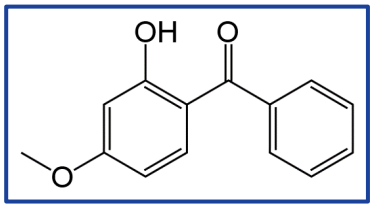
SUMMARY

Background: 2-Hydroxy-4-methoxybenzophenone (2H4MBP) is approved by the U.S. Food and Drug Administration for use in sunscreens and cosmetics in concentrations of up to 6%, either alone or combined with other chemicals, and in plastics that come into contact with food. Humans may be exposed to 2H4MBP throughout their lifespan, including during pregnancy and early childhood, via sunscreen use, ingestion, or absorption through the skin when using personal products. The effects of lifetime (2 years) exposure to 2H4MBP in feed in male and female rats and mice were studied to identify potential toxicity or cancer-related outcomes.



Methods: Pregnant rats were fed diets containing 1,000, 3,000, and 10,000 parts per million (ppm) of 2H4MBP throughout pregnancy and nursing of their offspring; afterwards, groups of 50 or 60 male and female rat offspring continued on the same diet as their mother for 2 years. Fifty male and 50 female mice were fed diets containing 1,000, 3,000, and 10,000 ppm of 2H4MBP for 2 years beginning in adolescence. Control animals (rats and mice) for all studies were fed diets with no chemical added (0 ppm 2H4MBP). Additional evaluations around the time of birth of the offspring and at 3 months were conducted to set appropriate exposure concentrations and identify target organs for subsequent studies. At the end of each study, tissues from more than 40 sites from every animal were examined for signs of disease. Tests were conducted to evaluate the potential for 2H4MBP to cause DNA damage.

Results: Exposure of pregnant rats to 2H4MBP had no discernable effect on their health. Compared to controls, a marginal reduction in body weights of pregnant dams (all groups) and offspring (10,000 ppm group) was observed. The difference in body weight of male and female offspring persisted to the end of the 2-year study. Neoplasms (which can include benign or malignant growths) were observed in the brain and spinal cord of male offspring and the thyroid and uterus of female offspring exposed to 2H4MBP for 2 years. Noncancerous tissue abnormalities were observed in the testes of male offspring and uterus and adrenal cortex of female offspring. In mice, body weights of males and females (10,000 ppm group) were reduced compared to control animals during most of the study; the reduced body weights were not due to the mice consuming less feed. Mice did not have 2H4MBP-related neoplasms in any examined tissues. Noncancerous lesions were observed in the bone marrow, spleen, and kidney of males and females, and the liver of males. Additional tests to evaluate the potential for 2H4MBP to damage DNA were negative.

Conclusions: *The NTP four-point scale rates the level of evidence that a substance has the ability to cause cancer in laboratory animals. Under the conditions of these 2-year feed studies, there was equivocal (uncertain) evidence that 2H4MBP exposure has the ability to cause brain cancer in male rats and benign tumors in the thyroid and polyps in the uterus in female rats, and no evidence that it has the ability to cause cancer in male or female mice. In addition, 2H4MBP exposure caused increased incidences of noncancerous tissue abnormalities (e.g., hyperplasia, hypertrophy, metaplasia) in the testes in male rats; the uterus and adrenal cortex in female rats; the bone marrow, spleen, and kidney in male and female mice; and the liver in male mice.*