solution and 1 mL of reducing solution were added, in this order. The mixture was well mixed, diluted to volume with pure water and allow to stand at least 30 minutes.

Preparation of Reference Item Solutions

The reference item stock solutions were prepared like the test item solution using silica standard at 99.995 % purity. The calibration solutions for linearity were obtained diluting these stock solutions.

Table A 3: Silica stock solutions

Code	Batch	Purity	Weight	Volume	Dilution	Concentration
-	-	[%]	[mg]	[mL]	-	[mg/mL]
SM 247-3	MKBN9350V	99.995	58.7	1000	10	0.0059

following table:

Table A 4: Reference items calibration and control solutions used for linearity and precision

Table A 5: Reference items calibration and control solutions used for linearity and precision

Code	Initial conc.	Volume Taken	Final Volume	Final Silica conc.		Code
[Name]	[mg/mL]	[mL]	[mL]	[mg/mL]	[%]	[Name]
SM 247-3	0.0059	2.5	5	0.0029	19.57	SL 247-3 A
SM 247-3	0.0059	3.5	5	0.0041	27.39	SL 247-3 B
SM 247-3	0.0059	4.5	5	0.0053	35.22	SL 247-3 C
SM 247-3	0.0059	5.0	5	0.0059	39.13	SM 247-3
SM 247-4	0.0059	2.5	5	0.0029	19.57	SL 247-4 A
SM 247-4	0.0059	3.5	5	0.0041	27.39	SL 247-4 B
SM 247-4	0.0059	4.5	5	0.0053	35.22	SL 247-4 C
SM 247-4	0.0059	5.0	5	0.0059	39.13	SM 247-4

Preparation of Recovery Solutions

Recovery solutions were obtained like the sample solution, but adding an adequate amount of reference item (about 25mg) to an adequate amount of test item (about 70mg), to be within calibration.

Preparation of Reagent Blank Solution

Reagent blank solution was obtained like the reference item solutions, but omitting the silica. It was used as blank during the spectrophotometrical measurement.

Validation - Results and discussions

Table A 6: Methods suitable for the determination of quartz sand in plant protection product Repentol 6 PA

	quartz sand
Author, year	Giori S, 2020
Principle of method	Spectrophotometrical determination.
Specificity	The UV-Vis spectrum of the Molybdenum blue complex obtained from test item was compared with spectrum of the Molybdenum blue complex obtained from reference item; furthermore, the UV-VIS spectrum of the reagent blank solution showed no interference. The method is specific.
Linearity	Linearity determined in the range of 0.0029-0.0059 mg/mL(19.55-

	quartz sand
(linear between mg/L / % range of the declared content) (correlation coefficient, expressed as r)	39.09% w/w). $y=145.4485x-0.0390$ Correlation coefficient $R^2=0.9938$ Required: $R^2 \geq 0.99$
Precision – Repeatability Mean n = 5 (%RSD)	For the precision determination, five independent sample solutions were used. Repeatability RSD = 1.36% RSDr = 1.61% Horrat: 0.84 Required: Horrat ≤ 1
Accuracy n = 3 (% Recovery)	To determine the accuracy of the analytical method, recovery experiments were performed by fortification of the test item with analytical standard. Recovery: 97.7% (range 97.61-97.79%) Acceptable recovery $100 \pm 2\%$
Comment	No.

Conclusion

The analytical method developed for the determination of Silica in Repentol 6 PA was validated with respect to specificity, linearity of detector response, accuracy and precision. Square correlation coefficient (r^2), recovery determination and modified Horwitz values (Horrat) fulfilled the requirements of SAN-CO/3030/99 rev. 5.

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.