3.3.2	Area covered	Not applicable	
3.3.3	Occlusion	Not applicable	
3.3.4	Vehicle	Glycerol formal	
3.3.5	Concentration in vehicle	2 – 10%	
3.3.6	Total volume applied	Dose rates: 2.5, 4, 5, 8, 10, 16. 20, 40 mg a.s./kg bodyweight	X
3.3.7	Duration of exposure	Not applicable	
3.3.8	Removal of test substance	Not applicable	
3.3.9	Controls	No	
3.4	**Examinations**	Toxic effects and mortality	
3.5	**Method of determination of LD_{50}**	Weil – moving average method (1952)	
3.6	**Further remarks**	-	
		4. RESULTS AND DISCUSSION	
4.1	**Clinical signs**	Toxic effects were typical of a direct inhibitor of cholinesterase, developing within a few minutes after intraperitoneal dosing. Deaths mainly occurred after 4 - 15 min and survivors started to recover after ½ - 2 h. Recovery was visually complete well within 24 h.	
4.2	**Pathology**	No data	
4.3	**Other**	-	
4.4	**LD_{50}**	8 mg/kg bw (M & F)	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	Sixteen females and 6 males Wistar rat received intraperitoneal injections of bendiocarb dissolved in glycerol formal at dose rates ranging from 2.5-40 mg as/kg bw.	
5.2	**Results and discussion**	Death occurred within 4 - 15 minutes following administration in animals tested at 8 mg a.s./kg bw and above. The LD_{50} was determined as 8 mg a.s./kg bw for both sexes.	
5.3	**Conclusion**		
5.3.1	Reliability	2	
5.3.2	Deficiencies	No	

Table A6.11-1 Table for Intraperitoneal Toxicity

Dose [mg/kg]	Conc. %	Batch No.	Number of dead/number of investigated	Time of death (range)	Observations
Female rat					
2.5	2-10	15	0/2	-	
5	2-10	15	0/2	-	
10	2-10	15	2/2	15 min	
20	2-10	15	2/2	6-8 min	
40	2-10	15	2/2	5 min – 6h	
4	2	33	0/2		
8	2	33	1/2	13 min	
16	2	33	2/2	5-6 min	
Male rat					
4	2	33	0/2	-	
8	2	33	1/2	10 min	
16	2	33	2/2	4-6 min	
LD_{50} value	8 mg/kg bw (M & F)				

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Materials and methods	3.2.6. Each dose group comprised two animals. The total number of animals used was 6M, 16F. 3.3.6. Females were tested at the dose rates detailed. Males were tested at 4, 8 and 16 mg/kg.
Conclusion	As described by the applicant.
Reliability	2
Acceptability	Acceptable.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12 Medical data in anonymous form

6.12.1 Medical surveillance data on manufacturing plant personnel

			Official use only
		1. REFERENCE	
1.1	**Reference**	[redacted] (2001) Health Surveillance for Individuals Working with Bendiocarb [redacted] Document C016068 6.12.1/01 September 2001 Unpublished [redacted] (1989) Bendiocarb: Skin Sensitisation in Man [redacted] Document A90597 6.12.1/02 October 1989 Unpublished	
		2. GUIDELINES AND QUALITY ASSURANCE (NOT APPLICABLE)	
		3. MATERIALS AND METHODS	
3.1	**Substance**	Bendiocarb	
3.2	**Persons exposed**	Plant operatives during manufacture, formulation and packing. Pest controllers during application and secondary exposure of the public whose premises had been treated.	
3.2.1	Sex	Male/female	
3.2.2	Age/weight	No detailed data.	
3.2.3	Known diseases	No detailed data.	
3.2.4	Number of persons	No detailed data.	
3.2.5	Other information	The reports collectively detail the steps the company has taken to: • Actively perform pre-employment medical examinations (including information to establish a baseline of important clinical measures); • Require periodic health examinations; • Encourage employees to report health problems that are work related or changes in general health • Train personnel to adopt safe workplace procedures. Case reports following alleged over-exposure are also detailed from professional users and the general public.	
3.3	**Exposure**		
3.3.1	Reason of exposure	Manufacturing and public use	
3.3.2	Frequency of exposure	Manufacturing: exposures to bendiocarb are intermittent and long spells of non exposure occur.	
3.3.3	Overall time period of exposure	Not specified	

3.3.4	Duration of single exposure	Not specified	
3.3.5	Exposure concentration / dose	Not specified	
3.3.6	Other information	**Case Reports following Accidental Exposure** In the period from 1990 to September 2001, a total of 19 enquiries were received concerning the public use of bendiocarb products in the UK. Several were from hospitals or general practitioners seeking advice or confirmation of likely symptoms following possible accidental exposure to the insecticide. In many of the cases, insufficient information was available to clearly determine whether there had actually been any contributory involvement of insecticide material – this is particularly true when householders or occupants of premises complained post-treatment of symptoms which do not fit with the known properties of bendiocarb or its formulations (e.g. bendiocarb and its formulations are not skin irritants or sensitizers). Seven incidents related to problems with spraying or dusting equipment resulting in pest control operators receiving some splashing of diluted spray or dust to the face or eyes – none of these resulted in anything more than e.g. transitory miosis. One suicide was reported.	
3.4	**Examinations**	**Manufacture** Periodical health surveillance is undertaken on an annual basis. This includes a detailed history and full general examination. **Public** Hospitals, General Practitioners	
3.5	**Treatment**	Symptomatic, first-aid if necessary in accident situations	
3.6	**Remarks**	-	
		4. RESULTS AND DISCUSSION	
4.1	**Clinical signs**	Bendiocarb exposure can result in typical symptoms of acetyl cholinesterase inhibition (tunnel vision, sweating etc). The symptoms are rapidly reversible with no long-term effects. There is a wide margin of safety between the onset of symptoms and danger to health.	
4.2	**Results of examinations**	**Manufacture** No chronic health effects have been noted in relation to work with bendiocarb. A comprehensive medical database exists to record all illness whether occupational or non-occupational which has been in place since 1996. Prior to this paper records exist. Cause of death of all members of the pension fund are also collated and can be used for epidemiological purposes. Acute effects recorded in the workforce since 1995 were two cases only. Both were eye contamination leading to tunnel vision of short duration. No other problems have been identified. **Public** In many of the cases, insufficient information was available to clearly determine whether there had actually been any contributory involvement of insecticide material.	

		Seven incidents related to problems with spraying or dusting equipment resulting in pest control operators receiving some splashing of diluted spray or dust to the face or eyes – none of these resulted in anything more than e.g. transitory miosis. One suicide was reported. According to company records, there have been no cases of skin sensitization due to bendiocarb in synthesis, formulations, packaging or usage.	
4.3	**Effectivity of medical treatment**	Effective when required but not normally necessary.	
4.4	**Outcome**	No evidence of significant adverse incidents or effects.	
4.5	**Other**	-	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The reports collectively detail the steps the company has taken to: • Actively perform pre-employment medical examinations (including information to establish a baseline of important clinical measures); • Require periodic health examinations; • Encourage employees to report health problems that are work related or changes in general health • Train personnel to adopt safe workplace procedures. Case reports following alleged over-exposure are also detailed from professional users and the general public.	
5.2	**Results and discussion**	No chronic health effects have been noted in relation to work with bendiocarb. Acute effects recorded in the workforce since 1995 were two cases only. Both were eye contamination leading to tunnel vision of short duration. In many of the cases reported by the public, insufficient information was available to clearly determine whether there had actually been any contributory involvement of insecticide material. According to company records, there have been no cases of skin sensitization due to bendiocarb in synthesis, formulations, packaging or usage. Provided suitable working practices are in place in manufacture and use of the product, exposure and hazard to manufacturing personnel, professional pest controllers and the general public is minimal.	
5.3	**Conclusion**		

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	Not applicable
Acceptability	Acceptable
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

			Official use only
		1. REFERENCE	
1.1	Reference	[redacted] (2004a) Occupational Medical Experiences with Bendiocarb [redacted] Document C044098 6.12.1/03 28 September 2004 Unpublished	
		2. GUIDELINES AND QUALITY ASSURANCE (NOT APPLICABLE)	
		3. MATERIALS AND METHODS	
3.1	Substance	Bendiocarb	
3.2	Persons exposed	Plant operatives during manufacture	
3.2.1	Sex	No detailed data.	
3.2.2	Age/weight	No detailed data.	
3.2.3	Known diseases	No detailed data.	
3.2.4	Number of persons	10.	
3.2.5	Other information	Personal safety measures included dust mask, PVC or nitrile gloves, light protective clothing and PVC boots.	
3.3	Exposure		
3.3.1	Reason of exposure	Potential exposure during manufacture	
3.3.2	Frequency of exposure	Infrequent as annual manufacturing campaigns are not extensive	
3.3.3	Overall time period of exposure	Not specified	
3.3.4	Duration of single exposure	Not specified	
3.3.5	Exposure concentration / dose	Not specified	
3.3.6	Other information	-	
3.4	Examinations	Physical medical examination and lung function testing Laboratory examinations – full blood count, urine status.	
3.5	Treatment	Symptomatic, first-aid if necessary in accident situations	
3.6	Remarks	-	
		4. RESULTS AND DISCUSSION	
4.1	Clinical signs	There was no evidence of clinical signs during the examinations of the plant operatives.	
4.2	Results of examinations	Annual medical surveillance of workers exposed to bendiocarb did not reveal any unwanted effects in the workers. The examinations included physical exams (3.4) and clinical and technical examinations. During the production campaigns no accidents with bendiocarb occurred in the workers and no consultations of the Medical Department due to work or contact with bendiocarb were required.	

4.3	Effectivity of medical treatment	Not specified	
4.4	Outcome	No evidence of significant adverse incidents or effects.	
4.5	Other	-	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	Materials and methods	Periodical health surveillance of plant operatives is undertaken on an annual basis. This includes a detailed history and full general examination. This has been conducted campaign-wise since 1987 [redacted] on an average annual production of [redacted] tonnes.	
5.2	Results and discussion	Annual medical surveillance of workers exposed to bendiocarb did not reveal any unwanted effects in the workers. The examinations included physical exams and clinical and technical examinations. During the production campaigns no accidents with bendiocarb occurred in the workers and no consultations of the Medical Department due to work or contact with bendiocarb were required. No adverse effects have occurred.	
5.3	Conclusion		

EVALUATION BY COMPETENT AUTHORITIES	
EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	14th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	Not applicable
Acceptability	Acceptable
Remarks	
COMMENTS FROM ...	
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

			Official use only
		1. REFERENCE	
1.1	**Reference**	[redacted] (2006) Occupational Medical Experiences with Bendiocarb Technical [redacted] Document M-266376-01-1 6.12.1/04 06 February 2006 Unpublished	
		2. GUIDELINES AND QUALITY ASSURANCE (NOT APPLICABLE)	
		3. MATERIALS AND METHODS	
3.1	**Substance**	Bendiocarb	
3.2	**Persons exposed**	Plant operatives during formulation	
3.2.1	Sex	No detailed data.	
3.2.2	Age/weight	No detailed data.	
3.2.3	Known diseases	No detailed data.	
3.2.4	Number of persons	30	
3.2.5	Other information	Personal safety measures included self breathing hood, protective gloves, chemical-resistant suit	
3.3	**Exposure**		
3.3.1	Reason of exposure	Potential exposure during formulation	
3.3.2	Frequency of exposure	Five days a year are assigned to Ficam W production	
3.3.3	Overall time period of exposure	Years 2000 - 2005	
3.3.4	Duration of single exposure	Not specified	
3.3.5	Exposure concentration / dose	Not specified	
3.3.6	Other information	-	
3.4	**Examinations**	Laboratory examinations: differential blood count, cholinesterase rate, creatinine, urine-status, hepatic enzyme. Medical examinations: full physical examination with orientating neurological status (reflexes, sensitivity, coordination) and skin status. Technical examinations: audiometry, vision-testing, lung function, ergometry. Routine examinations are conducted twice a year and blood control once a year.	
3.5	**Treatment**	Symptomatic, first-aid if necessary in accident situations	
3.6	**Remarks**	-	

		4. RESULTS AND DISCUSSION	
4.1	**Clinical signs**	Decrease of cholinesterase rate, dizziness.	
4.2	**Results of examinations**	Occupational medical surveillance has been performed biannually on a routine basis since 2000 [redacted]. About 30 workers from the production plant are exposed to bendiocarb technical during the production of Ficam W. The surveillance did not reveal any unwanted effects in the workers, apart from skin effects (itches). The examinations included laboratory parameters, and clinical and technical examinations (3.4). During the last production period (2000 – 2005), there was only one case of intoxication with bendiocarb technical. The worker felt unwell for a few hours (dizziness). His cholinesterase rate had decreased, but was normal again after a few days	
4.3	**Effectivity of medical treatment**	Not specified	
4.4	**Outcome**	The cholinesterase rate of the intoxicated worker was normal again after a few days.	
4.5	**Other**	-	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	Occupational medical surveillance has been performed biannually on a routine basis since 2000 [redacted] About 30 workers from the production plant are exposed to bendiocarb technical during the production of Ficam W (5 days per year). The examinations included laboratory parameters, and clinical and technical examinations.	
5.2	**Results and discussion**	The surveillance did not reveal any unwanted effects in the workers, apart from skin effects (itches). During the last production period (2000 – 2005), there was only one case of intoxication with bendiocarb technical. The worker felt unwell for a few hours (dizziness). His cholinesterase rate had decreased, but was normal again after a few days	
5.3	**Conclusion**		

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	Not applicable
Acceptability	Acceptable
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.2 Direct observation

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**	
Limited exposure [ ]	**Other justification [✓]**	
Detailed justification:	See Point 6.12.1	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Evaluation of applicant's justification	Direct observations pertaining to bendiocarb exposure in manufacturing plant personnel and pest control officers were recorded in the documents submitted for point 6.12.1.
Conclusion	The justification for non-submission of data is acceptable.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.3 Health records

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**	
Limited exposure [ ]	**Other justification [✓]**	
Detailed justification:	See Point 6.12.1	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Evaluation of applicant's justification	The health records of manufacturing plant personnel and members of the public possibly pertaining to potential exposure to bendiocarb were summarised in the documents submitted for point 6.12.1.
Conclusion	The justification is acceptable.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.4 Epidemiological studies on the general population

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	As bendiocarb is a carbamate, a group of chemicals with well-defined symptoms and effects, an epidemiological study should not be needed.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Evaluation of applicant's justification	All the toxicological effects seen in animals following bendiocarb exposure, and all those seen in manufacturing plant personnel and pest control officers, were related to the anticholinesterase mode of action of bendiocarb. It is unlikely that an epidemiological study would reveal any additional toxicology or provide further information.
Conclusion	The justification for non-submission of data is acceptable.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.5 Diagnosis of poisoning

			Official use only
1.1	Reference	**1. REFERENCE** Steffens, W. (2004b) Intoxication Treatment Database - Bendiocarb Bayer CropScience AG Document M-258950-01-1 6.12.5/01 07 October 2004 Unpublished	
		2. GUIDELINES AND QUALITY ASSURANCE (NOT APPLICABLE)	
3.1	Substance	**3. MATERIALS AND METHODS** Bendiocarb	
4.1	Symptoms	**4. APPLICANT'S SUMMARY AND CONCLUSION** Carbamate insecticides inhibit esterases in the organism, the key enzyme inhibited and accounting for the signs and symptoms is the acetylcholinesterase (AChE). Thus the mechanism of action is similar to organophosphate insecticides, but carbamates do not irreversibly bind to AChE, and their effect is much shorter. The inhibition of AChE leads to an accumulation of the neurotransmitter acetylcholine in the central and peripheral nervous system, resulting in an endogenous acetylcholine intoxication with the following signs and symptoms: Eye: miosis, lacrimation Heart/circulation: bradycardia, hypotension Mouth: salivation Lung: bronchial secretion Intestines: nausea, vomiting, diarrhea Skin: sweating Muscles: fibrillation, tics, myoclonus, paralysis of respiratory muscles, peripheral respiratory paralysis Central Nervous System: somnolence, coma, respiratory depression and failure, hypothermia, convulsions There are indications that symptoms in –small – children may be different to those in adults with a predominance of CNS depression and less specific symptoms.	

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	Not applicable
Acceptability	Acceptable
Remarks	No mention is made of the diagnosis of bendiocarb poisoning by measurement of cholinesterase activity.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.6 Sensitisation/allergenicity observations

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	Bendiocarb is not a sensitizer as proven in laboratory studies in the guinea pig. No cases of sensitisation have been reported as part of routine hygiene inspections of personnel (see Points 6.12.1/01 and 6.12.1/02). Therefore this study is not needed.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Evaluation of applicant's justification	The guinea pig study submitted to fulfill data requirement A6.1.5 showed that bendiocarb was not a strong sensitiser in that system. The Buehler assay is generally considered to be less sensitive than the guinea pig maximisation test and local lymph node assay. However, observations of manufacturing plant personnel over several years have not revealed any cases of sensitisation amongst workers. The level of exposure of these workers is not known, since any potential exposure is intermittent, and the training and work practices are designed to minimise exposure.
Conclusion	Sensitisation/allergenicity observations have been submitted in point 6.12.1/01 and 6.12.1/02.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.7 Specific treatment in case of accident

			Official use only
		1. REFERENCE	
1.1	**Reference**	Steffens, W. (2004b) Intoxication Treatment Database - Bendiocarb Bayer CropScience AG Document M-258950-01-1 6.12.7/01 07 October 2004 Unpublished	
		2. GUIDELINES AND QUALITY ASSURANCE (NOT APPLICABLE)	
		3. MATERIALS AND METHODS	
3.1	**Substance**	Bendiocarb	
		4. APPLICANT'S SUMMARY AND CONCLUSION	
4.1	**First aid**	- Remove patient from exposure/terminate exposure - Thorough skin decontamination with ample amounts of water - observe personal protection (long gloves) - Whilst induction of vomiting may be useful for the active ingredient in case of ingestion, it is strictly forbidden, if a formulation containing solvents has been swallowed. **Note:** In any case induction of vomiting should only be considered if a significant amount has been swallowed (more than a mouthful), if the ingestion was less than one hour ago, and if the patient is fully conscious. Induced vomiting can remove maximum 50% of the ingested substance.	
4.2	**Treatment**	In case of ingestion a gastric lavage within the first hour after ingestion and after intubation only with consecutive application of activated charcoal and sodium sulphate should be performed. Before treatment is started, either clear symptoms of carbamate insecticide poisoning (as described under Point 6.12.5) should be present or a reduction of cholinesterase activity to below 30% of normal should be found. The following antidote is generally accepted: atropine. Additionally a benzodiazepine (e.g. diazepam) should be given in case of seizures/ convulsions according to standard regimens. 2 regimens for initial atropine treatment are currently suggested; in both cases the cessation of the cholinergic symptoms salivation, bronchial secretion, sweating and bradycardia indicates sufficient atropinization. The skin should be dry, the lungs should be clear on auscultation and the heart rate should be in a range of 80 to 100/min. Overdoses of atropine have to be strictly avoided, as these can promote heart rhythm disturbances (torsades des pointes).	

	Regimen 1: 2-10 mg atropine i.v. , followed every 15 minutes by 2 mg atropine i.v. until cessation of the symptoms as above Regimen 2: - 2 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear - 4 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear - 8 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear - 16 mg atropine i.v., 5 minutes wait, if symptoms persist or reappear - 32 mg atropine i.v. No higher doses of atropine should be given nor are necessary. It is mandatory to allow 5 minutes after each dose for atropine to become fully effective, the next higher dose must not be given earlier and only if the above symptoms are persisting. Regimen 2 currently is advisable. If further atropine treatment is required (taking into account the relatively short effect of carbamates), it should be done by continuous application of 1 – 2 mg/hour. Atropine treatment can be stopped, when the plasma cholinesterase level has returned to above 30% of normal. **For children** the dosage has to be more careful due to a higher sensitivity of children to atropine. The initial dose should be 0.1 mg/kg body weight, then careful repletion or increase depending on the reversal of symptoms as described above. Both giving too much and too little atropine should strictly be avoided, the dosage should be adjusted to the signs of esterase-inhibitor poisoning. **Note: Oxime** therapy has not been convincingly shown to have additional value in the treatment of carbamate poisoing. On the other hand - with the one exception of carbaryl – it has been shown not to have negative effects. Thus in cholinesterase-inhibitor poisoning with an unknown substance, oxime therapy is recommended.	

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	Not applicable
Acceptability	Acceptable
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.12.8 Prognosis following poisoning

			Official use only
		1. REFERENCE	
1.1	**Reference**	[redacted] (1974) Evidence for the Reversal of Cholinesterase Inhibition by NC 6897 in Laboratory Animals [redacted] Document A90363 6.12.8/01 September 1974 Unpublished [redacted] (1971b) The Toxicology of NC 6897: Symptoms and Cholinesterase Inhibition in the Rat Following Single or Multiple Oral Doses [redacted] Document A90945 6.12.8/02 March 1971 Unpublished.	
		2. GUIDELINES AND QUALITY ASSURANCE (NOT APPLICABLE)	
		3. MATERIALS AND METHODS	
3.1	**Substance**	Bendiocarb	
3.2	**Persons exposed**	n.a. – experiments on laboratory animals	
3.2.1	Sex	-	
3.2.2	Age/weight	-	
3.2.3	Known diseases	-	
3.2.4	Number of persons	-	
3.2.5	Other information	-	
3.3	**Exposure**	n.a. – experiments on laboratory animals	
3.3.1	Reason of exposure	-	
3.3.2	Frequency of exposure	-	
3.3.3	Overall time period of exposure	-	
3.3.4	Duration of single exposure	-	
3.3.5	Exposure concentration / dose	-	
3.3.6	Other information	-	
3.4	**Examinations**	See 5.1 and 5.2	
3.5	**Treatment**	n.a.	
3.6	**Remarks**	-	

		4. RESULTS AND DISCUSSION	
4.1	**Clinical signs**	Typical of cholinesterase inhibition	
4.2	**Results of examinations**	See 5.2	
4.3	**Effectivity of medical treatment**	See 5.2	
4.4	**Outcome**	See 5.2	
4.5	**Other**		
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	Bendiocarb is a typical carbamate cholinesterase inhibitor. As such it forms a reversible complex with the enzyme, in contrast with the typical organophosphate cholinesterase inhibitor which forms an irreversible complex with the enzyme. Therefore the rate at which cholinesterase can recover from bendiocarb inhibition is dependent upon the hydrolysis of the complex and elimination of the compound from the proximity of the enzyme by metabolism and/or excretion. **Acute oral administration to the rat ([redacted] 1971c – A90945)** Bendiocarb in solution in glycerol formal was given in a dose of 4 mg/kg by stomach tube to three groups of four rats once a day on each day for three consecutive days. Whole blood and plasma cholinesterase was estimated in each rat taking one group for each time interval of 10, 30 and 90 minutes after dosing on day 1 and day 3. The rats received no further treatment for an additional three days after which blood samples were taken from eight animals in order to assess the effect of withdrawal of treatment. **Recovery of inhibited cholinesterase in dogs fed bendiocarb ([redacted] 1974 – A90363)** Two female beagles supplied by Boots Ltd., Nottingham, weighing 9.5 and 10.5 kg were caged separately with water available ad libitum but no food was given for 24 hours before the experiment. Technical bendiocarb (micronised) was mixed with a tinned meat dog food at the required level. It was proposed that food containing 1000 ppm bendiocarb be offered to each dog for one hour and then removed, but as one dog showed symptoms of cholinesterase inhibition 20 minutes after the start of feeding, the food was taken away from both dogs. The food eaten was then measured and the chemical intake calculated (31.5 and 33.2 mg/kg). Blood samples were taken before feeding and at 1, 6, 25, 30, 48, 54 and 72 hours after the end of the feeding period. The samples were chilled in ice and immediately assayed for cholinesterase activity by the modified Ellman technique. Enzyme activities were expressed as percentage of the pre-exposure values on samples taken before feeding.	

		Reversibility of cholinesterase activity in dogs fed bendiocarb for 16 weeks ([redacted] 1974 – A90358 Point 6.4.1/01) Bendiocarb was fed to groups of male and female beagle dogs at dose levels* of 20, 100 and 500 to 1000 ppm for 16 weeks as part of a general toxicity study. At the end of the treatment period, half the animals were examined for blood cholinesterase one hour after a feeding period and then placed on untreated diet and assayed at 24 and 48 hours. The other half were examined for brain cholinesterase and recovery of this enzyme was estimated after allowing homogenate to stand at room temperature for 24 hours. Blood and brain cholinesterase estimations were subsequently also carried out in the animals which had been taken off treatment for 2 – 3 days as an estimate of the reversibility of the effect of bendiocarb on the enzyme. * Dose level increased from 500 to 1000 at week 13.	
5.2	Results and discussion	**Acute oral administration to the rat ([redacted] 1971c – A90945)** The recovery of cholinesterase activity in whole blood and plasma had begun 30 minutes after dosing and was proceeding rapidly at 90 minutes and measurements made at 3 days after the last treatment showed a complete recovery of the enzyme (see Table A6.12.8-1). **Recovery of inhibited cholinesterase in dogs fed bendiocarb ([redacted] 1974 – A90363)** Six hours after the administration of bendiocarb to the female beagle dog there is a considerable degree of recovery of cholinesterase activity and at 25 hours after treatment, recovery is complete (see Table A.6.12.8-2). **Reversibility of cholinesterase activity in dogs fed bendiocarb for 16 weeks ([redacted] 1974 – A90358 Point 6.4.1/01)** Cholinesterase activity was not affected by a dietary level of 20 ppm. Dietary levels of 500-1000 ppm produced whole blood, plasma and brain cholinesterase activity depression up to 28 – 46%. The effect was rapidly reversible in two to three days (see Tables A.6.12.8-3 andA.6.12.8.4).	
5.3	Conclusion	The degree of reversibility of the cholinesterase inhibition after oral bendiocarb treatment has been demonstrated for blood and plasma cholinesterase in the rat and dog and for brain cholinesterase in the dog. Recovery of whole blood, plasma and brain cholinesterase from inhibition by bendiocarb is rapid. The results demonstrate that cholinesterase activity commenced recovery at least 30 minutes after treatment and even after high oral dose levels, up to 33 mg/kg, in the dog recovery was complete 24 hours after treatment.	

Table A6.12.8-1 **Rat Blood Cholinesterase Activity after 1 or 3 Oral Doses of 4 mg/kg ([redacted] 1971 – A90945)**

Time after dosing	Cholinesterase activity as % of pre-exposure							
	Whole blood				Plasma			
	10 min	30 min	90 min	3d	10 min	30 min	90 min	3d
After 1 dose	16	17	42		37	32	59	
	24	22	35		40	48	43	
	9	21	43		22	45	58	
	13	27	58		41	41	55	
Mean	15	22	44		35	41	54	
After 3 doses	16	22	73	112	36	43	65	91
	12	26	39	103	47	34	64	93
	10	14	-	98 11	32	48	43	92
	37	51	110		41	40	57	96
Mean	12	25	54	106	39	41	57	93

Table A6.12.8-2 **Female Beagle Dog Blood Cholinesterase Activity after 1 Dose of 1000 ppm ([redacted] 1974 – A90363)**

Whole blood cholinesterase activity as % of pre-exposure		
Dog No.	153	197
Time from end of feeding period		
1 hour	30	24
6 hours	54	50
25 hours	104	87
30 hours	103	97
48 hours	102	97
54 hours	103	-
72 hours	97	98

Table A6.12.8-3 **Individual Whole Blood and Plasma Cholinesterase Activity for Control and Test Male and Female Beagle Dogs that have been Fed with Bendiocarb Technical in the Diet for 16 Weeks ([redacted] 1974 – A90358 Point 6.4.1/01)**

Animals (sex)	Whole blood cholinesterase (moles/litre/wt.blood/min x 10^{-3})				Plasma cholinesterase (moles/litre/min x 10^{-3})			
	Test W. 16	Recovery		Test W. 16 (% of mean recovery value)	Test W. 16	Recovery		Test W. 16 (% of mean recovery value)
		Day 1	Day 2			Day 1	Day 2	
Controls								
M	1.68	1.50	1.76	103	1.24	1.19	1.19	104
M	2.38	1.94	1.94	122	1.14	1.32	1.28	87
F	1.24	1.32	1.14	100	1.24	1.24	1.24	100
F	0.88	0.98	0.97	91	1.32	1.28	1.28	103
20 ppm								
M	1.76	1.68	1.50	111	1.28	1.32	1.19	102
M	1.76	1.94	1.58	100	1.14	1.37	1.32	85
F	1.50	1.68	1.58	92	0.93	1.24	1.19	76
F	1.76	1.58	1.68	108	1.06	1.01	1.01	104
100 ppm								
M	2.38	2.02	1.76	125	1.06	1.06	1.06	100
M	1.24	1.32	1.14	100	0.97	0.97	0.93	102
F	1.94	1.68	1.58	119	1.24	1.19	1.28	100
F	1.14	1.76	1.94	62	1.19	1.32	1.37	89
1000 ppm								
M	1.24	1.68	1.68	74	0.62	1.01	0.97	62
M	0.88	1.68	1.59	54	0.66	1.24	1.24	54
F	1.50	2.48	2.30	63	1.19	1.63	1.81	69
F	0.62	1.42	1.68	40	0.71	1.28	1.32	54

Table A6.12.8-4 Individual Brain Cholinesterase Activity (ΔA/min/g) for Control or Test Male and Female Beagle Dogs that have been Fed with Bendiocarb Technical in the Diet for 16 Weeks ([redacted] 1974 – A90358 Point 6.4.1/01)

Males (No)	Test W.16	Recovery	Test W. 16 (% of recovery value)	Females (No)	Test W.16	Recovery	Test W. 16 (% of recovery value)
Controls				Controls			
99c		17.0		80c		18.5	
100c		20.0		83c		23.5	
103	-	-		88	21.5	24.5	88
105	20.0	22.5	89	89	18.0	20.5	88
20 ppm				20 ppm			
97c		26.7		79c		20.0	
98	-	-		82c		16.5	
106c		19.5		87	20.5	23.5	87
107	18.7	22.5	83	90	19.5	21.0	93
100 ppm				100 ppm			
78c		16.0		81c		16.5	
96c		20.5		84c		18.0	
102	17.0	23.5	73	72	17.5	19.5	90
110	21.0	24.0					
1000 ppm				1000 ppm			
77c		19.0		86c		20.0	
104c		17.5		91c		15.5	
108	11.5	21.0	55	94	13.0	19.5	67
109	8.5	17.5	49	111	11.5	19.5	59

c: brain cholinesterase estimates after being placed on control diet

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	14th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	Not applicable
Acceptability	Acceptable
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.13 Toxic effects on livestock and pets

6.13.1 Acute environmental exposure

		1. REFERENCE	Official use only
1.1	**Reference**	[redacted] (1979a) The Acute Environmental Exposure of Cats to 1% Bendiocarb Dust [redacted] Document A90965 6.13.1/01 April 1979 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	No, but the study was conducted in line with good scientific practice.	
2.2	**GLP**	No, the study was conducted prior to the introduction of GLP as a standard requirement.	
2.3	**Deviations**	n.a.	
		3. MATERIALS AND METHODS	
3.1	**Test material**	Ficam D (bendiocarb 1% dust)	
3.1.1	Lot/Batch number	Batch 23 U7	
3.1.2	Specification	Bendiocarb 1.26 ± 0.05% [redacted]	
3.1.2.1	Description	Not specified but Ficam D is known as an off-white powder	
3.1.2.2	Purity	Contains 1.26% bendiocarb	
3.1.2.3	Stability	Not specified but FICAM D is not known to decompose at room temperature	
3.2	**Test Animals**		
3.2.1	Species	Cat	
3.2.2	Strain	Ex MRC and LAC derived	
3.2.3	Source	Fisons Pharmaceuticals Division, Loughborough	
3.2.4	Sex	Female	
3.2.5	Age/weight at study initiation	1.85 – 2.48 kg	
3.2.6	Number of animals per group	6	
3.2.7	Control animals	6	

3.3	**Administration/ Exposure**	Exposure in a room in which the floor had been dusted with Ficam D insecticide at 20 g product/m^2. Potential existed for oral, dermal and inhalation exposure but, because of the high acute oral toxicity and cats' well known fastidious grooming habits, the main hazard was considered to be by oral contamination.
3.3.1	Postexposure period	15 days
3.3.2	Type	n.a.
3.3.3	Concentration	n.a.
3.3.4	Vehicle	n.a.
3.3.5	Concentration in vehicle	n.a.
3.3.6	Total volume applied	The test room was treated with one application of 1% bendiocarb dust at the normal maximum application rate of 20 g dust/m^2.
3.3.7	Controls	6 cats were placed in an untreated room of the same size.
3.4	**Examinations**	Clinical observations and general condition, bodyweight, macroscopic examination at necropsy.
3.5	**Method of determination of LD_{50}**	n.a.
3.6	**Further remarks**	-
		4. RESULTS AND DISCUSSION
4.1	**Clinical signs**	No overt sign of toxicity was seen throughout the 15 day observation period, despite the licking of the floor and feet, when cats were reintroduced to the room after application of the chemical.
4.2	**Pathology**	There was no macroscopic abnormality attributable to treatment.
4.3	**Other**	No significant difference in bodyweight gain was found between the tests and control groups.
4.4	**LD_{50}**	n.a.
		5. APPLICANT'S SUMMARY AND CONCLUSION
5.1	**Materials and methods**	The cat is the most susceptible species tested to the acute effects of bendiocarb and the hazard from the acute exposure of cats in rooms treated with a 1% dust formulation of bendiocarb (Ficam D) has been studied. Six female adult cats were placed in a room, the floor of which had been dusted with Ficam D (20 g product/m^2). The room was thoroughly cleaned on Day 8 using a vacuum cleaner. The total exposure period was 15 days.
5.2	**Results and discussion**	No overt sign of toxicity was seen throughout the 15 day exposure and observation period. No significant difference in bodyweight gain was found between the test and control groups. There was no macroscopic abnormality attributable to treatment.
5.3	**Conclusion**	It is concluded that there was no evidence of adverse effect of prolonged exposure of cats to the dust applied at 20 g/m^2 .
5.3.1	Reliability	2

5.3.2 Deficiencies	No	

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	2
Acceptability	Acceptable
Remarks	The dust formulation used in this study contained 1% bendiocarb.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.13.2 Acute oral exposure

			Official use only
		1. REFERENCE	
1.1	**Reference**	[redacted] (1979b) The Acute Oral Toxicity of Ficam 80W to the Cat [redacted] Document A90967 6.13.2/01 May 1979 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	No, but the study was conducted in line with good scientific practice.	
2.2	**GLP**	No, the study was conducted prior to the introduction of GLP as a standard requirement.	
2.3	**Deviations**	n.a.	
		3. MATERIALS AND METHODS	
3.1	**Test material**	Ficam 80W (bendiocarb 80% water dispersible powder)	
3.1.1	Lot/Batch number	Batch no. 8A8	
3.1.2	Specification	As given in Section 2, Doc III-B	
3.1.2.1	Description	Off-white powder	
3.1.2.2	Purity	Contains 79.4% bendiocarb	
3.1.2.3	Stability	Stable	
3.2	**Test Animals**		
3.2.1	Species	Cat	
3.2.2	Strain	Ex MRC and LAC derived	
3.2.3	Source	Fisons Pharmaceuticals Division, Loughborough	
3.2.4	Sex	Female	
3.2.5	Age/weight at study initiation	2.18 – 2.86 kg	
3.2.6	Number of animals per group	6	X
3.2.7	Control animals	No	
3.3	**Administration/ Exposure**	Oral	
3.3.1	Postexposure period	14 days	
3.3.2	Type	Gelatin capsules	

3.3.3	Concentration	0.625, 10, 20 and 80 mg product/kg bw (equivalent to 0.5, 8, 16 and 64 mg a.i./kg)	
3.3.4	Vehicle	n.a.	
3.3.5	Concentration in vehicle	n.a.	
3.3.6	Total volume applied	Appropriate dose (see 3.3.3) in gelatin capsules	
3.3.7	Controls	n.a.	
3.4	**Examinations**	Clinical observations, bodyweight and macroscopic examination at necropsy.	
3.5	**Method of determination of LD_{50}**	Weil	
3.6	**Further remarks**		
		4. RESULTS AND DISCUSSION	
4.1	**Clinical signs**	Toxic effects seen comprised muscular fibrillation, ataxia, miosis, urinary and faecal incontinence, prostration, salivation, rapid respiration, dyspnoea, convulsions, lachrymation and death. Survivors showed rapid and complete recovery. Only one animal was seen to vomit and this subsequently died; however, at necropsy three animals were found to have vomit in and around their mouths and in the respiratory tract. Signs of toxicity were consistent with anticholinesterase properties and were attributed to the bendiocarb in the formulation.	
4.2	**Pathology**	Cats receiving 16 mg a.i./kg bodyweight and above died as a result of chemical treatment and, on macroscopic examination, exhibited the following: - incomplete dilation of pupils - anal sphincter relaxation - evidence of vomiting and subsequent inhalation of vomit which may possibly have contributed towards death in up to three animals.	
4.3	**Other**	-	
4.4	**LD_{50}**	ca. 14 mg product/kg (equivalent to 11 mg a.i./kg)	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The acute oral toxicity of Ficam 80W was investigated in the female cat. Six female cats were given single doses of Ficam 80W in gelatin capsules (0.5 – 64 mg a.i./kg bodyweight) and observed for 14 days.	
5.2	**Results and discussion**	Toxic effects seen comprised muscular fibrillation, ataxia, miosis, urinary and faecal incontinence, prostration, salivation, rapid respiration, dyspnoea, convulsions, lachrymation and death. Survivors showed rapid and complete recovery. Signs of toxicity were consistent with anticholinesterase properties and were attributed to the bendiocarb in the formulation.	

		Cats receiving 16 mg a.i./kg bodyweight and above died as a result of chemical treatment and, on macroscopic examination, exhibited the following: - incomplete dilation of pupils - anal sphincter relaxation - evidence of vomiting and subsequent inhalation of vomit which may possibly have contributed towards death in up to three animals. The oral LD_{50} was ca. 14 mg product/kg (equivalent to 11 mg a.i./kg). The minimum symptomatic dose was not accurately determined but it falls between 0.625 and 10 mg product/kg (equivalent to 0.5 and 8 mg a.i./kg).	
5.3	**Conclusion**		
5.3.1	Reliability	2	
5.3.2	Deficiencies	No	

Table A6.13.2-1 Table for Acute Toxicity

Dose [mg a.i./kg]	Number of dead/number of investigated	Time of death (range)	Observations
0.5	0/1	-	
8	0/2	-	Symptoms 10 min – 2.75 h; fully recovered 5.5 – 6.75 h
16	2/2	1 – 1.75 h	
64	1/1	1.25 h	
LD_{50} value	ca. 14 mg product/kg (equivalent to 11 mg a.i./kg)		

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	2
Acceptability	Acceptable
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.13.3 Chronic environmental exposure

		1. REFERENCE	Official use only
1.1	Reference	[redacted] (1972b) Chronic Environmental Exposure of Cats in a Room Treated with Ficam [redacted] Document A90345 6.13.3/01 January 1972 Unpublished	
1.2	Data protection	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	Guideline study	No, but the study was conducted in line with good scientific practice.	
2.2	GLP	No, the study was conducted prior to the introduction of GLP as a standard requirement.	
2.3	Deviations	n.a.	
		3. MATERIALS AND METHODS	
3.1	Test material	Ficam 80W (bendiocarb 80% water dispersible powder)	
3.1.1	Lot/Batch number	CR 13374	
3.1.2	Specification	As given in Section 2, Doc III-B	
3.1.2.1	Description	Off-white powder	
3.1.2.2	Purity	Contains 80.0% bendiocarb	
3.1.2.3	Stability	Stable	
3.2	Test Animals		
3.2.1	Species	Cat	
3.2.2	Strain	Not specified	
3.2.3	Source	Not specified	
3.2.4	Sex	Male	
3.2.5	Age/weight at study initiation	1.63 – 1.82 kg	
3.2.6	Number of animals per group	2	
3.2.7	Control animals	No	

3.3	**Administration/ Exposure**	Exposure in a room in which the floor and lower parts of the walls had been sprayed with Ficam 80W insecticide. Potential existed for oral, dermal and inhalation exposure but, because of the high acute oral toxicity and cats' well known fastidious grooming habits, the main hazard was considered to be by oral contamination.	
3.3.1	Postexposure period	33 days	
3.3.2	Type	n.a.	
3.3.3	Concentration	n.a.	
3.3.4	Vehicle	n.a.	
3.3.5	Concentration in vehicle	n.a.	
3.3.6	Total volume applied	240 ml of 1% dilution of Ficam 80W (2.4 g a.i.) was sprayed on the walls of the test room to a height of 0.3 m. The floor was also sprayed to effect a coverage of ca. 70%. Overall this represents a gross exaggeration of the actual dose employed in practice (2 – 4 x)	
3.3.7	Controls	n.a.	
3.4	**Examinations**	Clinical observations and general condition, bodyweight, whole blood cholinesterase, terminal autopsy. Persistence of deposit (cockroach mortality)	
3.5	**Method of determination of LD_{50}**	n.a.	
3.6	**Further remarks**		
		4. RESULTS AND DISCUSSION	
4.1	**Clinical signs**	No adverse effects on bodyweight, general condition or whole blood cholinesterase activity were found.	
4.2	**Pathology**	No adverse effects on gross pathology were found.	
4.3	**Other**	-	
4.4	**LD_{50}**	n.a.	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The cat is the most susceptible species tested to the acute effects of Ficam 80W and the hazard from the chronic exposure of cats in rooms treated with Ficam 80W has been studied. Two male adult cats were placed in a room, the floor and lower part of the walls of which had been sprayed with Ficam 80W (2.4 g a.i.) as soon as the deposit had dried. The exposure period was 33 days and whole blood cholinesterase activity was measured on days 0, 1, 15, 21 and 28 after exposure commenced.	
5.2	**Results and discussion**	No adverse effects on bodyweight, general condition, whole blood cholinesterase activity (the most sensitive criterion of overexposure) or gross pathology were found.	
5.3	**Conclusion**	The use of Ficam 80W to control domestic pests should present no hazard to cats entering or living in treated areas after spraying.	
5.3.1	Reliability	2	
5.3.2	Deficiencies	No	

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Materials and methods	As described by the applicant.
Conclusion	As described by the applicant.
Reliability	2
Acceptability	Acceptable
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.14 Other test(s) related to the exposure of humans

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	In normal use of bendiocarb biocidal product, no substances, other than mammalian metabolites, are generated from bendiocarb, Actually the major metabolite found in the environment (NC 7312) was detected in mammals. Then its toxicity has been tested along with the parent. Consequently, no further studies should be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Evaluation of the applicants justifications	There is no indication that the toxicology of bendiocarb should be different in humans than in other mammalian species. The major metabolites detected during use of bendiocarb products are those that occur in mammals, which have been tested during the submitted *in vivo* toxicity studies.
Conclusion	No further tests related to the exposure of humans are required.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.15 Food and feedingstuffs

6.15.1 Identification of the residues (identity and concentrations), degradation and reaction products and of metabolites of the active substance in contaminated foods or feedingstuffs

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	The product is not to be used to treat food-handling surfaces nor is it intended to treat when uncovered food is present. Labelling restrictions include the following: - DO NOT APPLY TO SURFACES on which food or feed is stored, prepared or eaten. - COVER FOOD, FOOD PREPARING EQUIPMENT AND EATING UTENSILS before application. As the product is only for use by trained pest control operators, these precautions are normally taken into account during the course of treatment. Therefore, no food contamination is anticipated when Ficam W is used and residue studies should not be needed.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Evaluation of applicant's justification	The labelling of the product, which is for use only by trained personnel, clearly states that it should not be used on food-handling surfaces or in the vicinity of uncovered food.
Conclusion	No feed residue studies are required.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.15.2 Behaviour of the residues of the a.s., its degradation and reaction products and where relevant, its metabolites on the treated or contaminated food or feedingstuffs including the kinetics of disappearance

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	The product is not to be used to treat food-handling surfaces nor is it intended to treat when uncovered food is present. Labelling restrictions include the following: - DO NOT APPLY TO SURFACES on which food or feed is stored, prepared or eaten. - COVER FOOD, FOOD PREPARING EQUIPMENT AND EATING UTENSILS before application. As the product is only for use by trained pest control operators, these precautions are normally taken into account during the course of treatment. Therefore, no food contamination is anticipated when Ficam W is used and residue studies should not be needed.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Evaluation of applicant's justification	The labelling of the product, which is for use only by trained personnel, clearly states that it should not be used on food-handling surfaces or in the vicinity of uncovered food.
Conclusion	No feed residue studies are required.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.15.3 Estimation of potential or actual exposure of the a.s. to humans through diet and other means

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	The product is not to be used to treat food-handling surfaces nor is it intended to treat when uncovered food is present. Labelling restrictions include the following: - DO NOT APPLY TO SURFACES on which food or feed is stored, prepared or eaten. - COVER FOOD, FOOD PREPARING EQUIPMENT AND EATING UTENSILS before application. As the product is only for use by trained pest control operators, these precautions are normally taken into account during the course of treatment. Therefore, no food contamination is anticipated when Ficam W is used. Then there is no potential or actual exposure of the active substance to humans through diet or other means.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Materials and methods	The labelling of the product, which is for use only by trained personnel, clearly states that it should not be used on food-handling surfaces or in the vicinity of uncovered food.
Conclusion	No information on dietary exposure to bendiocarb is required.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.15.4 Proposed acceptable residues

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	The product is not to be used to treat food-handling surfaces nor is it intended to treat when uncovered food is present. Labelling restrictions include the following: - DO NOT APPLY TO SURFACES on which food or feed is stored, prepared or eaten. - COVER FOOD, FOOD PREPARING EQUIPMENT AND EATING UTENSILS before application. As the product is only for use by trained pest control operators, these precautions are normally taken into account during the course of treatment. Therefore, no food contamination is anticipated when Ficam W is used and no MRLs specific to biocidal product uses are necessary.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	
Evaluation of applicant's justification	The labelling of the product, which is for use only by trained personnel, clearly states that it should not be used on food-handling surfaces or in the vicinity of uncovered food.
Conclusion	No food contamination is anticipated so the submission of acceptable residues is not required.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.15.5 Any other available relevant information

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**	
Limited exposure [ ]	**Other justification [✓]**	
Detailed justification:	All relevant information has been submitted.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Evaluation of applicant's justification	The UK CA agrees that all relevant information has been submitted.
Conclusion	There is no requirement for further information.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.15.6 Summary and evaluation of data submitted under 6.15

The product is not to be used to treat food-handling surfaces nor is it intended to treat when uncovered food is present. Labelling restrictions include the following:

- DO NOT APPLY TO SURFACES on which food or feed is stored, prepared or eaten.
- COVER FOOD, FOOD PREPARING EQUIPMENT AND EATING UTENSILS before application.

As the product is only for use by trained pest control operators, these precautions are normally taken into account during the course of treatment. Therefore, no food contamination is anticipated when Ficam W is used and no MRLs specific to biocidal product uses are necessary.

6.16 Any other tests related to the exposure of the a.s. to humans in its biocidal products

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [ ]**	
Limited exposure [ ]	**Other justification [✓]**	
Detailed justification:	No other tests relevant to the exposure of bendiocarb to humans should be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Evaluation of the applicant's justification	The UK CA agrees that no other tests related to the exposure of bendiocarb to humans are required.
Conclusion	No tests related to this point are required.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

6.17 Tests to assess toxic effects of metabolites from treated plants

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ] Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	As the product is not intended for the treatment of plants, no further information should be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	15th November 2006
Evaluation of applicant's justification	The product is not intended to be used on plants.
Conclusion	No information is required for this point.
Remarks	
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

REGULATORY TOXICOLOGY

POSITION PAPER

Subject :

Bendiocarb

CONTENTS : Evaluation of the Dermal Absorption Studies

Author :

[redacted]

Toxicologist

[redacted]

FRANCE

Date : 5 February 2008

In a dermal absorption study conducted with Ficam W ([redacted] C040850, 2004a), the wettable powder was diluted in water to prepare a liquid formulation and applied to 6 dermatomed human skin samples. The formulation was removed from the skin surface after 8 hours and the extent of absorption was determined.

In the study report, Table F1 reports among other endpoints the radioactivity observed in each of the tape-strips. In the description of the method it is stated that each skin sample will be tape-stripped until the skin shows a 'shiny' appearance, which will indicate that the stratum corneum is removed (approximately 10 tape-strips). In Table F1, the abbreviation "N.S." is used to indicate that a tape-strip was not taken. Thus, skin sample 1 (W1H1) had 5 tape-strips taken before, as specified in the protocol, it was determined by visual examination that the shiny surface of the skin indicated that the stratum corneum had been removed, while skin sample 2 (W1H2) had only two tape-strips taken before it reached this same point. Thus, having taken fewer tape-strips therefore just indicates that:

- the stratum corneum for these skin samples was thinner or easier to remove
- all remaining product has been recovered by analysis of the remaining skin.

The amount of radioactivity in the skin, the receptor fluid, and the receptor chamber were used to indicate the absorption or potential absorption of Ficam W, while radioactivity in the stratum corneum, the donor chamber, and the swabs taken prior to tape-stripping of the skin were totalled to indicate non-absorbed material. These findings are summarized in the table below (results expressed as % of the dose applied).

	Skin sample						Mean
	W1H1	W1H2	W1H3	W1H4	W1H5	W1H6	
Receptor fluid	3.651	3.939	3.278	1.795	2.804	1.899	2.894
Receptor fluid at termination	0.162	0.007	0.015	0.015	0.020	0.019	0.040
Receptor chamber	2.148	ND	ND	0.063	0.038	ND	0.375
Skin	2.898	0.265	0.222	0.699	1.954	0.772	1.135
Absorption	**8.859**	**4.211**	**3.515**	**2.572**	**4.816**	**2.69**	**4.44**
Stratum corneum	0.206	0.152	0.211	0.827	0.530	1.049	0.496
Donor chamber	1.353	0.307	0.465	0.113	0.346	0.375	0.493
Swabs	84.89	89.191	91.108	82.171	83.507	82.062	85.488

ND = Non-detected

As shown, the absorption of radioactivity into the skin and the receptor fluid and the adsorption of radioactivity onto the receptor chamber is generally quite low. One sample, W1H1, is different from the others in most of the parameters assessed. A fairly large amount of radioactivity (2.148%) is adsorbed to the receptor chamber compared to the rest of the samples (mostly at limit of detection with a maximum of 0.063%). This is also true for the donor chamber with 1.353 % against a maximum of 0.465 %. These two points taken together suggest that this incubation in general was not optimal. Taken as a group, the other 5 samples in this study show low absorption of Ficam W through dermatomed human skin, generally low content of radioactivity in the skin, and low recovery of radioactivity from either the donor or the receptor chambers.

The No Sample indications in the table are following the explanations given above not indicating a potential data gap. They are due to the natural variations of the thickness of the stratum corneum. The fewer strips are taken, the more active is thus left to be considered as having penetrated in the skin.

It is our position that the findings observed in skin samples W1H2 through W1H6 are representative of the potential for dermal absorption of Ficam W through human skin from a liquid formulation, and that it is more appropriate to use the mean value (4.4%) than to use the maximum absorption value, taken from one single cell out of 6.

This conclusion is further supported taking into account the overall very conservative approach in calculating primary/secondary exposure based on the deterministic approach where worst case assumptions are lined up:

- calculations always take into account maximum application rates
- upper end values regarding work rate and exposure duration are taken into consideration
- lower end body weights
- etc...

Hence the corresponding exposure results are very likely to represent the upper end of the overall exposure distribution relevant for the respective exposure scenario. Accordingly the nature of the exposure results can be regarded acute rather than sub-chronic/chronic typically considered by the corresponding acceptable exposure level (AEL). By selecting in addition the maximum dermal absorption value as proposed by the UK CA and accordingly considering a **worst case acute** exposure scenario in our opinion an over conservative approach is chosen.
Therefore, taking further into account the high level on certainty given with regard to dermal absorption BES considers mean dermal absorption values as adequate conservative measures to assess primary and secondary exposure in the context of sub-chronic/chronic exposure conditions.

For the same reason, the mean dermal absorption value (0.25%) from the study carried out with Ficam D (dustable powder) ([redacted] C040839, 2004b) should be considered for dry bendiocarb.

The results of this study are summarized in the table below (results expressed as % of the dose applied).

	Skin sample					Mean
	DH3	DH6	DH8	DH9	DH11	
Receptor fluid	0.138	0.220	0.156	0.091	0.062	0.133
Receptor fluid at termination	0.022	0.003	0.028	0.015	0.027	0.019
Receptor chamber	0.043	0.137	0.026	ND	0.017	0.044
Skin	0.128	0.09	0.042	0.013	0.015	0.058
Absorption	**0.331**	**0.45**	**0.252**	**0.119**	**0.121**	**0.25**
Stratum corneum	0032	0.023	0.063	0.011	0.012	0.028
Donor chamber	0.118	0.199	0.056	2.519	0.012	0.581
Swabs	99.992	92.121	87.778	92.494	99.463	94.370

ND = Non-detected

By examining this compiled data for each of the samples used, it is clear that there is not a great deal of variation in absorption between the different skin samples. Therefore, the mean value for absorption of 0.25%, rather than the maximum value of 0.45%, will be sufficiently protective when used in human risk assessments.

Section A7 – Ecotoxicological Profile Including Environmental Fate and Behaviour

7.1 Fate and behaviour in water

7.1.1 Degradation, initial studies

7.1.1.1 Abiotic

7.1.1.1.1 Hydrolysis as a function of pH and identification of breakdown products

		1. REFERENCE	Official use only
1.1	**Reference**	Campbell, J.K. (1988) The Hydrolysis of Bendiocarb at Acid, Neutral and Alkaline pH Schering Agrochemicals Ltd. Document A90220 7.1.1.1.1/01 11 November 1988 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	OECD Guideline 111	
2.2	**GLP**	Yes	
2.3	**Deviations**	No	X
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C-Bendiocarb and unlabelled bendiocarb	
3.1.1	Lot/Batch number	Bendiocarb radiolabelled: CFQ 4944 Bendiocarb unlabelled: R000174	
3.1.2	Specification	As given in Section 2	
3.1.3	Purity	Bendiocarb unlabelled: 99 % Bendiocarb labelled: >98 % radiochemical purity	
3.1.4	Further relevant properties	^{14}[C]-labelled in the phenyl ring (specific activity 107 mCi/g)	
3.2	**Reference substance**	No	
3.2.1	Initial concentration of reference substance	n.a.	
3.3	**Test solution**	Buffer used were: phthalate pH 5, phosphate pH 7 and borax pH 9. See Tables A7.1.1.1.1-1 and A7.1.1.1.1-2.	
3.4	**Testing procedure**		

3.4.1	Test system	See Table A7.1.1.1.1-3 All solutions were kept in darkness throughout the study	
3.4.2	Temperature	25°C	
3.4.3	pH	pH 5, 7 and 9	
3.4.4	Duration of the test	At each pH, hydrolysis was monitored for at least two half-lives or for 30 days	
3.4.5	Number of replicates	pH 5: 3 pH 7: 4 pH 9: 2	
3.4.6	Sampling	Sampling time varied according to pH because of the widely varying DT_{50} values – see Tables A7.1.1.1.1-4 and A7.1.1.1.1-5.	
3.4.7	Analytical methods	Hydrolysis solutions were analysed by direct injection onto HPLC (Zorbax ODS column, 250 x 4.6 mm). The solvent system was 27.5 %acetonitrile in water and the flow rate was 1.5 ml/min. The positions of bendiocarb and its hydrolysis products in the chromatogram were detected by UV absorption at 210 nm. The analytes were quantified by collecting fractions and measuring the radioactivity by liquid scintillating counting (LSC).	
3.5	**Preliminary test**	No. The hydrolysis of bendiocarb was comprehensively investigated previously (Browne, Reary and Whiteoak, 1978) in a study performed using ^{14}[C]-labelled in the heterocyclic ring. Although the results of that study are not disputed, it was necessary to repeat the investigation using phenyl-labelled bendiocarb in order to comply with EPA regulations.	
		4. RESULTS	
4.1	**Concentration and hydrolysis values**	See Table A7.1.1.1.1-4	
4.2	**Hydrolysis rate constant (k_h)**	pH 5: 269.8 x 10^{-6} h^{-1}; r^2 0.998 pH 7: 6.259 x 10^{-3} h^{-1}; r^2 0.999 pH 9: 0.4123 h^{-1}; r^2 0.999	
4.3	**Dissipation time**	pH 5: DT_{50} = 46.5 days pH 7: DT_{50} = 48.1 hours pH 9: DT_{50} = 43.8 minutes See Table A7.1.1.1.1-5	
4.4	**Concentration – time data**	See Table A7.1.1.1.1-4 Decay curves (log plots) at each pH are included in the study report.	
4.5	**Specification of the transformation products**	See Table A7.1.1.1.1-6 At pH 5, the main hydrolysis product was pyrogallol, but at pH 7 and pH 9, NC 7312 (2,2-dimethyl-1,3-benzodioxol-4-ol) predominated.	X
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	Bendiocarb, ^{14}[C]-labelled in the phenyl ring, was incubated at 25°C at pH 5, 7 and 9.	
5.2	**Results and discussion**	Hydrolysis of bendiocarb followed first order kinetics at each pH. The observed half-lives were 46.5 days, 48.1 hours and 43.8 minutes at pH 5, 7 and 9 respectively. At pH 5, the main hydrolysis product was pyrogallol, but at pH 7 and pH 9, NC 7312 (2,2-dimethyl-1,3-benzodioxol-4-ol) predominated.	

5.2.1	k_h	pH 5: 269.8 x 10^{-6} h^{-1} pH 7: 6.259 x 10^{-3} h^{-1} pH 9: 0.4123 h^{-1}	
5.2.2	DT_{50}	pH 5: 46.5 days pH 7: 48.1 hours pH 9: 43.8 minutes	X
5.2.3	r^2	pH 5: r^2 0.998 pH 7: r^2 0.999 pH 9: r^2 0.999	
5.3	**Conclusion**		
5.3.1	Reliability	1	X
5.3.2	Deficiencies	No	

Table A7.1.1.1.1-1 Type and Composition of Buffer Solutions (Specify kind of water if necessary)

pH	Type of buffer (final molarity)	Composition
5	Phthalate 0.01M	Potassium hydrogen phthalate (20.446 g) was dissolved in water (300 ml). A solution of 1N potassium hydroxide (50 ml) was added to bring the pH to 4.99 and the mixture was diluted to 1000 ml. This gave a buffer 0.1M w.r.t phthalate with a pH of 4.99 at 22°C. This buffer was diluted ten-fold for use in the study. The pH of this buffer at 25°C was 4.90 – 4.98.
7	Phosphate 0.01M	Disodium hydrogen phosphate (Na_2HPO_4), 35.4909 g, and sodium dihydrogen phosphate (Na_2HPO_4. $2H_2O$), 39.0113 g, were separately dissolved in water and diluted to 500 ml. To prepare a buffer the solutions were mixed on a magnetic stirrer while monitoring the pH. This produced a pH 7 buffer 0.5M w.r.t. phosphate. The buffer was diluted to 0.01M prior to use. The pH of this buffer at 25°C was 7.15 – 7.18.
9	Borax 0.01M	This buffer was purchased. The buffer was 0.01M w.r.t. sodium tetraborate decahydrate and 0.02M w.r.t. sodium chloride. The pH of this buffer at 25°C was 9.17 – 9.18

Table A7.1.1.1.1-2 Description of test solution

Criteria	Details
Purity of water	Glass distilled water
Preparation of test medium	Labelled and unlabelled bendiocarb were dissolved in acetone in a flask which had been sterilised by heating to 190 °C for 2 hours. The bendiocarb solution was diluted to a concentration of 4.0 mg/ml. The specific activity of the bendiocarb in solution was 16.3 mCi/g. This stock solution was stored in the dark at 0-4 °C. The hydrolysis reaction was initiated by adding bendiocarb stock solution (50 µl) to flasks containing 10 ml buffer.
Test concentrations (mg a.i./L)	20 mg a.i./L
Temperature (°C)	25 °C
Controls	n.a.
Identity and concentration of co-solvent	Acetone (0.5 % v/v)
Replicates	pH 5: 3 pH 7: 4 pH 9: 2

Table A7.1.1.1.1-3 Description of test system

Glassware	10 ml conical flasks fitted with screen tops and silicone rubber septa
Other equipment	pH meter: EIL 7050 with combination electrode and automatic temperature compensation HPLC: Perkin Elmer Series 3 pump, Pye Unicam LC detector and Gilson 202 fraction collector Scintillation counter: Intertechnique SL 4000 Scintillation cocktail: Scintran FHV Solvents: All solvents were of HPLC or Distol grade
Method of sterilisation	Flasks for bendiocarb solutions were sterilised by heating to 190 °C for 2 hours. Flasks containing buffer solutions were sealed and autoclaved (15 psi, 15 minutes). After cooling, the flasks were placed in a water bath at 25 °C and allowed to equilibrate overnight.

Table A7.1.1.1.1-4 Hydrolysis of Test Compound, Transformation Products and Reference Substance, Expressed as Percentage of Initial Concentrations, at pH5, pH7 and pH9

pH 5

Compound	Sampling times (days)					
	0#	7	13	20	27	33
Parent compound	98.2	88.8	81.0	72.2	66.7	59.8
Transformation product 1 (NC 7312)	0.8	2.9	4.4	5.8	6.8	8.2
Transformation product 2 (pyrogallol)	0.6	7.3	13.1	21.1	25.2	30.0
Reference compound	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Volatiles *	-	-	-	-	-	-
Total % recovery	101.5	103.6	100.5	99.6	102.6	98.1

* Total volatiles over 30 days = 0.7 %
\# The mean sampling time for the time zero sample was 3.0 ± 0.9 hours which is equivalent to 0.25 % of one half-life.

pH 7

Compound	Sampling times (days)											
	0.1	18	48	67	70	95	119	138	145	163	168	186
Parent compound	97.0	76.1	49.2	37.5	34.8	23.8	16.7	14.0	10.9	9.8	8.9	7.2
Transformation product 1 (NC 7312)	1.6	22.0	47.8	59.1	61.7	71.9	79.0	81.4	83.9	85.2	86.2	87.9
Transformation product 2 (pyrogallol)	0.6	1.3	2.3	2.7	2.9	3.5	3.8	3.8	4.7	4.1	4.4	4.4
Reference compound	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Volatiles *	-											
Total % recovery	102.9	103.2	105.7	104.7	103.4	103.9	105.5	103.1	101.9	102.4	102.4	105.4

* Total volatiles over 30 days = 4.7 %

pH 9

Compound	Sampling times (hours)								
	0 03	0.17	0.45	0.63	1.00	1.25	1.43	1.75	2.00
Parent compound	91.7	78.9	58.9	50.1	34.6	27.6	22.7	17.0	14.7
Transformation product 1 (NC 7312)	7.1	20.0	39.3	48.6	64.0	71.6	75.0	81.9	83.6
Transformation product 2 (pyrogallol)	0.4	0.6	1.1	0.9	0.8	0.7	1.6	1.0	0.9
Reference compound	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Volatiles *	-	-	-	-	-	-	-	-	-
Total % recovery	100.4	102.5	104.3	102.7	99.2	101.2	100.1	99.5	97.6

* Because of the very short half-life of bendiocarb at this pH, no attempt was made to trap volatile metabolites.

Table A7.1.1.1.1-5 Dissipation times of parent compound, transformation products and reference compound at pH5, pH7 and pH9

	pH 5		pH 7		pH 9	
	DT_{50}	DT_{90}	DT_{50}	DT_{90}	DT_{50}	DT_{90}
Parent compound	46.5 days	-	48.1 hours		43.8 mins	-
Transformation product 1 (NC 7312)	-	-	-	-	-	-
Transformation product 2 (pyrogallol)	-	-	-	-	-	-
Reference compound	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Table A7.1.1.1.1-6 Specification and Amount of Transformation Products

CAS-Number	CAS and/or IUPAC Chemical Name(s)	Amount [%] of parent compound measured at		
		pH 5	pH 7	pH 9
22961-82-6	NC 7312 (2,2-dimethyl-1,3-benzodioxol-4-ol)	8.2	87.9	83.6
87-66-1	Pyrogallol (1,2,3-trihydroxybenzene)	30.0	4.4	0.9

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	27/06/07
	2.3 Claims to have no deviations from OECD 111. Study uses pH 5 as lowest values whereas OECD 111 uses pH 4, thus deviation. UK CA believes that this will not affect validity of results.
Materials and methods	Applicant's version is acceptable with the following comment: **4.5** No further investigation of the metabolites is undertaken as part of the study.
Conclusion	Applicant's version is acceptable with the following comment: **5.2.2** The author determined correct half lives of 1116 hours (46.5 days) at pH 5; 48.1 hours (2.0 days) at pH 7 and 0.73 hours at pH 9, all values applying to 25°C. These values were determined based on the equation of the decay curve (log of bendiocarb concentration expressed as % of initial concentration vs time) presented in the study report (Figures 2-4 pages 30-32). However, for the calculation of the rate constants, Campbell used the wrong formula "k = log 2 / DT50" instead of the correct formula "k = ln 2 / DT50". The correct rate constants corresponding to the DT50 values are presented below:

	DT50 (h)	Rate constant (h^{-1})
pH 5	1116	6.21×10^{-4}
pH 7	48.1	0.0144
pH 9	0.73	0.9450

	As the rate constants were not used for risk assessment purposes, this mistake has no incidence on the conclusions drawn in the risk assessments. In addition, in the study report one should read '(days)' instead of '(hours)' in Table 2 as time unit (page 16) and '(hours)' instead of '(days)' in Table 3 (page 17). **5.3.1** Reliability changed to 2 due to different pH and lack of investigation of metabolite stability.
Reliability	2
Acceptability	Acceptable.
Remarks	Study and endpoints robust for use in risk assessments. All endpoints transcribed from study correctly.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	

Acceptability
Remarks

7.1.1.1.2 Phototransformation in water including identity of the products of transformation

		1. REFERENCE	Official use only
1.1	**Reference**	Brehm, M. (1988a) The Photolysis of Bendiocarb (Schering Code No. ZK 52 020) in Aqueous Solution Schering AG Agrochemicals Division Document A90107 7.1.1.1.2/01 21 October 1988 Unpublished Brehm, M. (1992a) The Photolysis of Bendiocarb (Schering Code No. ZK 52 020) in Aqueous Solution (supplement to APC 46/88 = A90107) Schering AG Agrochemicals Division Document A90108 7.1.1.1.2/02 14 April 1992 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	US EPA Guideline NTIS PB83-153973 (1982) The supplementary study was conducted to OECD (1990) Guideline	
2.2	**GLP**	No, but the study was conducted in line with good scientific practice and to QA. The supplementary study was conducted to GLP	
2.3	**Deviations**	No	
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C-Bendiocarb and unlabelled bendiocarb	
3.1.1	Lot/Batch number	Unlabelled bendiocarb: R000174	
3.1.2	Specification	As given in Section 2	
3.1.3	Purity	Unlabelled bendiocarb: 99.0 %	
3.1.4	Radiolabelling	^{14}[C]-labelling in the phenyl ring Specific activity 3.96 MBq/mg, 99 % radiochemical purity	
3.1.5	UV/VIS absorption spectra and absorbance value	λ max = 276 nm (ϵ = 2810 l. mole^{-1}. cm^{-1}) There is only the tailing end of this absorption at wavelengths λ >290 nm with very low absorbance. Therefore only a very low absorption of sunlight (λ >290 nm) can be expected.	

3.1.6	Further relevant properties	The absorption spectra of bendiocarb measured at pH 5, 7 and 9 are congruent. The hydrolytic breakdown at pH 5 is minimal therefore the photolytic experiments were conducted at pH 5.
3.2	**Reference substances**	NC 7312 (2,2-dimethyl-1,3-benzodioxol-4-ol), purity >99 % Pyrogallol, purity >99 %
3.3	**Test solution**	See Table A7.1.1.1.2-1
3.4	**Testing procedure**	
3.4.1	Test system	The photoreactor was a 'merry go round' apparatus (tested by ECETOC) with the light source situated in the centre of a rotating table.
3.4.2	Properties of light source	Hg-arc TQ 150. The light intensity used in this study in the wavelength 290-320 nm where bendiocarb absorbs sunlight corresponds to about 2.5-fold intensity compared to natural sunlight. See Table A7.1.1.1.2-2
3.4.3	Determination of irradiance	Uranylsulphate/oxalic acid actinometer (0.01M Uranylsulphate and 0.05M oxalic acid)
3.4.4	Temperature	28.8 ± 0.7 °C and 27.8 ± 0.7 °C in the dark solutions
3.4.5	pH	5.0
3.4.6	Duration of the test	719.8 hours
3.4.7	Number of replicates	11
3.4.8	Sampling	Photolysis and dark experiment: 26.3, 47.4, 144.0, 216.3, 311.6, 383.6, 479.6, 551.7, 647.7, 719.8 hours Sunlight experiment: 13.9 and 29.8 days
3.4.9	Analytical methods	HPLC (for radioactive decay and material balance) and LSC
3.5	**Transformation products**	Yes There were two radioactive peaks present in the HPLC chromatograms from photolysis and dark solutions. Co-chromatography of the test solutions with NC 7312 indicates that one peak (maximum amount ~ 12 %) can be assigned to NC7312. The second peak (maximum amount ~ 40 %) elutes at the front in both photolysis and dark solutions indicating polar products which are presumably phenolic hydrolysis products and their oxidation products (phenol-oxidation) in the test solutions.
3.5.1	Method of Analysis for transformation products	HPLC
		4. RESULTS
4.1	**Screening test**	Not performed
4.2	**Actinometer data**	See Table A7.1.1.1.2-3
4.3	**Controls**	Dark reaction (same concentration as test solutions in photolysis)
4.4	**Photolysis data**	
4.4.1	Concentration values	13 mg/l

4.4.2	Mass balance	HPLC analyses additional to those for measuring radiochemical decay. The total radioactivity in the dark solution stay constant during the experiment and are completely recovered in the HPLC chromatograms (small peaks may be somewhat overestimated, as a clear distinction from baseline noise is not possible). The total radioactivity in the photolysis solutions stay constant until an irradiation time of about 300 h and decrease to about 80 % after 719.8 h (corresponding to about two half-lives of the parent compound), indicating that volatile products are formed, probably in secondary reaction as the decrease of radioactivity mainly occurs after the half-life of the parent compound. Full details of the results are given in Table IV on p 23 of the original report.
4.4.3	k^c_p	7.7752×10^{-4} h^{-1}
4.4.4	Kinetic order	First order
4.4.5	k^c_p / k^a_p	-
4.4.6	Reaction quantum yield (ϕ^c_E)	6.21×10^{-3} (molecules degraded/photon absorbed).
4.4.7	k_{pE}	-
4.4.8	Half-life ($t_{½E}$)	37.3 days (corrected for dark reaction) and under natural sunlight calculated as 187 days (40° north, midday, summer). This value is in very good agreement with the result of an additional photolysis experiment conducted in natural sunlight to confirm the extrapolation obtained from the laboratory experiment. However, this half-life of 187 days differs by a factor of ca. 7 to the values obtained with the use of the quantum yield (using computer program GCSOLAR). These half-life values strongly depend on the season and latitude (1070 – 20000 days) due to the variation of sunlight intensity in the UV-B range (< 310 nm) where bendiocarb absorbs sunlight. This difference could be explained by considering that the comparison of light intensities was related to midday conditions only and did not consider the greater increase of light intensity of the Hg-arc relative to sunlight at wavelengths < 300 nm where bendiocarb has its maximum light absorption. Furthermore the possible errors of the quantum yield determination of compounds with such a low overlap of the absorption spectrum with the incident light intensity at wavelengths > 290 nm have to be considered. The coefficients of variation from the mean value determined in different laboratories with several compounds were found in a range of 24 – 63 % in a ring test using the same experimental set-up used here. The rate of photodegradation of bendiocarb is determined by the difference of the overall reaction and dark reaction which is in the same order of magnitude as the photoreaction. This results in additional possibilities of error, which is especially true for sunlight experiment. Therefore the excellent agreement of the sunlight experiment with the extrapolation seems to be somewhat accidental and one should consider the order of magnitude only.

4.5	**Specification of the transformation products**	The conversion products found in the photolysis solutions were NC 7312 (product of hydrolysis of the carbamate group) (maximum amount ~ 12 %) and various polar products that could not be isolated or identified separately (maximum amount ~ 40 %). See Table A7.1.1.1.2-4	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	Aqueous solutions of ^{14}[C]-labelled bendiocarb (13 mg/l in buffer solution pH 5.0 to minimise hydrolysis, containing 1 % acetonitrile) were irradiated with the filtered light (λ >290 nm) of a Hg-arc using a 'merry go round' photoreactor. The light intensity, measured by chemical actinometry, in the wavelength range 290-320 nm where bendiocarb has the tailing end of its absorption band (λ max = 276 nm), was increased by a factor of about 2.5 compared to that of natural sunlight in summer at moderate northern latitudes. For the sunlight experiment, 3.3 ml aliquots of the test solution (unlabelled bendiocarb) were placed in 4 screw-capped quartz glass test tubes two of which were wrapped in aluminium foil to exclude any light. For sunlight exposure, the test tubes were placed on a black background on the roof of a company building in Berlin where no shadow was observed during the day and no reflections from other buildings occurred. The test tubes were oriented with the upper end to the North with an angle of 45° to the horizontal plane. Samples were taken from dark and photolysis solutions at 13.9 and 28.9 days and analysed by HPLC. In addition to the data included in this report the quantum yield of photodegradation of bendiocarb was determined to make the study compatible with the current OECD guidelines for photodegradation in water.	
5.2	**Results and discussion**	The rate of degradation of bendiocarb (corrected for dark reactions) could be described by first order kinetics with a half-life of 37.3 days. For the half-life extrapolation to natural sunlight conditions one has to consider a factor of ca. 5 (decrease of light intensity by a factor of about 2.5 and only 12h irradiation per day) to give an environmental half-life of about 187 days. This value is in very good agreement with the result of an additional photolysis experiment conducted in natural sunlight to confirm the extrapolation obtained from the laboratory experiment. However, this half-life of 187 days differs by a factor of ca. 7 to the values obtained with the use of the quantum yield (using computer program GCSOLAR). These half-life values strongly depend on the season and latitude (1070 – 20000 days) due to the variation of sunlight intensity in the UV-B range (< 310 nm) where bendiocarb absorbs sunlight.	

		This difference could be explained by considering that the comparison of light intensities was related to midday conditions only and did not consider the greater increase of light intensity of the Hg-arc relative to sunlight at wavelengths < 300 nm where bendiocarb has its maximum light absorption. Furthermore the possible errors of the quantum yield determination of compounds with such a low overlap of the absorption spectrum with the incident light intensity at wavelengths > 290 nm have to be considered. The coefficients of variation from the mean value determined in different laboratories with several compounds were found in a range of 24 – 63 % in a ring test using the same experimental set-up used here. The rate of photodegradation of bendiocarb is determined by the difference of the overall reaction and dark reaction which is in the same order of magnitude as the photoreaction. This results in additional possibilities of error, which is especially true for sunlight experiment. Therefore the excellent agreement of the sunlight experiment with the extrapolation seems to be somewhat accidental and one should consider the order of magnitude only. The conversion products found in the photolysis solutions were NC 7312 (product of hydrolysis of the carbamate group) (maximum amount ~ 12 %) and various polar products that could not be isolated or identified separately (maximum amount ~ 40 %). The quantum yield Φ, calculated from the degradation rate determined under well defined irradiation conditions in report A90107 and the UV-spectrum of bendiocarb was determined to be $\Phi = 6.21 \times 10^{-3}$ (molecules degraded/photon absorbed).	
5.2.1	k^e_p	$7.7752 \times 10^{-4}\ h^{-1}$	
5.2.2	K_{pE}	-	
5.2.3	ϕ^e_E	6.21×10^{-3} (molecules degraded/photon absorbed).	
5.2.4	$t_{½E}$	37.3 days (corrected for dark reaction) and under natural sunlight calculated as 187 days. However, this half-life of 187 days differs by a factor of ca. 7 to the values obtained with the use of the quantum yield (using computer program GCSOLAR). These half-life values strongly depend on the season and latitude (1070 – 20000 days) due to the variation of sunlight intensity in the UV-B range (< 310 nm) where bendiocarb absorbs sunlight.	
5.3	**Conclusion**		
5.3.1	Reliability	2	
5.3.2	Deficiencies	No	

Table A7.1.1.1.2-1 Description of test solution and controls

Criteria	Details
Purity of water	Double distilled
Preparation of test chemical solution	The solubility of bendiocarb in water is 226 ppm (w/v). The concentration of bendiocarb chosen for the photolysis experiments was 10 ml/l which is low enough to avoid any solubility problems in the test solution. 2.49 mg of unlabelled bendiocarb were weighed into a 2 ml volumetric flask containing 519 KBq (≈ 131 µg) [^{14}C]-bendiocarb and dissolved in 2 ml acetonitrile. One ml of this solution was transferred into a 100 ml volumetric flask containing 20 ml 0.1 M acetate buffer, pH 5, and then brought to a final volume of 100 ml with double distilled water. By this procedure 100 ml of a solution with a concentration of ≈ 13 mg/l bendiocarb in 0.02 M acetate buffer containing 1 % acetonitrile were obtained. The final pH-value of an aliquot of this solution measured with a calibrated glass electrode pH-meter was 5.0
Test concentrations (mg a.s./L)	13 mg/l
Temperature (°C)	28.8 ± 0.7 °C and 27.8 ± 0.7 °C in the dark solutions
Preparation of a.s. solution	Dissolved in acetonitrile
Controls	1 cuvette (irradiated) containing water 1 cuvette containing water and 11 containing test solution (dark) The cuvettes containing water were used for temperature measurements of the test solutions at each sampling interval.
Identity and concentration of co-solvent	n.a.

Table A7.1.1.1.2-2 Description of test system

Criteria	Details
Laboratory equipment	The photoreactor was a 'merry go round' apparatus (tested by ECETOC) with the light source situated in the centre of a rotating table.
Test apparatus	Uranyl sulphate/oxalic acid actinometer
Properties of artificial light source	
Nature of light source	Hg-arc TQ 150.
Emission wavelength spectrum	290-320 nm
Light intensity	0.77 mWatt/cm^2
Filters	-
Properties of natural sunlight	
Latitude	Berlin Dahlem 40°N
Hours of daylight	15 hours (ave)
Time of year	August
Light intensity	0.3 mWatt/cm^2
Solar irradiance (L_λ)	-

Table A7.1.1.1.2-3 Actinometer data

Uranyl sulphate/oxalic acid concentrations	0.01 M uranyl sulphate and 0.05 M oxalic acid
ϕ^a_E	0.56 molecules oxalic acid degraded/photon absorbed
k^a_p	-

Table A7.1.1.1.2-4 Specification and Amount of Transformation Products

CAS-Number	CAS and/or IUPAC Chemical Name(s)	Amount [%] of parent compound measured at pH 5
22961-82-6	2,2-dimethyl-1,3-benzodioxol-4-ol (NC 7312)	12 % maximum

Section A7 **Annex Point IIA7.6.2.2**	**Ecotoxicological Profile Including Environmental Fate and Behaviour** A7.1.1.1.2 Phototransformation in water including identity of the products of transformation

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	03/01/07
Materials and methods	Applicant's version is acceptable.
Conclusion	Applicant's version is acceptable.
Reliability	2
Acceptability	Acceptable
Remarks	Study and endpoints robust for use in risk assessments. All endpoints transcribed from study correctly.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

7.1.1.2 Biotic
7.1.1.2.1 Ready biodegradability

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [✓]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	No ready and inherent biodegradability studies are available. However higher tier water/sediment simulation studies have been submitted (Points 7.1.2.2.2/01 & /02) together with radiolabelled hydrolysis (Point 7.1.1.1.1), phototransformation in water (Point 7.1.1.1.2) and aerobic, anaerobic biodegradation studies (Points 7.1.2.1.1. & 7.1.2.1.2). These studies describe route and rate of both abiotic and biological degradation in natural water systems, thereby giving an indication of biodegradability of bendiocarb. Furthermore ready biodegradation tests were not designed to generate degradation rates and it is considered that the radiolabelled higher tier water/sediment simulation studies (Points 7.1.2.2.2/01 & /02) together with radiolabelled hydrolysis (Point 7.1.1.1.1), phototransformation in water (Point 7.1.1.1.2), aerobic and anaerobic biodegradation studies (Points 7.1.2.1.1. & 7.1.2.1.2) provide more meaningful data for the overall assessment of the environmental fate and biodegradability of bendiocarb in water. Therefore these data together with aerobic degradation (Point 7.2.1/01 & /02) and adsorption/desorption studies (Point 7.2.3.1) in soil are considered scientifically valid for evaluating the biodegradability and fate of bendiocarb in the environment.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	27/06/07
Evaluation of applicant's justification	Applicant's justification is acceptable because of the reasons given, in addition to the availability of a study assessing aerobic biodegradation in sewage treatment.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.1.1.2.2 Inherent biodegradability

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [✓]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	No ready and inherent biodegradability studies are available. However higher tier water/sediment simulation studies have been submitted (Points 7.1.2.2.2/01 & /02) together with radiolabelled hydrolysis (Point 7.1.1.1.1), phototransformation in water (Point 7.1.1.1.2) and aerobic, anaerobic biodegradation studies (Points 7.1.2.1.1. & 7.1.2.1.2). These studies describe route and rate of both abiotic and biological degradation in natural water systems, thereby giving an indication of biodegradability of bendiocarb. Furthermore ready biodegradation tests were not designed to generate degradation rates and it is considered that the radiolabelled higher tier water/sediment simulation studies (Points 7.1.2.2.2/01 & /02) together with radiolabelled hydrolysis (Point 7.1.1.1.1), phototransformation in water (Point 7.1.1.1.2) and aerobic, anaerobic biodegradation studies (Points 7.1.2.1.1. & 7.1.2.1.2) provide more meaningful data for the overall assessment of the environmental fate and biodegradability of bendiocarb in water. Therefore these data together with aerobic degradation (Point 7.2.1/01 & /02) and adsorption/desorption studies (Point 7.2.3.1) in soil are considered scientifically valid for evaluating the biodegradability and fate of bendiocarb in the environment.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	27/06/07
Evaluation of applicant's justification	Applicant's justification is acceptable because of the reasons given, in addition to the availability of a study assessing aerobic biodegradation in sewage treatment.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.1.1.2.3 Biodegradation in seawater

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	Based on the proposed use pattern described under Section A5 (Points 5.2, 5.3 & 5.4), bendiocarb is not to be used or released in marine environments. Therefore, a seawater biodegradation test should not be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	27/06/07
Evaluation of applicant's justification	Applicant's justification is acceptable.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.1.2 Rate and route of degradation in aquatic systems

7.1.2.1 Biological sewage treatment

7.1.2.1.1 Aerobic biodegradation

			Official use only
		1. REFERENCE	
1.1	**Reference**	Doebbler, G. (1978) Investigation of the Metabolism of the Compound Bendiocarb (NC 6897, Ficam) by Activated Sludge Union Carbide Environmental Services, USA and Schering Agrochemicals Ltd. Document A90198 7.1.2.1.1/01 5 October 1978 Unpublished **See also in Section 7.1.2.2.2** (Water/sediment degradation study): Purser, D. (1997a) [^{14}C]-Bendiocarb: Aerobic Aquatic Metabolism Covance Ltd. and AgrEvo UK Ltd. Document A92628 7.1.2.1.1/02 11 December 1997 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	No, but the study was conducted in line with good scientific practice.	
2.2	**GLP**	No, the study was conducted prior to the introduction of GLP as a standard requirement.	
2.3	**Deviations**	n.a.	
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C- bendiocarb (radiolabelled in the heterocycling ring) and unlabelled bendiocarb	
3.1.1	Lot/Batch number	No data	
3.1.2	Specification	As given in Section 2 for unlabelled bendiocarb; (^{14}C)- bendiocarb 4.05 µCi/mg	
3.1.3	Purity	Not specified for unlabelled bendiocarb	
3.1.4	Further relevant properties	-	
3.1.5	Composition of product	n.a.	

3.1.6	TS inhibitory to microorganisms	No
3.1.7	Specific chemical analysis	TLC
3.2	**Reference substance**	No
3.2.1	Initial concentration of reference substance	n.a.
3.3	**Testing procedure**	
3.3.1	Inoculum / test species	Mixed liquor for the tests was obtained from two laboratory Activated Sludge wastewater treatment Process (ASP) reactors, one a control (unacclimated) and one a reactor continuously exposed for 30 days to bendiocarb (acclimated). Upon receipt by the laboratory, the mixed liquors were gravity settled and washed once with synthetic sewage, resettled and suspended to the original reactor's solids concentration (ca. 2000 mg/litre) in synthetic sewage. The 20 ml aliquots were pipetted and incubated in air overnight before addition of bendiocarb. See Table A7.1.2.1.1-1
3.3.2	Test system	See Table A7.1.2.1.1-2
3.3.3	Test conditions	See Table A7.1.2.1.1-3
3.3.4	Method of preparation of test solution	The ^{14}C-bendiocarb (30.3 mg) was dissolved in 6 ml acetone and aliquots of this solution were added to unlabeled bendiocarb and diluted with acetone to give high and low stock solutions containing respectively 20 mg/ml and 0.20 mg/ml. Aliquots of 0.100 ml each of the respective stock solutions were added to 20 ml of mixed liquor (resuspended activated sludge solids in synthetic sewage) in 125 ml flasks with Teflon lined screw caps and with centre wells.
3.3.5	Initial TS concentration	1 and 100 ppm
3.3.6	Duration of test	49 hours
3.3.7	Analytical parameter	CO_2 evolution
3.3.8	Sampling	Single flasks of each sludge type at each concentration were removed at 3.5, 25 and 49 hours.
3.3.9	Intermediates / degradation products	Identified – TLC The most likely identity of the metabolite in the effluent (liquid phase) is the carbamate phenol, NC 7312.
3.3.10	Controls	Unacclimated activated sludge
3.3.11	Statistics	All counting data were computed to average net cpm and average net DPM.
		4. RESULTS
4.1	**Degradation of test substance**	
4.1.1	Graph	Degradation was minimal and no graph was prepared.

4.1.2	Degradation	Bendiocarb and/or its metabolites remain largely in the liquid phase and would pass through an ASP in the effluent. In the unacclimated (U) sludge systems at 1 ppm, 98 % of the ^{14}C was present in the effluent at zero time; this decreased to 85 % of the dose at 24-48 hours. In the acclimated (A) sludge systems at 1 ppm, 97 % of the ^{14}C was present in the effluent at zero time; this decreased to 77 % in 48 hours. In the respective U and A solids (biomass) 0.4 and 0.6 % of the dose were present at zero time; these levels increased to 2 % and 15 % during 48 hours incubation. The percent of the bendiocarb converted to CO_2 in 48 hours at 1 ppm concentration was respectively 0.2 % and 2 % for the unacclimated and acclimated sludge types. At 100 ppm concentration some evidence was found for either inhibition or more likely saturation of bioconcentration processes for uptake into the biomass of added bendiocarb or its metabolites. The liquid phase concentrations of ^{14}C for U and A sludge types decreased only slightly during 48 hours as % of dose (98 % to 94 %) while the respective solids phases (biomass) ^{14}C increases for U-type sludge from 0.4 to 2 % and for A-type sludge from 0.6 to 5 % in 48 hours. The corresponding conversions to $^{14}CO_2$ were 0.1 % and 0.3 % of the total ^{14}C present. The rate or extent of metabolism to CO_2 therefore was reduced at the higher concentration.	
4.1.3	Other observations	-	
4.1.4	Degradation of TS in abiotic control	-	
4.1.5	Degradation of reference substance	n.a.	
4.1.6	Intermediates / degradation products	The most likely identity of the metabolite in the effluent (liquid phase) is the carbamate phenol, NC 7312. The reasoning for this is as follows: 1. The pH of the mixed liquors from the laboratory ASP reactors was within the range 7.6 to 8.3. Under the incubation conditions of 23°C, bendiocarb will hydrolyse to NC 7312 with a half-life of 1-3 days (depending upon pH). Thus, the detection of some NC 7312 in the system would be expected as a result of the chemical degradation of bendiocarb. 2. NC 7312 has a higher Rf value than bendiocarb when chromatographed on silica gel using toluene/ethyl acetate (4:1). Thus, the metabolite detected with this chromatographic system was almost certainly due to NC 7312. (The ether-methylene chloride TLC system is used to separate N-hydroxymethyl bendiocarb from bendiocarb. This method gives little or no separation of NC 7312 from bendiocarb).	X
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The effects of an activated sludge process (ASP) on bendiocarb were determined in shake flask assays using ^{14}C labelled bendiocarb added to mixed liquors from both control (unacclimated) and continuously treated (acclimated) ASP reactors.	

5.2	**Results and discussion**	Only limited uptake into the biomass (maximum 15 % with acclimated sludge at 1 ppm) and only minimal metabolism to CO_2 (2 % in 48 hours at 1 ppm for acclimated sludge) took place. The bendiocarb was largely present in the effluent (liquid phase) and would pass through an activated sludge process in the effluent. Evidence from thin layer chromatography of the organic extracts of the effluent indicated that the ^{14}C was not present as the parent compound bendiocarb when compared to the stock bendiocarb used for testing. The most likely identity of the metabolite in the effluent (liquid phase) is the carbamate phenol, NC 7312.	
5.3	**Conclusion**		X
5.3.1	Reliability	2	
5.3.2	Deficiencies	No	

Table A7.1.2.1.1-1 Inoculum / Test Organism

Criteria	Details
Nature	Activated sludge
Species	Waste water treatment process
Strain	-
Source	Tonawanda, New York
Sampling site	-
Laboratory culture	Yes
Method of cultivation	Laboratory ASP reactors
Preparation of inoculum for exposure	Gravity settled and washed once with synthetic sewage, resettled and suspended to the original reactor's solids concentration.
Pretreatment	Incubated in air overnight.
Initial cell concentration	ca. 2000 mg solids/litre

Table A7.1.2.1.1-2 Test System

Criteria	Details
Culturing apparatus	Laboratory ASP reactors
Number of culture flasks/concentration	6 (100 ppm); 4 (1 ppm) acclimated and unacclimated
Aeration device	Flushed with oxygen and sealed
Measuring equipment	Liquid scintillation counter
Test performed in closed vessels due to significant volatility of TS	No

Table A7.1.2.1.1-3 Test Conditions

Criteria	Details
Composition of medium	Resuspended active sludge solids on synthetic sewage
Additional substrate	-
Test temperature	23 ± 1°C
pH	7.6-8.3
Aeration of dilution water	No
Suspended solids concentration	ca. 2000 mg solids/litre
Other relevant criteria	-

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	27/06/07
Materials and methods	Applicant's version is acceptable with the following comments: **4.1.6** No further investigation undertaken as to the rate and route of the major metabolites fate in a STP.
Conclusion	**5.3 Conclusion** - No additional comments were made by the Applicant. The UK CA considers that because the study results showed limited uptake into the biomass and minimal metabolism to CO_2 despite the use of acclimated sludge, that bendiocarb (or its metabolite(s)) can be expected to remain largely in the effluent and would pass through an STP. Therefore, this study also suggests that the active substance cannot be considered to be 'readily biodegraded'.
Reliability	2
Acceptability	Acceptable.
Remarks	Study and endpoints robust for use in risk assessments. All endpoints transcribed from study correctly.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

7.1.2.1.2 Anaerobic biodegradation

7.1.2.2 Biodegradation in freshwater

7.1.2.2.1 Aerobic aquatic degradation study

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [✓]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	Information on the rate and route of degradation of bendiocarb in freshwater under aerobic conditions is provided under Point 7.1.2.2.2/02 where a study on the fate of [^{14}C]-bendiocarb in stream water (in either presence or absence of sediment) is summarized. In addition, water/sediment simulation studies (Points 7.1.2.2.2/01 & /02) together with radiolabelled hydrolysis (Point 7.1.1.1.1), phototransformation in water (Point 7.1.1.1.2) and aerobic, anaerobic biodegradation studies (Points 7.1.2.1.1. & 7.1.2.1.2) provide meaningful data for the overall assessment of the fate and degradation of bendiocarb in water. Therefore these data together with aerobic degradation (Point 7.2.1/01 & /02) and adsorption/desorption studies in soil (Point 7.2.3.1) are considered scientifically valid for evaluating the degradation and fate of bendiocarb in the environment.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	26/06/07
Evaluation of applicant's justification	A study has been provided under the wrong heading of 7.1.2.2.2/02. Therefore this justification is irrelevant.
Conclusion	See above comment.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.1.2.2.2 Water/sediment degradation study

			Official use only
		1. REFERENCE	
1.1	**Reference**	Purser, D. (1997a) [^{14}C]-Bendiocarb: Aerobic Aquatic Metabolism Covance Ltd. and AgrEvo UK Ltd. Document A92628 7.1.2.2.2/01 11 December 1997 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	US EPA Guideline 162-4	
2.2	**GLP**	Yes	
2.3	**Deviations**	No	
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C- bendiocarb (labelled in the phenyl ring) and unlabelled bendiocarb;	
3.1.1	Lot/Batch number	Unlabelled bendiocarb T00960 and R000728 (^{14}C)-Bendiocarb batch number CFQ4944/RP1	
3.1.2	Specification	As given in Section 2 for unlabelled bendiocarb; specific radioactivity of (^{14}C)-bendiocarb 106.8 µCi/mg (3952 KBq/mg)	
3.1.3	Purity	Unlabelled bendiocarb 98.4 % Radiochemical purity of (^{14}C)-bendiocarb 99.2 %	
3.1.4	Further relevant properties	-	X
3.1.5	Composition of product	n.a.	
3.1.6	TS inhibitory to microorganisms	No	
3.1.7	Specific chemical analysis	HPLC and TLC	
3.2	**Reference substance**	Non-radiolabelled bendiocarb was used as authentic reference standard	
3.2.1	Initial concentration of reference substance	n.a.	
3.3	**Testing procedure**		

3.3.1	Inoculum / test species	See Table A7.1.2.2.2-1	
3.3.2	Test system	See Table A7.1.2.2.2-2	
3.3.3	Test conditions	See Table A7.1.2.2.2-3	
3.3.4	Method of preparation of test solution	Dissolved in acetonitrile	
3.3.5	Initial TS concentration	Water/sediment system was treated at a rate equivalent to ca. 3.4 kg ai/ha (application to the surface water) under aerobic conditions	
3.3.6	Duration of test	30 days	
3.3.7	Analytical parameter	Surface water was analysed by HPLC for bendiocarb and its metabolites The radioactivity in sediment extracts and surface water was determined by liquid scintillation counting (LSC) and subsequently partitioned into organic solvent. The organic fractions were analysed for parent bendiocarb and degradation products by thin layer chromatography (TLC) and HPLC. Radioactivity remaining unextracted was quantified by combustion to $^{14}CO_2$ followed by LSC.	
3.3.8	Sampling	At intervals of 0, 6, 12 hours and 1, 2, 3, 7, 14, 21, and 30 days after treatment, duplicate units were removed for analysis.	
3.3.9	Intermediates / degradation products	Identified	
3.3.10	Controls	Unlabelled bendiocarb	
3.3.11	Statistics	All data relating to the recovery of administered radioactivity were calculated using Lotus 1-2-3 release 3.1 software (Lotus Corporation Inc).	
		4. RESULTS	
4.1	**Degradation of test substance**		
4.1.1	Graph	The decline of bendiocarb in sandy loam sediment system followed a log-linear relationship over 30 days (although the duplicate analyses for 7 to 30 days exhibited a wide variation from the mean value, especially the timepoint at 21 days which was not included on the linear regression analysis). The degradation followed first order reaction kinetics. The initial half-life of (^{14}C)-bendiocarb in the sandy loam sediment was found to be 9.2 days (by HPLC) and 8.9 days (by TLC). See Figures 6.2.1 and 6.2.4 on pp 45 and 47 of the original report.	

4.1.2	Degradation	Immediately after (^{14}C)-bendiocarb application >97 % of applied radioactivity was recovered in the surface water. Over the incubation period a slow transfer of radioactive material to the sediment was observed with the surface water containing 31 to 35 % of applied radioactivity after 30 days. The radioactivity extracted from the sediment with acetonitrile increased from *ca* 3 % of applied radioactivity at day 0 to 7 to 13 % after 30 days. Unextracted sediment residues increased from <0.1 % to 15 to 23 % of applied radioactivity over the incubation period. The additional aqueous extraction, when applied to a single duplicate sample at 1, 7, 14, 21 and 30 days, extracted between 0.03 and 3.4 % of the applied radioactivity as more polar metabolites. Only negligible quantities of applied radioactivity (<0.3 %) were recovered in the incubation unit washes. The ethanediol traps also contained negligible quantities (<0.7 %) of the applied radioactivity up to 21 days. Between 21 and 30 days, however, significant amounts of the applied radioactivity were trapped in the ethanediol traps (2.8 to 4.7 %). The quantity of radioactivity in the ethanolamine traps increased with time, and contained a total of 20 to 22 % of the applied radioactivity after 30 days.	
4.1.3	Other observations	-	
4.1.4	Degradation of TS in abiotic control	-	
4.1.5	Degradation of reference substance	n.a.	
4.1.6	Intermediates / degradation products	The major component in the surface water and sediment acetonitrile extracts in all samples analysed up to 7 days after application was (^{14}C)-bendiocarb. At 7 days NC 7312 was present at similar levels to that of bendiocarb. Thereafter the proportion of parent compound decreased, such that at the end of the study period the amount detected declined to ca 7 % of applied radioactivity. NC 7312 was the major degradation product detected accounting for 38 to 43 % of applied radioactivity after 7 days. At the termination of the study at 30 days this proportion had decreased to 12 to 25 % of the applied radioactivity. In some surface water and sediment extracts small quantities of radioactivity (<1.5 %) co-chromatographed with pyrogallol. Two minor unidentified degradates were detected by TLC at 3 and 21 days in the surface water samples (organic extracts) which accounted for 7 % and 0.4 % of applied radioactivity, respectively. The analysis of extracts by TLC demonstrated the presence of non-migrating origin material (range 0.2 to 16 %) and similarly analysis by HPLC produced unretained material (range 0.1 to 14 %), especially at the later timepoints. These components were thought to be due to the production of polar metabolites. Bendiocarb was degraded to NC 7312, the hydrolysis metabolite, and to volatile products and unextracted bound sediment residues. Some polar metabolites were also evident from the chromatographic results.	X

		5. APPLICANT'S SUMMARY AND CONCLUSION
5.1	**Materials and methods**	The degradation of (^{14}C)-bendiocarb, applied at a rate of *ca* 3.4 kg ai/ha, has been studied in a sandy loam sediment/water system over a 30 day period under aerobic conditions. The incubations were performed in glass cylinders (ca 4.5 cm diameter), containing sediment to a depth of 2.5 cm covered by associated water to a depth of 6 cm above the sediment, maintained in the dark at 20 ± 1°C. The units were pre-incubated for 41 days to establish an equilibrium. Moistened air was passed over the water surface in each unit and through a series of traps (ethanediol and ethanolamine) to collect volatile products. Duplicate incubation units were removed for analysis at intervals of 0, 6, 12 hours, 1, 2, 3, 7, 14, and 30 days after test article application. Portions of surface water were analysed by HPLC (high performance liquid chromatography) and further portions acidified then partitioned with dichloromethane, followed by diethyl ether. The combined organic extracts were concentrated by rotary evaporation. Sediment was Soxhlet extracted with acetonitrile and the extract concentrated by rotary evaporation. Concentrated surface water and sediment extracts were analysed for parent compound and degradation products by high performance liquid chromatography (HPLC) and thin layer chromatography (TLC). Where aqueous phases from partition extractions showed significant (>0.01 mg/kg) amounts of applied radioactivity, then these were submitted to HPLC and TLC also.
5.2	**Results and discussion**	The aerobic degradation of (^{14}C)-bendiocarb has been investigated in a sandy loam sediment and associated water over a 30 day period, following a single application (equivalent *ca* 3.4 kg ai/ha) to the water surface. The microbial biomass declined during the study from 355 µg carbon/g of sediment to 107 µg carbon/g, however, these data demonstrated that the soil remained viable at the termination of the study. Immediately after (^{14}C)-bendiocarb application >97 % of applied radioactivity was recovered in the surface water. Over the incubation period a slow transfer of radioactive material to the sediment was observed with the surface water containing 31 to 35 % of applied radioactivity after 30 days. The radioactivity extracted from the sediment with acetonitrile increased from *ca* 3 % of applied radioactivity at day 0 to 7 to 13 % after 30 days. Unextracted sediment residues increased from <0.1 % to 15 to 23 % of applied radioactivity over the incubation period. The additional aqueous extraction, when applied to a single duplicate sample at 1, 7, 14, 21 and 30 days, extracted between 0.03 and 3.4 % of the applied radioactivity as more polar metabolites. Only negligible quantities of applied radioactivity (<0.3 %) were recovered in the incubation unit washes. The ethanediol traps also contained negligible quantities (<0.7 %) of the applied radioactivity up to 21 days. Between 21 and 30 days however, significant amounts of the applied radioactivity were trapped in the ethanediol traps (2.8 to 4.7 %). The quantity of radioactivity in the ethanolamine traps increased with time, and contained a total of 20 to 22 % of the applied radioactivity after 30 days.

	Overall recoveries of applied radioactivity ranged from 87 to 106 % (with two recoveries outside this range; the results from 14 day A replicate and 21 day A replicate, at 63 and 68 % of applied radioactivity, respectively). The sediment extracts and the associated water and its extracts were characterized using TLC and HPLC. The major component in the surface water and sediment acetonitrile extracts in all samples analysed up to 7 days after application was (^{14}C)-bendiocarb. At 7 days NC 7312 was present at similar levels to that of bendiocarb. Thereafter the proportion of parent compound decreased, such that at the end of the study period the amount detected declined to ca 7 % of applied radioactivity. Actually, in the surface water extracts, bendiocarb accounted for 94-98 % of the applied radioactivity at day 0 and this proportion had decreased to 4-7 % of the applied radioactivity at the termination of the study at 30 days. NC 7312 was the major metabolite detected accounting for 28-32 % of the applied radioactivity after 7 days. After termination of the study at 30 days this proportion had decreased to 6-18 % of the applied radioactivity. In the sediment extracts, bendiocarb accounted for 10-12 % of the applied radioactivity after 7-21 days and this proportion had decreased to 1.4 % of the applied radioactivity at the termination of the study at 30 days. NC 7312 was the major metabolite detected accounting for 17-18 % of the applied radioactivity after 2-3 days and this proportion had decreased to 6-7 % of the applied radioactivity at the termination of the study after 30 days. In some surface water and sediment extracts small quantities of radioactivity (<1.5 %) co-chromatographed with pyrogallol. Two minor unidentified degradates were detected by TLC at 3 and 21 days in the surface water samples (organic extracts) which accounted for 7 % and 0.4 % of applied radioactivity, respectively. In the whole system, NC 7312 was the major degradation product detected accounting for 38 to 43 % of applied radioactivity after 7 days. At the termination of the study at 30 days this proportion had decreased to 12 to 25 % of the applied radioactivity. The analysis of extracts by TLC demonstrated the presence of non-migrating origin material (range 0.2 to 16 %) and similarly analysis by HPLC produced unretained material (range 0.1 to 14 %), especially at the later timepoints. These components were thought to be due to the production of polar metabolites. Bendiocarb was degraded to NC 7312, the hydrolysis metabolite, and to volatile products and unextracted bound sediment residues. Some polar metabolites were also evident from the chromatographic results. The half-life of bendiocarb in a sandy loam sediment system at 20°C was about 9 days (9.2 days (by HPLC) and 8.9 days (by TLC). In summary, under aerobic conditions bendiocarb degrades quickly in a sandy loam sediment system. Degradation results in the formation of volatile degradation products, unextractable sediment residues, NC 7312 (2,2-dimethyl-1,3-benzodioxol-4-ol) and polar metabolites.	

5.3	**Conclusion**		
5.3.1	Reliability	1	X
5.3.2	Deficiencies	No	

Table A7.1.2.2.2-1 Inoculum / Test Organism

Criteria	Details
Nature	Brown Carrick Hill sandy loam sediment and associated water
Species	See above
Strain	See above
Source	Scottish Agricultural College, Auchincruive, Ayr, Scotland
Sampling site	Brown Carrick Hill
Laboratory culture	Yes
Method of cultivation	See below
Preparation of inoculum for exposure	Sediment was sieved through a 2 mm mesh sieve, then dispensed into individual borosilicate glass cylinders *(ca* 4.5 cm diameter) to a depth of 2.5 cm. Associated water was added to each vessel to a depth of 6 cm above the sediment. The water level was maintained throughout the study by addition of deionised water as required.
Pretreatment	The sediment and water were preincubated for a period of 41 days to establish an equilibrium.
Initial cell concentration	The microbial biomass of the sediment was determined at Rothamsted Experimental Station, Harpenden, Hertfordshire. A value of 355 µg carbon/g sediment was obtained prior to commencing the study and a value of 107 µg carbon/g sediment on completion. However these data demonstrated that the soil remained viable at the termination of the study.

Table A7.1.2.2.2-2 Test System

Criteria	Details
Culturing apparatus	Borosilicate glass cylinders
Number of culture flasks/concentration	22
Aeration device	-
Measuring equipment	LSC; HPLC
Test performed in closed vessels due to significant volatility of TS	No

Table A7.1.2.2.2-3 Test Conditions

Criteria	Details
Composition of medium	Sandy loam sediment (1.3 % OC; 2.2 % OM) and associated water
Additional substrate	-
Test temperature	in the dark at 20°C ± 1°C
pH	3.4 -7.1 (surface water at sampling)
Aeration of dilution water	No
Suspended solids concentration	355 µg carbon/g sediment was obtained prior to commencing the study and a value of 107 µg carbon/g sediment on completion. However these data demonstrated that the soil remained viable at the termination of the study.
Other relevant criteria	To maintain aerobic conditions in the surface, a current of moistened air was passed over the surface via a dip tube.

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	26/06/07
Materials and methods	Applicant's version is acceptable with the following comments: **3.4.1** Properties such as water solubility (0.28 g/l at pH 7) would be useful to the information. **4.1.6** No further investigation of metabolites over 10 % threshold was carried out.
Conclusion	Applicant's version is acceptable with the following comments: **5.3.1** Reliability changed to 2 due to lack of additional information regarding stability of metabolites.
Reliability	2
Acceptability	Acceptable
Remarks	Study and endpoints robust for use in risk assessments. All endpoints transcribed from study correctly.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

			Official use only
		1. REFERENCE	
1.1	**Reference**	Purser, D. (1997b) [^{14}C]-Bendiocarb: Anaerobic Aquatic Metabolism Covance Ltd. and AgrEvo UK Ltd. Document A92629 7.1.2.1.2/01 17 November 1997 Unpublished	X
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	US EPA Guideline 162-3	
2.2	**GLP**	Yes	

2.3	**Deviations**	No	
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C- bendiocarb (labelled in the phenyl ring) and unlabelled bendiocarb.	
3.1.1	Lot/Batch number	Unlabelled bendiocarb R000728 (^{14}C)-Bendiocarb batch number CFQ4944/RP1	
3.1.2	Specification	As given in Section 2 for unlabelled bendiocarb; specific radioactivity of (^{14}C)-bendiocarb 106.752 µCi/mg (3949.8 KBq/mg) .	
3.1.3	Purity	Unlabelled bendiocarb 98.4 % Radiochemical purity of (^{14}C)-bendiocarb 99.21 %	
3.1.4	Further relevant properties	-	X
3.1.5	Composition of product	n.a.	
3.1.6	TS inhibitory to microorganisms	No	
3.1.7	Specific chemical analysis	HPLC and TLC	
3.2	**Reference substance**	Non-radiolabelled bendiocarb was used as authentic reference standard	
3.2.1	Initial concentration of reference substance	n.a.	
3.3	**Testing procedure**		
3.3.1	Inoculum / test species	See Table A7.1.2.1.2-1	
3.3.2	Test system	See Table A7.1.2.1.2-2	
3.3.3	Test conditions	See Table A7.1.2.1.2-3	
3.3.4	Method of preparation of test solution	Dissolved in acetonitrile	
3.3.5	Initial TS concentration	Sediment and water were treated at a rate equivalent to 4.8 kg ai/ha (4.2 lbs ai/acre), following establishment of anaerobic conditions	
3.3.6	Duration of test	371 days	
3.3.7	Analytical parameter	Surface water was analysed by HPLC for bendiocarb and its metabolites. The radioactivity in sediment extracts and surface water was determined by liquid scintillation counting (LSC) and subsequently partitioned into organic solvent. The organic fractions were analysed for parent bendiocarb and degradation products by thin layer chromatography (TLC) and HPLC. Radioactivity remaining unextracted was quantified by combustion to $^{14}CO_2$ followed by LSC.	

		Radiolabelled volatile products were collected in ethanediol and ethanolamine traps and quantified by LSC.	
3.3.8	Sampling	Duplicate samples were taken for analysis at 0, 1, 3, 7, 14, 30, 63, 120, 180, 271 and 371 days following test article application.	
3.3.9	Intermediates / degradation products	Identified	
3.3.10	Controls	Unlabelled bendiocarb	
3.3.11	Statistics	All data relating to the recovery of administered radioactivity were calculated using Lotus 1-2-3 release 3.1 software (Lotus Corporation Inc).	
		4. RESULTS	
4.1	**Degradation of test substance**		
4.1.1	Graph	See Figure 6.2.2 on p 48 of the original report	
4.1.2	Degradation	Mean levels of (^{14}C)-bendiocarb detected in the associated water, by direct injection onto HPLC, decreased rapidly from 94.85 % at 0 day, to 9.33 % after 14 days and was not detected after 30 days. A corresponding increase in the concentration of the metabolite NC7312 was observed from less than 1 % at 0 days, to a maximum mean level of 86.9 % reached after 30 days incubation. The mean level of (^{14}C)-bendiocarb in the sediment extracts, detected by both TLC and HPLC, were low (less than 2 %) throughout the incubation period. A slow increase in the concentration of NC 7312 was observed, reaching a maximum mean level of 15.95 % after 120 days. Bendiocarb was rapidly degraded under anaerobic conditions in sandy loam sediment and associated water. The half-life was determined by TLC and HPLC and was found to be 4.65 and 4.66 days respectively.	
4.1.3	Other observations	-	
4.1.4	Degradation of TS in abiotic control	-	
4.1.5	Degradation of reference substance	n.a.	
4.1.6	Intermediates / degradation products	Products of degradation were observed in sediment extracts and associated water. The major metabolite was NC7312 (2,2-dimethyl-l,3-benzodioxol-4-ol) which reached maximum mean concentrations of 86.9 % in the associated water after 30 days and 15.95 % in the sediment after 120 days (determined by HPLC). After attaining these maximum mean levels the amount of NC7312 present declined, with 26.97 % observed in the associated water and 4.01 % observed in the sediment after 371 days.	X

		Polar metabolites were observed as radioactivity unretained on HPLC column and as origin material on TLC. These metabolites reached a maximum mean concentration of 37.82 % in the associated water after 180 days (determined by HPLC). Similar analysis of the sediment extracts showed that less than 1 % was present as polar metabolites. A single unknown metabolite was observed in sediment and associated water samples. Analysis by TLC and HPLC showed that mean levels of less than 4 % were present after 371 days incubation. Volatile degradation products were collected in ethanediol and ethanolamine trapping reagents. The amounts present in these traps increased during the experiment to a mean of 3.64 % and 18.54 % respectively, after 371 days. The radioactivity detected in the ethanolamine trap is likely to be $^{14}CO_2$ released from the system.	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The objective of the study was to measure the rate of degradation of (^{14}C)-bendiocarb (2,2-dimethylbenzo-l,3-dioxol-4-yl methylcarbamate) in a sandy loam sediment and associated water, incubated at *ca* 20°C under anaerobic conditions, for up to 371 days. Sediment and water were treated at a rate equivalent to 4.8 kg ai/ha (4.2 lbs ai/acre), following establishment of anaerobic conditions. At appropriate time intervals duplicate samples were removed and the surface water and associated sediment separated. Aliquots of the surface water were analysed for parent bendiocarb and degradation products by high performance liquid chromatography (HPLC). The sediment was extracted with acetonitrile followed by an acetonitrile/water mixture. The radioactivity in sediment extracts and surface water was determined by liquid scintillation counting (LSC) and subsequently partitioned into organic solvent. The organic fractions were analysed for parent bendiocarb and degradation products by thin layer chromatography (TLC) and HPLC. Radioactivity remaining unextracted was quantified by combustion to $^{14}CO_2$ followed by LSC. Radiolabelled volatile products were collected in ethanediol and ethanolamine traps and quantified by LSC.	
5.2	**Results and discussion**	Bendiocarb was rapidly degraded under anaerobic conditions in sandy loam sediment and associated water. The half-life was determined by TLC and HPLC and was found to be 4.65 and 4.66 days respectively. Products of degradation were observed in sediment extracts and associated water. The major metabolite was NC7312 (2,2-dimethyl-l,3-benzodioxol-4-ol), which reached maximum mean concentrations of 86.9 % in the associated water after 30 days and 15.95 % in the sediment after 120 days (determined by HPLC). After attaining these maximum mean levels the amount of NC7312 present declined, with 26.97 % observed in the associated water and 4.01 % observed in the sediment after 371 days. Polar metabolites were observed as radioactivity unretained on HPLC column and as origin material on TLC. These metabolites reached a maximum mean concentration of 37.82 % in the associated water after 180 days (determined by HPLC). Similar analysis of the sediment extracts showed that less than 1 % was present as polar metabolites. A single unknown metabolite was observed in sediment and associated water samples. Analysis by TLC and HPLC showed that mean levels of less than 4 % were present after 371 days incubation.	

		Combustion of sediment residues following extraction showed the amount of unextracted residue increasing throughout the experiment to a mean level of 10.22 % after 371 days. Volatile degradation products were collected in ethanediol and ethanolamine trapping reagents. The amounts present in these traps increased during the experiment to a mean of 3.64 % and 18.54 % respectively, after 371 days. The radioactivity detected in the ethanolamine trap is likely to be $^{14}CO_2$ released from the system. The overall mean recovery of radioactivity from the experiment decreased to a level of 50.36 % after 371 days incubation and was attributed to incomplete trapping of radiolabelled volatile components. In summary, the degradation of (^{14}C)-bendiocarb in a anaerobic aquatic system produced the metabolite NC7312 (2,2-dimethyl-l,3-benzodioxol-4-ol) in addition to polar metabolites, an unextracted residue and volatile products, the majority of which were present as carbon dioxide. The initial degradation of bendiocarb to NC7312 occurred primarily in the surface water with low levels of bendiocarb detected in the associated sediment. The metabolite NC7312 was observed in both surface water and sediment. Further metabolism of NC7312 occurred forming polar products which were detected in the water and observed as an unextracted residue in the sediment. The detection of radioactivity in the ethanolamine trapping reagent suggested the release of carbon dioxide which will result from opening of the phenyl ring in the molecule as NC7312 is metabolised. Other volatile radiolabelled products may be formed following ring opening and these may not have been trapped by the experimental system used. This could account for the low mass balance observed at the later sampling intervals.	
5.3	**Conclusion**		
5.3.1	Reliability	1	X
5.3.2	Deficiencies	No	

Table A7.1.2.1.2-1 Inoculum / Test Organism

Criteria	Details
Nature	Brown Carrick Hill sandy loam sediment and associated water
Species	See above
Strain	See above
Source	Scottish Agricultural College, Auchincruive, Ayr, Scotland
Sampling site	Brown Carrick Hill
Laboratory culture	Yes
Method of cultivation	See below
Preparation of inoculum for exposure	Sediment was sieved through a 5 mm mesh screen, then dispensed into individual borosilicate glass cylinders (ca 4.5 cm diameter) to a depth of 2.5 cm. Associated water was added to each vessel to a depth of 6 cm above the sediment. The water level was maintained throughout the study by addition of deionised water as required. Each incubation unit was labelled with the study number and a unique sample code.
Pretreatment	The sediment and water were pre-incubated for a period of 28 days to establish anaerobic conditions.
Initial cell concentration	The microbial biomass of the sediment was determined at Rothamsted Experimental Station, Harpenden, Hertfordshire. A value of 335 µg carbon/g sediment was obtained prior to commencing the study and a value of 29 µg carbon/g sediment on completion.

Table A7.1.2.1.2-2 Test System

Criteria	Details
Culturing apparatus	Borosilicate glass cylinders
Number of culture flasks/concentration	22
Aeration device	-
Measuring equipment	LSC; HPLC
Test performed in closed vessels due to significant volatility of TS	No

Table A7.1.2.1.2-3 Test Conditions

Criteria	Details
Composition of medium	Sandy loam sediment (2.2 % OM) and associated water
Additional substrate	-
Test temperature	in the dark at 20°C ± 1°C
pH	6.1 (adjusted to 5.5-6.0)
Aeration of dilution water	No
Suspended solids concentration	335 µg carbon/g sediment was obtained prior to commencing the study and a value of 29 µ carbon/g sediment on completion.
Other relevant criteria	Moistened nitrogen was passed above the surface of the water in each incubation unit to maintain anaerobic conditions.

	EVALUATION BY COMPETENT AUTHORITIES
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	26/06/07
	1.1 The title and method for this study suggests that this endpoint would be more appropriately placed elsewhere
Materials and methods	Applicant's version is acceptable with the following comments: **3.1.4** Properties such as water solubility (0.28 g/l at pH 7) would be useful to the information. **4.1.6** No further investigation of metabolites over 10 % threshold was carried out.
Conclusion	Applicant's version is acceptable with the following comments: **5.3.1** Reliability changed to 2 because of lack of information as to the rate of decline (DT_{50}) of major metabolite in water-sediment environment.
Reliability	2
Acceptability	Acceptable
Remarks	Study and endpoints robust for use in risk assessments. All endpoints transcribed from study correctly.
	COMMENTS FROM …
Date	
Results and discussion	
Conclusion	
Reliability	
Acceptability	
Remarks	

			Official use only
		1. REFERENCE	
1.1	**Reference**	Arnold, D.J. (1984) The Fate of [^{14}C]-Bendiocarb in Water and Sediment-Water Microcosms FBC Limited and Schering Agrochemicals Ltd. Document A90212 7.1.2.2.2/02 10 May 1984 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	No, but the study was conducted in line with good scientific practice.	
2.2	**GLP**	No, the study was conducted prior to the introduction of GLP as a standard requirement.	
2.3	**Deviations**	n.a.	
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C- bendiocarb (labelled in the heterocycling ring)	
3.1.1	Lot/Batch number	CFQ 1799	
3.1.2	Specification	Specific radioactivity of (^{14}C)-bendiocarb ca. 50 µCi/mg	
3.1.3	Purity	Radiochemical purity of (^{14}C)-bendiocarb 97.2 %	
3.1.4	Further relevant properties	-	X
3.1.5	Composition of product	n.a.	
3.1.6	TS inhibitory to microorganisms	No	
3.1.7	Specific chemical analysis	TLC and LSC	
3.2	**Reference substance**	No	
3.2.1	Initial concentration of reference substance	n.a.	
3.3	**Testing procedure**		
3.3.1	Inoculum / test species	See Table A7.1.2.2.2-4	
3.3.2	Test system	See Table A7.1.2.2.2-5	

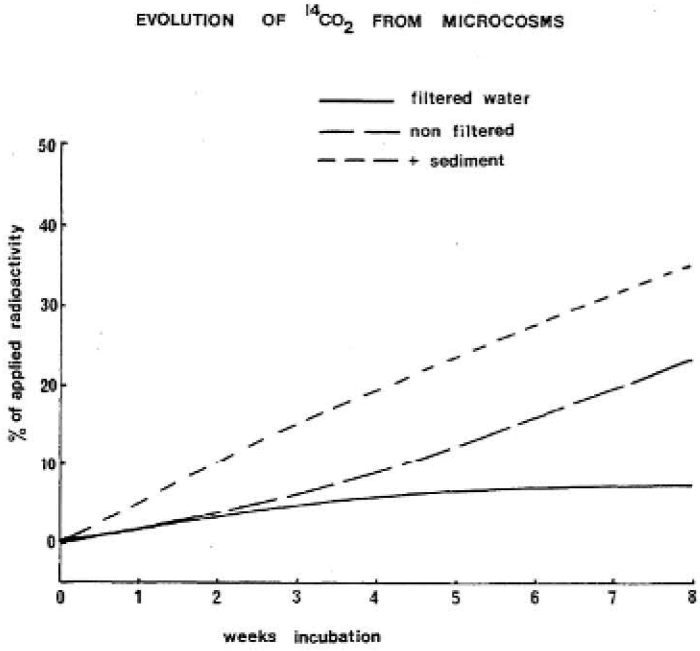
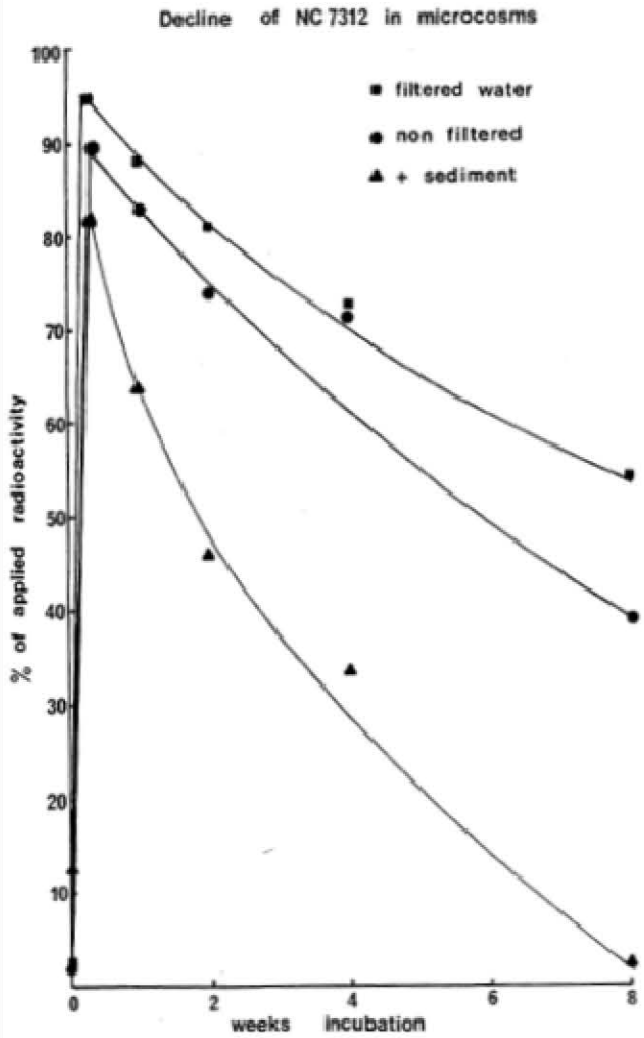
3.3.3	Test conditions	See Table A7.1.2.2.2-6	
3.3.4	Method of preparation of test solution	Dissolved in methanol	
3.3.5	Initial TS concentration	The surface of the water in each microcosm was treated at a rate equivalent to ca. 1.5 kg ai/ha	
3.3.6	Duration of test	Up to 8 weeks	
3.3.7	Analytical parameter	TLC for parent and metabolite. Radioactivity by LSC after combustion of sediment extracts to $^{14}CO_2$.	
3.3.8	Sampling	Microcosms were removed for analysis 0, 2 days, 1, 2, 4 and 8 weeks after treatment.	
3.3.9	Intermediates / degradation products	Identified	
3.3.10	Controls	1 for each microcosm (for pH measurement)	
3.3.11	Statistics	-	
4.1 Degradation of test substance		**4. RESULTS**	
4.1.1	Graph	Figure 5  	

		Figure 6  See Figure 5 (CO_2 evolution) on p20 of original report and Figure 6 (decline of NC 7312 in microcosms) on p21 of original report
4.1.2	Degradation	Bendiocarb was rapidly hydrolysed (99 % in 2 days) resulting in the formation of NC 7312 (2,2-dimethyl-l,3-benzodioxol-4-ol) which was further degraded.
4.1.3	Other observations	-
4.1.4	Degradation of TS in abiotic control	-
4.1.5	Degradation of reference substance	n.a.

4.1.6	Intermediates / degradation products	The rate of degradation of NC 7312 was influenced by microcosm type and was greatly accelerated in the presence of sediment. The half lives of NC 7312 were: < 2 weeks (+ sediment), 6 weeks (unfiltered water) and an estimated 10 weeks (filtered water). The increased rate of $^{14}CO_2$ evolution in the sediment/water microcosms (35 % in 8 weeks) compared with that in both non-filtered and filtered water alone (24 % and 7 % respectively) suggests enhanced microbial activity in the presence of sediment. Only very small amounts (less than 0.5 %) of other volatile radioactive products were trapped in ethanediol.	
		5. APPLICANT'S SUMMARY AND CONCLUSION	
5.1	**Materials and methods**	The fate of ^{14}C-radiolabelled bendiocarb (2,2-dimethyl-l,3-benzodioxol-4-ol methyl carbamate) was assessed in model aquatic systems (microcosms) comparing stream water in either the presence or absence of bottom sediment, or in stream water filtered (5 µm) to remove suspended particulate matter. Microcosms, treated with bendiocarb at a rate equivalent to 1.5 kg a.i./ha, were incubated in the dark at a temperature of 18 ± 2°C for periods of up to 8 weeks.	
5.2	**Results and discussion**	Bendiocarb was rapidly hydrolysed (99 % in 2 days) resulting in the formation of NC 7312 (2,2-dimethyl-l,3-benzodioxol-4-ol) which was further degraded. The rate of degradation of NC 7312 was influenced by microcosm type and was greatly accelerated in the presence of sediment. The half- lives of NC 7312 were: <2 weeks (+ sediment), 6 weeks (unfiltered water) and an estimated 10 weeks (filtered water). The increased rate of $^{14}CO_2$ evolution in the sediment/water microcosms (35 % in 8 weeks) compared with that in both non-filtered and filtered water alone (24 % and 7 % respectively) suggests enhanced microbial activity in the presence of sediment. Only very small amounts (less than 0.5 %) of other volatile radioactive products were trapped in ethanediol. In summary, within two days of application to aquatic microcosms in the laboratory, (^{14}C)-bendiocarb was completely degraded by hydrolysis of the carbamate moiety resulting in the formation of the phenol (MC 7312). The rate of loss of the phenol and subsequent mineralization was influenced by the microcosm type. The presence of sediment resulted in a substantially increased rate of degradation compared with that in water alone. Removal of particulate matter and a proportion of the microbial population by filtration of the water resulted in a reduced rate of degradation. It was therefore concluded that bendiocarb is rapidly degraded in aquatic systems and biodegradation rates are likely to be enhanced in situations where sediment is present.	
5.3	**Conclusion**		
5.3.1	Reliability	2	
5.3.2	Deficiencies	No	

Table A7.1.2.2.2-4 Inoculum / Test Organism

Criteria	Details
Nature	Beck Brook stream water and sediment
Species	Sandy clay loam sediment (3 % OM)
Strain	See above
Source	Beck Brook nr. Rampton, Cambridgeshire, UK (OS Map Reference: TL 423668)
Sampling site	See above
Laboratory culture	No
Method of cultivation	n.a.
Preparation of inoculum for exposure	The sediment and water were equilibrated in the laboratory at 18°C for 3 days with constant aeration of the water.
Pretreatment	See above
Initial cell concentration	Mean values from triplicate samples were as follows: Unfiltered water 375 cells/ml Filtered water 135 cells/ml

Table A7.1.2.2.2-5 Test System

Criteria	Details
Culturing apparatus	30 cm x 50 mm i.d. glass cylinders
Number of culture flasks/concentration	1 for each microcosm
Aeration device	Air bubbler
Measuring equipment	LSC
Test performed in closed vessels due to significant volatility of TS	No

Table A7.1.2.2.2-6 Test Conditions

Criteria	Details
Composition of medium	stream water (5 µm filtered), unfiltered stream water or unfiltered stream water plus a layer of stream sediment.
Additional substrate	-
Test temperature	18°C ± 2°C (in the dark)
pH	8.0 – 8.5
Aeration of dilution water	Yes (CO_2–free air)
Suspended solids concentration	-
Other relevant criteria	-

Table A7.1.2.2.2-7 Distribution of radioactivity in filtered and non-filtered water treatments

	FILTERED WATER						NON-FILTERED WATER					
Distribution of radioactivity	% of applied radioactivity Weeks incubation						% of applied radioactivity Weeks incubation					
	0	2 days	1	2	4	8	0	2 days	1	2	4	8
Water } Combined organic part- } fractions	99.6	97.0	92.5	85.7	79.4	63.6	97.1	94.6	86.9	79.8	81.9	45.4
ition } Aqueous fractions	0.7	2.1	1.1	1.5	2.6	2.2	0.8	1.7	1.2	1.3	3.2	6.2
Glass cylinder solvent rinse	<0.1	0.5	0.6	0.8	0.4	0.4	<0.1	0.4	0.7	1.0	0.2	0.5
$^{14}CO_2$ evolved	-	0.7	2.4	3.6	6.0	7.2	-	0.5	2.2	4.2	8.1	24.0
Other ^{14}C-volatiles	-	0.1	0.2	0.2	0.2	0.2	-	<0.1	0.2	0.1	0.4	0.2
Total recovery	100.3	100.4	96.8	91.8	88.6	73.6	97.9	97.2	91.3	86.4	94.8	76.3

Table A7.1.2.2.2-8 Distribution of radioactivity in microcosms containing sediment and water

	% of applied radioactivity					
	Weeks incubation					
	0	2 days	1	2	4	8
surface water partition } Combined organic fractions	103.4	81.8	66.2	49.7	31.3	3.6
surface water partition } Aqueous fractions	0.9	1.2	3.0	3.8	5.8	7.3
Sediment analysis } Combined extracts	1.3	7.3	13.6	9.0	13.0	5.8
Sediment analysis } Unextracted 'bound' radioactivity	0.1	4.5	5.1	9.7	15.1	23.6
Glass cylinder solvent rinse	<0.1	0.1	0.2	0.4	0.3	0.4
$^{14}CO_2$ evolved	–	1.8	4.8	9.1	19.8	36.0
Other ^{14}C-volatiles	–	<0.1	0.1	0.3	0.2	0.2
Total recovery	105.7	96.7	93.0	82.0	85.5	71.9

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	21/11/06
Materials and methods	Applicant's version is acceptable with the following comments: **3.1.4** Other physico-chemical properties such as water solubility (0.28 g/l at pH 7) would be useful.
Conclusion	Applicant's version is acceptable
Reliability	2
Acceptability	Acceptable
Remarks	Study and endpoints robust for use in risk assessments. All endpoints transcribed from study correctly.
	COMMENTS FROM ...
Date	
Results and discussion	
Conclusion	
Reliability	

Acceptability
Remarks

7.1.3 Adsorption/desorption screening test

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [✓]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	Adsorption/desorption screening studies are not available. However, one adsorption/desorption study in four different soil types has been conducted with bendiocarb according to an in-house method which is similar to the EC method C.18 and OECD guideline 106. This study submitted under Point 7.2.3.1 is considered as higher tier as the adsorption/desorption has been investigated in more depth than in screening studies. Consequently, adsorption/desorption screening test should not be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	26/06/07
Evaluation of applicant's justification	Applicant's justification is acceptable.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.1.4 Further adsorption and desorption studies

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [✓]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	As explained under Point 7.1.3, an adsorption/desorption study in four soil types has been conducted with bendiocarb according to an in-house method which is similar to the EC method C.18 and OECD guideline 106. This study is submitted under Point 7.2.3.1. Therefore, further adsorption/desorption studies should not be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	26/06/07
Evaluation of applicant's justification	Applicant's justification is acceptable.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.1.4.1 Field study on accumulation in the sediment

	JUSTIFICATION FOR NON-SUBMISSION OF DATA	Official use only
Other existing data [ ]	**Technically not feasible [ ]** **Scientifically unjustified [✓]**	
Limited exposure [ ]	**Other justification [ ]**	
Detailed justification:	According to the Guidance on Additional Data Requirements for Active Substances, if non-extractable residues are formed exceeding 70 % of the initial dose in the water/sediment study or if the mineralization rate in the water/sediment system is less than 5 % in 100 days, then a field study on accumulation in the sediment should be done. Based on the results of the water/sediment study submitted under Point 7.1.2.2.2/01, the non-extractable residues formed are not exceeding 70 % of the initial dose and the mineralization rate is not less than 5 % in 100 days. Therefore, the trigger values in the TGDs are not reached and hence a field study on accumulation in the sediment should not be required.	
Undertaking of intended data submission [ ]		

EVALUATION BY COMPETENT AUTHORITIES	
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	26/06/07
Evaluation of applicant's justification	Applicant's justification is acceptable.
Conclusion	Applicant's justification is acceptable.
Remarks	
	COMMENTS FROM OTHER MEMBER STATE *(specify)*
Date	*Give date of comments submitted*
Evaluation of applicant's justification	*Discuss if deviating from view of rapporteur member state*
Conclusion	*Discuss if deviating from view of rapporteur member state*
Remarks	

7.2 Fate and behaviour in soil

7.2.1 Aerobic degradation in soil, initial study

			Official use only
		1. REFERENCE	
1.1	**Reference**	Mackenzie, E.A. and Allen, R. (1990) The Degradation of [^{14}C]-Bendiocarb in Soils under Aerobic Conditions Schering Agrochemicals Ltd. Document A90228 7.2.1/01 21 June 1990 Unpublished	
1.2	**Data protection**	Yes	
1.2.1	Data owner	Bayer CropScience AG	
1.2.2	Companies with letter of access	n.a.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I.	
		2. GUIDELINES AND QUALITY ASSURANCE	
2.1	**Guideline study**	In house method in line with US EPA Guideline	X
2.2	**GLP**	Yes	
2.3	**Deviations**	No	X
		3. MATERIALS AND METHODS	
3.1	**Test material**	^{14}C-bendiocarb (labelled in the phenyl ring) and unlabelled bendiocarb	
3.1.1	Lot/Batch number	Unlabelled bendiocarb R000174 (^{14}C)- bendiocarb CFQ 4944 (Amersham International plc)	
3.1.2	Specification	As given in Section 2 for unlabelled bendiocarb; (^{14}C)- bendiocarb (specific activity 102.7 µCi/mg)	
3.1.3	Purity	Unlabelled bendiocarb 99.5 % (^{14}C)- bendiocarb >96 % (TLC)	
3.1.4	Further relevant properties	-	X
3.1.5	Method of analysis	Unlabelled bendiocarb HPLC (^{14}C)- bendiocarb TLC and LSC	
3.2	**Degradation products**	Yes	
3.2.1	Method of analysis for degradation products	The ethanediol and ethanolamine traps were replaced when soil flasks were removed for analysis and at up to five weekly intervals during the course of the study. The radioactivity in those removed was analysed directly by liquid scintillation counting (LSC).	