UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF PREVENTION,
PESTICIDES, AND TOXIC SUBSTANCES

July 10, 2006

ACTION MEMORANDUM

SUBJECT: Reassessment of One Exemption from the Requirement of a Tolerance for 2-Hydroxy-4-n-Octoxybenzophenone (OH-OBP, CAS No. 1843-05-6)

FROM: Pauline Wagner, Chief
Inert Ingredient Assessment Branch
Registration Division (7505P)

TO: Lois Rossi, Director
Registration Division (7505P)

I. FQPA REASSESSMENT ACTION

Action: Reassessment of one inert ingredient exemption from the requirement of a tolerance as listed in Table 1 below.

Table 1.

CFR Citation				CAS Reg. No. 9CI Name
40 CFR §	**Inert Ingredients**	**Limits**	**Uses**	
180.920[a]	2-Hydroxy-4-n-Octoxybenzophenone (CAS Reg. No. 1843-05-6)	Not more than 0.2 pt[b] of pesticide formulation.	Light stabilizer	1843-05-6 Methanone, [2-hydroxy-4-(octyloxy)phenyl]phenyl-

[a]Residues listed in 40 CFR 180.920 are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.
[b]This "pt" is an error in 40 CFR and should read "pct" [an abbreviation for percent (%)]. This error will be corrected in a future Federal Register notice.

Use Summary: OH-OBP is used as a light stabilizer at not more than 0.2% in pesticide formulations applied to growing crops only. Other uses of OH-OBP include: a photostabilizer for a variety of plastic systems, an antioxidant in food packaging materials, and a stabilizer in petroleum wax. Benzophenones are used in adhesives and sealants, in surface coatings, and in polymers such as resins, cellulosic esters, polyesters, polystyrenes, rubber, flexible (plasticized and semi-rigid) and rigid vinyl, and vinylidene

chloride. Benzophenones are also used in skin moisturizing products and sunscreen lotions, as well as cosmetic, pharmaceutical, and plastic products.

List Reclassification Determination: The current List Classification for OH-OBP is 3. Because EPA has determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to this chemical when used as an inert ingredient at not more than 0.2% in pesticide formulations, the List Classification for OH-OBP will change from List 3 to List 4B.

II. MANAGEMENT CONCURRENCE

I concur with the reassessment of the exemption from the requirement of a tolerance for the inert ingredient 2-hydroxy-4-n-octoxybenzophenone (OH-OBP), as well as the List reclassification determination described above. I consider the one exemption established in 40 CFR 180.920 to be reassessed for purposes of FFDCA's section 408(q) as of the date of my signature, below. A Federal Register Notice regarding this tolerance exemption reassessment decision will be published in the near future.

Lois Rossi

Lois A. Rossi, Director
Registration Division

July 13, 2006

Date:

cc: Debbie Edwards, SRRD
Joe Nevola, SRRD

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July 10, 2006

MEMORANDUM

SUBJECT: Reassessment of One Exemption from the Requirement of Tolerance for 2-Hydroxy-4-n-Octoxybenzophenone (CAS Reg. No. 1843-05-6)

FROM: Keri Grinstead
Inert Ingredient Assessment Branch
Registration Division (7505P)

TO: Pauline Wagner, Chief
Inert Ingredient Assessment Branch
Registration Division (7505P)

BACKGROUND

Attached is the science assessment for 2-hydroxy-4-n-octoxybenzophenone (OH-OBP, CAS Reg. No. 1843-05-6). The purpose of this document is to reassess the existing exemption from the requirement of a tolerance for residues of OH-OBP when used as an inert ingredient at not more than 0.2% in pesticide formulations applied to growing crops only under 40 CFR 180.920 as required under the Food Quality Protection Act (FQPA). This assessment summarizes available information on the use, physical/ chemical properties, toxicological effects, exposure profile, and environmental fate and ecotoxicity of OH-OBP.

EXECUTIVE SUMMARY

This report evaluates 2-hydroxy-4-n-octoxybenzophenone (OH-OBP), an inert ingredient which has one exemption from the requirement of a tolerance for its residues when used in accordance with good agricultural practice at not more than 0.2% in pesticide formulations applied to growing crops only under 40 CFR 180.920. It is also used as a photostabilizer in petroleum wax and for a variety of plastic systems. It is useful in preventing UV damage to stored products and increases the stability of containers.

OH-OBP exhibits relatively low acute oral toxicity and low subchronic oral toxicity in animal studies. It has demonstrated low developmental toxicity and was negative in mutagenicity and genotoxicity studies. There were no available reliable carcinogenicity data for this chemical, however, in the reproduction study listed in this document, it was concluded that feeding OH-OBP to rats from weaning through reproductive age for four successive generations at a level of 0.6% in the diet did not produce lesions in the parents or anomalies in the offspring which could be attributed to the compound. The NOAELs were ~614.3 mg/kg/day for maternal toxicity and ~523.9 mg/kg/day (males) and ~614.3 mg/kg/day (females) for developmental toxicity; the highest dosage(s) tested. The LOAEL for

maternal toxicity and developmental toxicity was not determined. In animal studies, OH-OBP was metabolized and rapidly (within 48 hours) excreted by the body.

This chemical exists as a solid at room temperature and is expected to be practically not volatile. It's predicted atmospheric oxidation half-life is 0.59 hours. EPIWIN predicts that OH-OBP is not biodegradable. Based on its use limitation of not more than 0.2% in pesticide formulations, contributions of concern to drinking water (from runoff or drift) are not expected to be substantial.

Based on the physical/chemical properties of OH-OBP, as well as its use limitation of not more than 0.2% in pesticide formulations; dietary (food and drinking water) and residential (inhalation and dermal) exposures of concern are unlikely from OH-OBP when used as an inert ingredient in pesticide products applied to growing crops only.

Based on the ecotoxicity data for this chemical summarized in the US EPA High Production Volume (HPV) Chemical Challenge Program document (Cytec/CIBA 2001), OH-OBP is of low acute toxicity to mammals, aquatic organisms, daphnid, and aquatic plants.

Taking into consideration all available information, EPA has determined there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to OH-OBP when used as an inert ingredient in pesticide formulations when considering dietary exposure and all other non-occupational sources of pesticide exposure for which there is reliable information. Therefore, it is recommended that the one exemption from the requirement of a tolerance established for residues of OH-OBP under 40 CFR 180.920 at not more than 0.2% of the pesticide formulation be maintained and considered reassessed as safe under section 408(q) of the Federal Food, Drug and Cosmetic Act (FFDCA). The limitation for this chemical as listed in 40 CFR 180.920 contains an error. The "pt" listed in the exemption is an error and should read "pct" [an abbreviation for percent (%)]. This error will be corrected in a future Federal Register notice.

I. Introduction

This report evaluates 2-hydroxy-4-n-octoxybenzophenone (OH-OBP), an inert ingredient which has one exemption from the requirement of a tolerance for its residues when used in accordance with good agricultural practice at not more than 0.2% in pesticide formulations applied to growing crops only under 40 CFR 180.920. OH-OBP is synthesized by reacting 2,4-dihydroxybenzophenones with octyl bromide or octyl chloride. It is an ultraviolet light absorber (UVA) and stabilizer of the benzophenone class, imparting light stability for plastics and other organic polymers.

OH-OBP is within the scope of the Agency's High Production Volume Challenge Program (HPV) and has full sponsorship by Cytec Industries Inc. and Ciba Specialty Chemicals Corporation. The goal of the HPV program is to collect and make publicly available a complete set of baseline health and environmental effects data on those chemicals that are manufactured in, or imported into the United States in amounts equal to or exceeding one million pounds per year. Industry sponsors volunteer to evaluate the adequacy of existing data and to conduct tests where needed to fill the gaps in the data, and EPA (and the public) has an opportunity to review and comment on the sponsors' robust summary report.

II. Use Information:

A. Pesticide Uses

Table 1. Tolerance Exemptions Being Reassessed in this Document

CFR Citation				CAS Reg. No. 9CI Name
40 CFR §	Inert Ingredients	Limits	Uses	
180.920[a]	2-Hydroxy-4-n-Octoxybenzophenone (CAS Reg. No. 1843-05-6)	Not more than 0.2 pt[b] of pesticide formulation.	Light stabilizer	1843-05-6 Methanone, [2-hydroxy-4-(octyloxy)phenyl]phenyl-

[a]Residues listed in 40 CFR 180.920 are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.
[b]This "pt" is an error in 40 CFR and should read "pct" [an abbreviation for percent (%)]. This error will be corrected in a future Federal Register notice.

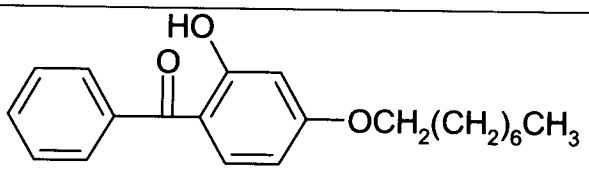
B. Other Uses

OH-OBP is used as a photostabilizer for a variety of plastic systems. It may be used as an antioxidant in food packaging materials and may be used as a stabilizer in petroleum wax. It is cleared under the 21 CFR (Code of Federal Regulations) 178.2010 for use as a stabilizer in polymers used in the manufacture of articles or components of articles intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food and also under 21 CFR 178.3710 as a stabilizer in petroleum wax used as a component of nonfood articles in contact with food. In packaging materials, OH-OBP prevents UV-radiation from reaching the stored product and increases the stability of the container. Benzophenones are used in adhesives and sealants, in surface coatings, and in polymers such as: resins, cellulosic esters, polyesters, polystyrenes, rubber, flexible (plasticized and semi-rigid) and rigid vinyl, and vinylidene chloride. Benzophenones are also used in skin moisturizing products and sunscreen lotions, as well as cosmetic, pharmaceutical, and plastic products.

III. Physical and Chemical Properties

Table 2. Physical and Chemical Properties

Parameter	Value
Chemical	2-hydroxy-4-n-octoxybenzophenone, CAS Reg. No. 1843-05-06
Molecular formula	$C_{21}H_{26}O_3$
Molecular weight	326.42
Color and form	A pale cream to white powder with friable lumps
Melting point	47-49°C
Boiling point	N/A. The chemical is solid and decomposes at > 300°C
Vapor pressure	N/A. The chemical is solid

Parameter	Value
Solubility	$<7.3 \times 10^{-7}$ g/L in water @ 20.0 +/-0.5°C
Octanol water partition coefficient	Log $P_{ow} > 6.00$
Estimated half-life in water at pH 4	> 1 year
Structure	

(Toxnet SIS, 2005 and Cytec/CIBA Data Summary and Test Plan, 2001).

IV. Hazard Assessment

A. Hazard Profile

OH-OBP exhibits relatively low acute oral toxicity and low subchronic oral toxicity in animal studies. It was nonirritating to the rabbit eye and was considered a moderate to strong skin sensitizer in albino Guinea pigs (positive reactions were all classified as very slight erythema or very slight edema). It has demonstrated low developmental toxicity and was negative in mutagenicity and genotoxicity studies. There were no available reliable carcinogenicity data for this chemical, however, in the reproduction study listed in this document, it was concluded that feeding OH-OBP to rats from weaning through reproductive age for four successive generations at a level of 0.6% in the diet did not produce lesions in the parents or anomalies in the offspring which could be attributed to the compound. In animal studies, OH-OBP was metabolized and rapidly (within 48 hours) excreted by the body.

The primary sources of information used in this assessment are a Final Report on the safety assessment of Benzophenones-1, -3, -4, -5, -9, and -11 published in the Journal of the American College of Toxicology (J. Am. Coll. Toxicol) and information and data summaries submitted under the auspices of the Agency's HPV Challenge program in support of OH-OBP, as well as information obtained from publicly available databases and sources.

B. Toxicological Data

Acute Toxicity

Acute toxicity data is presented in Table 3. (Am College of Toxicology –Toxnet SIS 2005)

TABLE 3. Reported LD_{50} values for 2-Hydroxy-4-N-octoxybenzophenone rabbits, rats, and mice.

Organism	Route	LD50 (mg/kg) (Comments)	Reference
Rabbit	Dermal	> 10,000 (Animals developed no systemic toxicity or skin irritation.)	Patel et al., cited by the J. Am. Coll. Toxicol.
Rat	Oral	>10,000 (Administered in water. Practically non-toxic.)	Patel et al., cited by the J. Am. Coll. Toxicol.
Rat	Oral	>12,000 (Administered in olive oil. Practically non-toxic.)	Homrowski, cited by the J. Am. Coll. Toxicol.

TABLE 3. Reported LD_{50} values for 2-Hydroxy-4-N-octoxybenzophenone rabbits, rats, and mice.			
Organism	Route	LD50 (mg/kg) (Comments)	Reference
Mouse	Oral	>13,000	Toxnet SIS, 2005.

Sub Chronic toxicity

A 30 day toxicity test of OH-OBP was carried out by the American Cyanamid Co. (Report 65-58), cited in the Cytec/CIBA HPV Test Plan. Male, albino CF Nelson rats (10/group) were fed diets containing 0, 1.25, 2.5, or 5.0 % test material (equal to 0, 1222, 2290, and 4780 mg/kg/day respectively) and the mean weight changes were determined after 30 days of treatment (Table 4). During the feeding period, animals in the 1.25% group were comparable to the controls, but animals in the mid- and high-dose groups had a poor appearance. Some rats in each test group showed signs of gross hematuria, and one death occurred in the high-dose group. At autopsy, the gross appearance of the kidneys was normal, but cut kidney sections from the high- and mid-dose groups revealed yellow masses in the renal tubules. Similar yellow masses were seen in the urinary bladders of several animals from the same groups. The masses were believed to be glucuronides which had been observed with other benzophenone derivatives. Mean food intake of the mid-dose group was also significantly lower (significance level was not reported) than the control group. On the basis of gross hematuria seen in all dose groups, the LOAEL was 1222 mg/kg/d and the NOAEL was undetermined.

In a 90-day toxicity study with OH-OBP, ten rats/sex/dose were fed diets containing 0, 0.2, 2.0, or 5.0% (equivalent to approximately 0, 192, 1920 or 4800 mg/kg/day, respectively, of the test article in the feed (Til *et al.* 1967). Animals in the 5% dose group appeared to be in poor health a few days after the start of the study and seven animals died within three weeks. The NOAEL was 0.2% OH-OBP in the feed (~192 mg/kg/day) and the LOAEL was 2.0% OH-OBP in the feed (~1920 mg/kg/day) based on reduced body weights, hematological effects, increased relative liver weights, and pathological changes in the urinary bladder of both sexes and in the kidney of females.

Eye irritation:

An eye irritation study was performed with OH-OBP using 5 albino rabbits. A 100 mg sample of the neat chemical was instilled into the rabbit eyes with no washing. (Patel et al., J. Am. Coll. Toxicol). Draize scores were reported from 0 through 7 days of observation. OH-OBP was classified as nonirritating to the rabbit eye.

Dermal Irritation/Sensitization

OH-OBP was evaluated for skin irritation/sensitization in a Guinea pig maximization test (Hagemann, Ch. 1991). At 24 and 48 hours following removal of the patches, the challenge reactions were graded according to the Draize scoring scale. Based on the maximization grading system of Magnusson and Kligman, which classifies a sensitization rate of 29% - 64% as moderate and 65% - 80% as strong, the test article was classified as a moderate to strong sensitizer in albino guinea pigs. The proportion of treated animals (males + females) showing a positive reaction were 12/20 or 60%. Positive reactions were all classified as very slight erythema or very slight edema.

Reproductive/Developmental Toxicity:

A 4-generation study of the effects of OH-OBP was conducted in rats (American Cyanamid Co, Report No. 69-251 Cytec/CIBA Test Plan). Charles River CD albino rats (stock animals) ~3 months old were mated and the offspring produced by mating were placed on the study as the F_0 generation at weaning. The F_0 animals were assigned to diets containing 0 (control) or 0.6% [6000 ppm; (~523.9 mg/kg/day (males) and ~614.3 mg/kg/day (females)] of OH-OBP. Sixteen males and females were used per group/generation. The test material was incorporated into ground lab chow on a weight basis, prepared weekly. Pups were weaned directly onto the diets their parents had been receiving.

The fertility, gestation, viability, and lactation indices for the test and control groups were comparable and were usually high. There was no impairment of reproduction or lactation performance in the test group. There were no significant differences in the number of live births or the number of pups weaned between the control and test groups. The average pup from rats fed the test material weighed slightly more than the average control pups. Pups of all litters, including those which died before weaning, were examined for gross defects. However, autopsies were performed only on pups from the first mating of the F_2 animals (F_{3a} generation). The latter pups were killed at weaning. Immediately after death, the 2 males and 2 females which were the smallest or least healthy appearing of each litter were set aside while the others were autopsied and examined for gross lesions. One of each sex of those set aside was autopsied, and portions of all organs were taken for histological processing and examination. The other 2 animals were examined for skeletal defects using skeletal staining. The only condition which occurred frequently was hydronephrosis. This is a known spontaneous lesion in rats. The incidence of this condition was higher in control animals. Microscopic findings were few and not related to the treatment. No skeletal abnormalities were seen in the control or treated pups. It was concluded that feeding OH-OBP to rats from weaning through reproductive age for 4 successive generations at a level of 0.6% did not produce lesions in the parents or anomalies in the offspring which could be attributed to the compound. The NOAEL was ~614.3 mg/kg/day for maternal toxicity. The NOAEL for developmental toxicity was ~523.9 mg/kg/day (males) and ~614.3 mg/kg/day (females). The LOAEL for maternal toxicity and developmental toxicity was not determined.

EPA's HPV program recommended that a new reproductive/developmental toxicity test (OECD 421) be performed because this study used a dose level that was lower than the guideline-recommended limit dose. However, the dose levels in this study are adequate for the evaluation of the use of OH-OBP as an inert ingredient in pesticide products at not more than 0.2% in pesticide formulations.

Genetic Toxicity / Mutagenicity

The following information is summarized from the Cytec/CIBA HPV Test Plan for OH-OBP.

In an *in vitro* bacterial reverse mutation assay to assess the genotoxicity of OH-OBP, *Salmonella typhimurium* strains TA98, TA100, TA1535 and TA1537, and *Escherichia coli* strain WP2uvrA were exposed in the standard plate incorporation procedure, to concentrations of 100, 333, 1000, 2500, or 5000 µg OH-OBP/plate, with and without microsomal activation. Precipitate was observed with concentrations of 2500 and 5000 µg OH-OBP/plate. Background lawns appeared to be

intact. No mutagenic activity was noted with concentrations up to 1000 μg OH-OBP/plate, either with or without activation.

In an Ames mutagenicity assay, Salmonella strains TA98, TA100, TA1535, and TA1537 with and without microsomal activation. No mutagenic activity was noted at doses up to 1000 μg/plate. Precipitate on plates was noted at 500 and 5000 ug/plate doses (background lawn appeared intact). *S. typhimurium* strains were exposed to the OH-OBP. The number of histidine protrophic mutants found in the controls and the treated strains were similar with or without activation.

In two chromosome aberration studies, OH-OBP did not induce any statistically significant increase in the frequency of cells with aberrations both when cells were exposed to OH-OBP both in the presence or in the absence of a 1% concentration of induced rat liver microsomes, or, in the second study when the cells were exposed to OH-OBP for 4 hours in the presence of a 2% concentration of rat liver microsomes or exposed for 24 hours in the absence of microsomal activation. Cell harvest occurred after a 20-hour expression period in both studies.

Carcinogenicity

There were no available reliable carcinogenicity studies on OH-OBP, however, in the reproductive/developmental study discussed above, it was concluded that feeding OH-OBP to rats from weaning through reproductive age for 4 successive generations at a level of 0.6% did not produce lesions in the parents or anomalies in the offspring that could be attributed to the compound.

B. Metabolism and Pharmacokinetics

An NTP-sponsored study of absorption, distribution, and clearance following oral administration of OH-OBP to animals demonstrated that OH-OBP is readily absorbed from the gastrointestinal tract and excreted primarily in urine. In general, for benzophenones, two-thirds of the dose given to animals by oral gavage, was excreted in urine. The absorption from the gastrointestinal tract was nearly complete at all doses administered across a range of approximately 3 mg/kg to 2.5 g/kg. Only a trace of the parent compound was excreted unmetabolized; which was converted to at least five metabolites and excreted in bile and urine. Metabolism and clearance were unaffected by the dose. The major metabolites were identified as glucuronide conjugates of the parent compound and 2,4-dihydroxybenzophenone, and a sulfate ester of a hydroxylated derivative of the parent compound. Excretion was rapid following oral or i.v. administration and was nearly complete within 48 hours after administration (J. Am. Coll. Toxicol 1983).

C. Special Considerations for Infants and Children

Based on all of the available studies, OH-OBP is of low toxicity for human health effects endpoints, including developmental and reproductive effects. It was concluded that feeding OH-OBP to rats from weaning through reproductive age for four successive generations at a level of 0.6% did not produce lesions in the parents or anomalies in the offspring which could be attributed to the compound. The NOAELs were ~614.3 mg/kg/day for maternal toxicity and ~523.9 mg/kg/day (males) and ~614.3 mg/kg/day (females) for developmental toxicity; the highest dosage(s) tested. The LOAEL for maternal toxicity and developmental toxicity was not determined. Dietary exposures from this chemical when used as an inert ingredient in pesticide products applied to growing crops are unlikely because of its use limitation of not more 0.2 % in pesticide formulations applied to growing crops only,

Based on this information, there is no concern, at this time, for increased sensitivity to infants and children to OH-OBP when used as an inert ingredient in pesticide formulations. For the same reasons, a safety factor analysis has not been used to assess risk and, therefore, the additional ten-fold safety factor for the protection of infants and children is also unnecessary.

V. Environmental Fate Characterization and Drinking Water Considerations

This chemical exists as a solid at room temperature and is expected to be practically not volatile. Based on its use limitation of not more than 0.2% in pesticide formulations, contributions of concern to drinking water (from runoff or drift) are not expected to be substantial.

As indicated earlier, OH-OBP is a solid at room temperature. It melts at 47-49°C. Its boiling point cannot be measured, but it decomposes at >300°C. It appears that the substance does not volatilize substantially. However, it has been predicted, that, should the vapors reach the environment, they would be decomposed by hydroxyl radicals (rate constant estimated 2.18×10^{14} cm^3/molecule-sec; corresponds to a half life of 0.59 hr).

This compound is very stable to hydrolysis, with estimated half-lives of <1 year at pH's of 5, 7 and 9 at 25°C. Using the Level III Fugacity model of EPIWIN, the predicted distribution was as follows: air 0.09%; water 8.2%; soil 29.5%, sediment 62.2%. EPIWIN predicts that the molecule is not biodegradable.

OH-OBP is fairly insoluble (<0.73 µg/L at 20.0±0.5°C). Its octanol/water partition coefficient ($K_{OW}>10^6$), indicates that the compound dissolves preferentially in organic solvents and it is likely that the compound has a relatively high octanol/carbon partition coefficient (K_{OC}). Therefore, the compound will bind preferentially to soils with high organic carbon content. Furthermore, it would be expected that runoff of OH-OBP would likely only occur in rain events accompanied with erosion. The compound may reach adjacent bodies of water via spray drift; however, the amount would likely be only a very small fraction due to the small percentage of OH-OBP allowed in pesticide formulations.

VI. Exposure Assessment

The primary potential human exposure to this chemical when used as an inert ingredient in pesticide products applied to growing crops would be via the oral route through consumption of food to which OH-OBP-containing pesticide products have been applied. EPA expects that such exposures (if any) would be low because this inert ingredient is limited to not more than 0.2% in pesticide formulations. For this same reason, contributions of concern to drinking water (from runoff) are also not expected from its use as an inert ingredient in pesticide products applied to growing crops. While exposure from residential (dermal and inhalation) home garden-type uses is possible, it is not expected to be of concern considering the significant use limitation of not more than 0.2% in formulation.

VII. Aggregate Exposures

In examining aggregate exposure, the FFDCA section 408 directs EPA to consider available information concerning exposures from the pesticide residue in food and all other nonoccupational

exposures, including drinking water from ground water or surface water and exposure through pesticide use in gardens, lawns, or buildings (residential and other indoor uses).

For OH-OBP, a qualitative assessment (food, drinking water, and residential) is appropriate given the lack of human health concerns associated with exposure to this chemical when used as an inert ingredient at not more than 0.2% in pesticide formulations.

VIII. Cumulative Exposure

Section 408(b)(2)(D)(v) of FFDCA requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider "available information" concerning the cumulative effects of a particular pesticide's residues and "other substances that have a common mechanism of toxicity."

Unlike other pesticide ingredients for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to OH-OBP and any other substances and OH-OBP does not appear to produce a toxic metabolite produced by other substances. For the purpose of these tolerance actions, therefore, EPA has not assumed that OH-OBP has a common mechanism of toxicity with other substances. For information regarding EPA's efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA's Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA's website at http://www.epa.gov/pesticides/cumulative/.

IX. Human Health Risk Characterization

OH-OBP exhibits relatively low acute oral toxicity and low subchronic oral toxicity in animal studies. It was nonirritating to the rabbit eye and was considered a moderate to strong skin sensitizer in Guinea pigs (positive reactions were all classified as very slight erythema or very slight edema). It has low developmental toxicity and was negative in mutagenicity and genotoxicity studies. There were no available reliable carcinogenicity data for this chemical, however, in the reproduction study listed in this document, it was concluded that feeding OH-OBP to rats from weaning through reproductive age for four successive generations at a level of 0.6% in the diet did not produce lesions in the parents or anomalies in the offspring which could be attributed to the compound. The NOAELs were ~614.3 mg/kg/day for maternal toxicity and ~523.9 mg/kg/day (males) and ~614.3 mg/kg/day (females) for developmental toxicity; the highest dosage(s) tested. The LOAEL for maternal toxicity and developmental toxicity was not determined. In animal studies, OH-OBP was metabolized and rapidly (within 48 hours) excreted by the body.

Based on the physical/chemical properties of OH-OBP, as well as its use limitation of not more than 0.2% in pesticide formulations; dietary (food and drinking water) and residential (inhalation and dermal) exposures of concern are unlikely from OH-OBP when used as an inert ingredient in pesticide products applied to growing crops only.

Taking into consideration all available information, EPA has determined there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to OH-OBP when used as an inert ingredient in pesticide formulations when considering the dietary exposure and

all other non-occupational sources of pesticide exposure for which there is reliable information. Therefore, it is recommended that the one exemption from the requirement of a tolerance established for residues of OH-OBP be maintained and considered reassessed as safe under section 408(q) of the FFDCA. The limitation for this chemical as listed in 40 CFR 180.920 contains an error. The "pt" listed in the exemption is an error and should read "pct" [an abbreviation for percent (%)]. This error will be corrected in a future Federal Register notice.

X. Ecotoxicity and Ecological Risk Characterization

Ecotoxicity data for this chemical were summarized in the US EPA High Production Volume (HPV) Chemical Challenge Program document (Cytec/CIBA 2001). Based on this summary, OH-OBP has low acute toxicity to mammals (rat LD50 > 10,000 mg/kg), aquatic organisms (zebra fish LC50 > 100 mg/L), daphnid (EC50 > 52 mg/L), and aquatic plants (green algae EC50 > 100 mg/L.

REFERENCES

J. Am. Coll. Toxicol. (Anonymous author). 1983. Final report on the safety assessment of benzophenones-1, -3, -4, -5, -9, and -11. Vol. 2 (5), 35-77.

Cytec/CIBA HPV Test Plan. 2001. US EPA High Production Volume (HPV) Chemical Challenge Program. Data Summary and Test Plan for 2-Hydroxy-4-n-Octoxybenzophenone <http://www.epa.gov/chemrtk/tetramet/c13452rt.pdf>.

Hagemann, Ch. 1991. Skin sensitization test in the guinea pig maximization test. Test No. 914110. TK 10050 (Chimassorb 81), CIBA-GEIGY Limited, Toxicology Services, Stein/Switzerland. Later submitted to the EPA by CIBA-GEIGY Corp. and indexed as "Initial submission: Skin sensitization test of Chimassorb 81 in the guinea pig with cover letter dated 041394." EPA/OTS document # 88-940000238.

Til, H.P., V.J. Faron, J.W. Huismans, and A.P. deGroot. 1967. Sub-chronic (90-day) feeding test as to the toxicity of "V 67 - 531" in rats. Cent. Inst. Nutrition and Food Res., Report No. 2525. Later submitted to the EPA by CIBA-GEIGY Corp. and indexed as "Initial submission: Sub-chronic (90-day) feeding test as to the toxicity of "V 67 - 531" in rats (Final report) with cover letter dated 041092." EPA/OTS document # 88-920001839.

Toxnet SIS. 2005. Specialized Information Service. On-line Scientific Search Engine, National Library of Medicine, National Institute of Health.< http://www.toxnet.nlm.nih.gov>. Search term: CAS No: 1843-05-6; Hazardous Substance Databank (last revised: *02/14/2003*); accessed *2005.*