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HIGH PRODUCTION VOLUME (HPV) CHALLENGE PROGRAM

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TEST PLAN

FOR

RESIN ACIDS AND ROSIN ACIDS, FUMARATED, DECYL ESTERS

CAS NO. 71243-68-0

(CORRECTED TO 258342-84-6 IN 2000)

PREPARED BY:

ARIZONA CHEMICAL COMPANY

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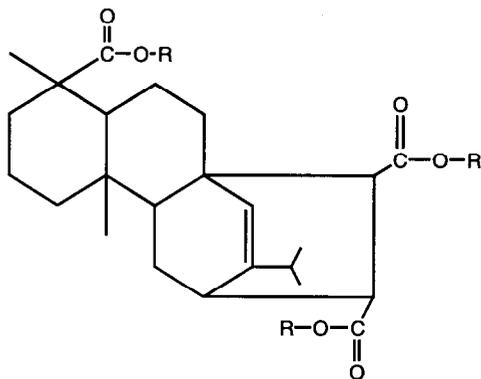
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OVERVIEW

Arizona Chemical Company hereby submits for review and public comment the test plan for "Resin acids and Rosin acids, fumarated, decyl esters" (CASRN 71243-68-0) under the Environmental Protection Agency's (EPA) High Production Volume (HPV) Chemical Challenge Program. It should be noted that this chemical identity was corrected by Arizona Chemical Company through the filing of an inventory correction (IC-5862) with the EPA. EPA accepted this correction on July 24, 2000 and this chemical is now known as "Rosin, fumarated, C9-11-isoalkyl esters, C10-rich" (CASRN 258342-84-6).

This substance is an amber colored viscous liquid based on rosin, a naturally occurring substance found in trees, predominantly pine trees. Rosin is composed primarily of resin acids, a class of tricyclic carboxylic acids, but also contains minor amounts of dimerized rosin, fatty acids and unsaponifiable matter. CASRN 71243-68-0 is made by reacting rosin with fumaric acid in a Diels-Alder adduction, thereby making the rosin into a tricarboxylic acid as opposed to monocarboxylic. This adducted rosin is then reacted with "alcohols, C9-11-iso-, C10-rich" to form the ester. In order for esterification to take place, the reaction is carried out at elevated temperature to remove the water of reaction. Temperatures in excess of 250C are generally required in order to force the reaction towards completion. This product is capable of forming a triester but complete esterification is not achieved and thus this product will contain a mix of mono-, di- and tri- ester. Therefore, this substance is a complex mixture and a Class 2 substance. A representative structure is given below:



Where R = H or $-(\text{CH}_2)_n-\text{CH}_3$ where $n = 8-10$ (mainly 9)

This substance is not sold as produced, but rather is used as a component of several rosin ester aqueous dispersions for commercial sale. These aqueous dispersions are then used as tackifiers in the rapidly growing pressure sensitive adhesives market.

Arizona Chemical Company has reviewed all existing data on this substance and has prepared robust summaries of data relating to the required SIDS endpoints of the HPV

Program. Where sufficient data do not exist, Arizona Chemical commits to undertake testing to satisfy the required endpoints.

A brief summary of the available data for the substance and the anticipated additional testing, is described below in Table 1.

Table 1
Matrix of Available Adequate Data and Proposed Testing on
Resin acids and Rosin acids, fumarated, decyl esters

Required SIDS Endpoints	Test Exists	OECD Study	Other	GLP	New Testing Required
	Y/N	Y/N	Y/N	Y/N	Y/N
PHYSICAL-CHEMICAL DATA					
Boiling Point	Y	Y	-	Y	N
Melting Point ¹	Y	Y	-	Y	N
Vapor Pressure	Y	Y	-	Y	N
Water Solubility	Y	Y	-	Y	N
Partition Coefficient	Y	Y	-	Y	N
ENVIRONMENTAL FATE					
Biodegradation	N	-	-	-	Y
Photodegradation	N	-	-	-	N ²
Hydrolysis	N	-	-	-	N ³
Transport between Environmental Compartments (Fugacity)	N	-	-	-	N ⁴
ECOTOXICITY					
Acute Toxicity to Fish	N	-	-	-	Y
Acute Toxicity to Aquatic Invertebrates	N	-	-	-	Y
Toxicity to Aquatic Plants	N	-	-	-	Y
TOXICOLOGICAL DATA					
Acute Toxicity- Oral	Y	Y	-	Y	N
Acute Toxicity-Dermal	Y	Y	-	Y	N
Repeat Dose Toxicity	N	-	-	-	Y
Genetic Toxicity-Mutation	Y	Y	-	Y	N
Genetic Toxicity-Chromosomal Aberrations	N	-	-	-	Y
Developmental Toxicity	N	-	-	-	Y
Toxicity to Reproduction	N	-	-	-	Y

¹ Pour Point measured instead of Melting Point due to physical form of material.

² Not relevant, since the vapor pressure of this compound is essentially zero and it could not enter the atmosphere.

³ Will not be determined because it is not applicable to water-insoluble substances.

⁴ Will not be determined due to the inability to provide usable inputs to the required model.

TEST PLAN DESCRIPTION FOR EACH SIDS ENDPOINT

A. Physical/Chemical Properties

Boiling Point - This endpoint has been determined and is reported in the robust summaries.

Melting Point - This endpoint has not been determined because this substance is a complex viscous liquid mixture and will not give a sharp melting point when heated. Pour Point has been measured instead and is reported in the robust summaries.

Vapor Pressure - This endpoint has been determined and is reported in the robust summaries.

Water Solubility - This endpoint has been determined and is reported in the robust summaries.

Partition Coefficient - This endpoint has been determined and is reported in the robust summaries.

Conclusion: All end points for physical/chemical properties have been satisfied by existing acceptable testing. No new testing will be conducted.

B. Environmental Fate

Biodegradation - This will be tested to fill the SIDS endpoint.

Photodegradation - This endpoint is not relevant, since the vapor pressure of this compound is essentially zero and it could not enter the atmosphere. In addition, based on the constituents in this complex mixture, there is no reason to suspect that it would be subject to breakdown by a photodegradative mechanism. Consequently, this endpoint will not be determined.

Stability in Water - Hydrolysis as a function of pH is used to assess the stability of a substance in water. Experience has shown that rosin ester molecules are very resistant to hydrolysis. In addition, low water solubility often limits the ability to determine hydrolysis as a function of pH. This substance has very low solubility in water, therefore it is expected to be stable in water and it is unnecessary to attempt to measure the products of hydrolysis.

Transport and distribution between environmental compartments -

This endpoint is intended to determine the ability of a chemical to move or partition in the environment. The determination of this property requires the use of various models. For Class 2 substances such as this rosin ester, the required inputs to the model are either not available or not feasible to determine including molecular mass, reaction half-life estimates for air, water, soil, sediment, aerosols, suspended sediment and aquatic biota. Consequently, due to the inability to provide usable inputs to the required model, no determination of transportation and distribution between environmental compartments will be undertaken.

Conclusion: Biodegradation will be generated (using OECD 301B) for this compound. No other testing will be conducted.

C. Ecotoxicity Data

Acute Toxicity to Fish – This endpoint will be tested using OECD 203 to fill the SIDS requirement.

Acute Toxicity to Aquatic Invertebrates - This endpoint will be tested using OECD 202 to fill the SIDS requirement.

Acute Toxicity to Aquatic Plants - This endpoint will be tested using OECD 201 to fill the SIDS requirement.

Conclusion: No data for these endpoints exists so testing will be carried out using OECD guidelines and GLP assurances under conditions that maximize solubility but reduce exposure to insoluble fractions, which may cause nonspecific toxicological effects.

D. Toxicological Data

Acute Toxicity - This endpoint has been determined both by the oral and dermal routes and is reported in the robust summaries. These data are deemed acceptable to satisfy the endpoint.

Repeat Dose Toxicity - This endpoint has not been determined and will be tested using OECD 422 to fulfill the SIDS requirement.

Genetic Toxicity-Mutation - This endpoint has been determined by an Ames study in Salmonella typhimurium and is reported in the robust summaries. This data is deemed acceptable to satisfy the SIDS requirement.

Genetic Toxicity-

Chromosomal Aberrations – This endpoint has not been determined and will be tested using OECD 476 to fulfill the SIDS requirement.

Developmental Toxicity - This endpoint has not been determined and a reproductive/developmental toxicity screening test will be added to the repeat dose study to fulfill the SIDS requirement.

Reproductive Toxicity - This endpoint has not been determined and a reproductive/developmental toxicity screening test will be added to the repeat dose study to fulfill the SIDS requirement.

Conclusion: Acute toxicity and Genetic toxicity-mutation SIDS endpoints have been satisfied by data from existing studies. The Repeat Dose Toxicity, Reproductive/Developmental Toxicity endpoints will be satisfied by conducting testing using OECD 422. Combining the testing in a single protocol will require the use of fewer animals. A Chromosomal Aberration test will also be conducted using OECD 476.