



FYI-94-000987
INIT 07/14/94

01048411
→ Will Perry
L. Bost
IR-430

THE UPJOHN COMPANY

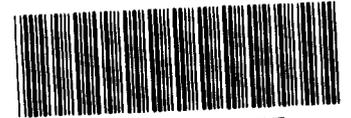
NORTH HAVEN, CONNECTICUT 06473

(A)

January 6, 1984

FYI-0794-000987

FINE CHEMICAL DIVISION
TELEPHONE: (203) 281-2700
TWX 710 465-0100



84940000087

Mr. Martin Greif
TSCA Interagency Testing Committee
Environmental Protection Agency (TS-792)
101 M Street, SW
Washington, DC, 20460

Contains No CBI

Dear Mr. Greif

The Upjohn Company has been a major producer of Benzophenone for a number of years and therefore, has an interest in your committee's deliberations on the recommendation of Benzophenone for further testing. While there is a good deal of toxicity information in the literature on this compound, Upjohn has generated additional unpublished data which may be of help to the committee.

1) Acute Toxicity

Tests for toxicity conducted by Upjohn's laboratory in August, 1976, using the procedure in "Toxicity Test for Bulk Chemicals to Meet DOT Regulations" produced the following results.

- a) Rabbit Eye Irritation: Negative
- b) Rabbit Dermal Irritation: Negative
- c) Rat oral Toxicity
 - 50 mg/Kg: Nontoxic
 - 500 mg/Kg: Nontoxic

The summary report of these results is attached. More detailed information on the methods and results can be provided if the committee requests.

2) Mutagenicity

Bacterial mutagenicity testing was performed in Upjohn's laboratory in August, 1978 with the following results:

- a) strain TA-100 with enzyme activation: Nonmutagen

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- b) strain TA-100 without enzyme activation: Nonmutagenic
- c) strain TA-98 with enzyme activation: Nonmutagenic
- d) strain TA-98 without enzyme activation: Nonmutagenic
- e) strain TA-1537 with enzyme activation: Nonmutagenic
- f) strain TA-1537 without enzyme activation: Nonmutagenic

The summary report of this work is attached. More detailed information on test methods and results can be provided if the committee requests.

3) Biodegradability

Upjohn has run no formal environmental fate studies, however, we have determined that the compound is biodegradable in our biological treatment facilities. Upjohn's plant has an activated sludge treatment plant designed to provide preliminary treatment of its waste waters prior to discharge to a POTW. Sampling and testing for Benzophenone content of the waste stream before and after preliminary activated sludge treatment revealed about a 50% reduction through the system. The summary report of this study is attached. More detailed information on the study can be provided if the committee requests.

The two major uses for Benzophenone are as a chemical intermediate and as an additive in polymer curing. In its chemical intermediate uses it is chemically changed to different chemicals useful as drugs, plastic additives and other end products. This chemical conversion takes place in the hands of sophisticated chemical manufacturers who routinely handle highly toxic compounds and are well equipped to deal with non toxic Benzophenone without any adverse effect on its workers or the environment.

The other major use is as a curing agent in UV curable coatings and films. In this case also it is handled along with toxic chemicals by companies well equipped to prevent adverse effects. Once the polymer is cured the Benzophenone is encapsulated in the polymer and is no longer available for human or environmental contact.

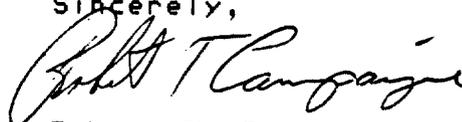
Benzophenone is also used in modest quantities as a fragrance additive to various consumer products such as soaps and detergents. Benzophenone has a boiling point of 305 degrees centigrade and a vapor pressure of 1 millimeter of Hg. at 108 degrees centigrade. These physical properties result in very low potential exposure via inhalation from the air by the general public.

Benzophenone is also approved as a food additive. (CFR21, Part 172, Subpart F, 172.515, April 1, 1982) However, to the best of our knowledge there is little or no actual usage as a food additive. If the committee considers the potential food use as a significant part of its justification for considering Benzophenone for further testing, the Upjohn Company strongly recommends that their recommendations for testing be handled by the FDA, rather than the EPA under TSCA. This action would permit removal of the compound from the approved food use list if the cost of the additional testing could not be justified by the food use market.

The Upjohn Company has no evidence of any adverse human or environmental effects from the manufacture or use of Benzophenone. We have also received no reports of suspected adverse effects from our employees or customers.

The Upjohn Company has searched the available literature on the toxicity of Benzophenone and has conducted the above described tests where it felt significant information was lacking. We do not believe that Benzophenone meets the criteria which TSCA directs the committee to use in selecting chemicals for priority testing and therefore asks that it not be included in the committee's recommendations to EPA.

Sincerely,



Robert T. Campaigne
Manager, Manufacturing, Research &
Development, and Quality Control

MEMO

TO R. H. Buller

SUBJECT Benzophenone: Acute Toxicity Tests

FROM W. E. Steger

DATE August 2, 1976

40-176 3/66

COPIES TO

D. Affeld
W. L. Bogue
E. R. Boller
R. T. Champaigne
(N. Haven)
A. Corstange
D. G. Griffeth
(N. Haven)
M. F. Grostic
R. H. Johnson
D. Miles
H. A. Nelson
S. P. Owen
C. W. Stewart
P. Woolrich
DH-file

Benzophenone was tested for acute toxicity according to the procedure in "Toxicity Test for Bulk Chemicals to Meet DOT Regulations," (1). The results of these tests were:

1. Rabbit Eye Irritation: Negative
2. Rabbit Dermal Irritation: Negative
3. Rat Oral Toxicity-
 - a. 50 mg/Kg: Nontoxic
 - b. 500 mg/Kg: Nontoxic

The results of these tests indicated a label of L-1, Minimal Precaution.

Acknowledgements:

I thank W. L. Bogue and A. Corstange for their technical assistance.

Reference:

Memo to S. P. Owen from R. H. Buller, "Toxicity Test for Bulk Chemicals to Meet DOT Regulations," April 24, 1973.

bb -

MEMO

TO D. K. Chesney

SUBJECT Benzophenone in Plant Effluent.

FROM *Jan*
A. L. Cain

December 16, 1983

DATE

COPIES TO

RTC Plant effluent entering and exiting the enclosed lagoon was examined for the presence of benzophenone. Each sample, after solvent extraction, was concentrated to a known volume and examined by GC and HPLC. GC indicated benzophenone to be present and this was confirmed by LC. Based on GC analysis, the following amounts were found:

Influent (12/7/83) - 3.78 ppm	
Effluent (12/8/83) - 1.93 ppm	51% reduction
Influent (12/13/83) - 5.82 ppm	
Effluent (12/14/83) - 2.80 ppm	48% reduction

The solubility of benzophenone in water was found to be 0.018 g./100 ml. (180 ppm).

ALC:mbn
12/21/83

RESULTS OF SALMONELLA/MICROSOME TEST* (BACTERIAL MUTAGENICITY)

U-Number: 57260

D. M. Zimmer, J. H. Mazurek, B. K. Bhuyan

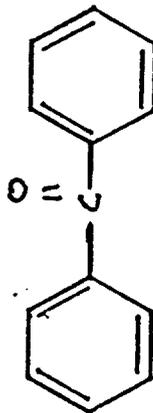
Submitter: D.K. Cheshire (North Haven)

RESULTS**: U- 57260 was a nonmutagen ~~weak mutagen/mutagen~~ against tester strains TA-98, TA-100, or TA-1537 with/without activation.

Date: 8-28-78

Notebook Reference: 14018 - 56, 57, 62, 63, 76, 77

14265 - 25, 26
Mutants/Plate



Benzophenone

TA-100		TA-98		TA-1537	
Activation	+	Activation	+	Activation	+
790	156	1200	34	93	7900
175	171	37	38	9	8
182	170	46	35	11	6
194	170	34	27	9	10
162	159	30	27	11	12
167	85	26	20	6	6

Data

Experiment II

Dose (µg/Plate)

Positive Control (AAF, 50)

0 (Vehicle Control)

31.3

62.5

125.0

250.0

TA-100		TA-98		TA-1537	
Activation	+	Activation	+	Activation	+
585	160	1140	32	600	22000
175	161	39	29	9	6
191	153	36	29	10	8
173	185	29	23	12	5
140	140	30	19	11	5
129	129	27	19	5	4

Data

Experiment III

Dose (µg/Plate)

Positive Control (AAF, 50)

0 (Vehicle Control)

COPIES TO: BBhuyan, Efeenstra, TKakuk, JMazurek, JParikh, GPetzold, JSwenberg, DZimmer, BS0, Submitter, File

Solvent Used: DMSO, Saline, Other

* Materials, Methods and Discussion of Results in Technical Report 7252/76/7252/007.

** A compound which raises the number of mutants/plate by 1.5-3.0 fold over concurrent vehicle controls is arbitrarily considered a weak mutagen; > 3 fold is considered a mutagen.

*** Toxic, nontoxic at this dose. DMZ/alb 3/17/78