

# STUDY ON DIBENZOFURAN WITH REFERENCE TO PROPERTIES

Dheeraj Kumar<sup>1</sup> Dr. Usha Yadav<sup>2</sup>

<sup>1</sup>Research Scholar, Deptt. Of Chemistry, Singhania University, Rajasthan.

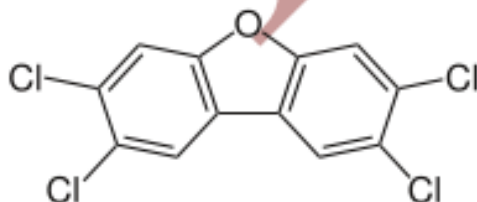
## ABSTRACT

*Dibenzofuran is a white crystal-like solid created from production of coal tar. It is used as an insecticide, in the production of PVC. Dibenzofuran is an aromatic ether having the chemical formula C<sub>12</sub>H<sub>8</sub>O. . Dibenzofuran is also listed in the Massachusetts Substance List for Right-to-Know Law, the New Jersey Department of Health Hazard Right-to-Know Program Hazardous Substance List, and the Pennsylvania Department of Labor and Industry Hazardous Substance List. California's Air Toxics "Hot Spots" List (Assembly Bill).*

**Keywords** Dibenzofuran derivatives, PVC, dibenzofurans (PCDFs), And High Performance Liquid Chromatography (HPLC)

## INTRODUCTION

**Dibenzofuran**, is a heterocyclic organic compound with the chemical structure shown at right. It is an aromatic compound that has two benzene rings fused to one furan ring in the middle. All of the numbered carbon atoms have a hydrogen atom bonded to each of them (not shown in the image). Dibenzofuran is an aromatic ether having the chemical formula C<sub>12</sub>H<sub>8</sub>O. **Dibenzofurans** can also inaccurately refer to polychlorinated dibenzofurans (PCDFs), a family of organic compounds with one or several of the hydrogens in the dibenzofuran structure replaced by chlorines. For example, 2,3,7,8-tetrachlorodibenzofuran (TCDF) has chlorine atoms substituted for each of the hydrogens on the number 2, 3, 7, and 8 carbons (see structure below). Polychlorinated dibenzofurans are much more toxic chemicals than the parent compounds with properties and chemical structures similar to polychlorinated dibenzodioxins. These groups together are often inaccurately called dioxins.



## REVIEW OF LITERATURE

It is a white crystal-like solid created from production of coal tar. It is used as an insecticide, in the production of PVC, industrial bleaching and incineration. Dibenzofuran is excreted 22% the daily intake of dioxins from meals is excreted from feces and 29% from sebum. Dibenzofuran is an aromatic ether having the chemical formula C<sub>12</sub>H<sub>8</sub>O.

## MATERIAL AND METHOD

Dibenzofuran is recovered from a wash oil fraction of coal tar that boils between 275 °C and 290 °C. Redistillation separates dibenzofuran from acenaphthene, which boils at a lower temperature. Crystallization of the redistilled fraction then produces technically pure dibenzofuran. Typical wood preservative creosote is approximately 3.5% dibenzofuran. Dibenzofuran occurs at levels of 0.19-1.50 wt % of dry tar in commercial coal tars. It also is a by-product of smoking and affects both the smoker and second hand smokers. Pathways of exposure Occupational exposure to dibenzofuran may occur through inhalation and dermal contact, particularly at sites where coal tar, coal tar derivatives, and creosote are produced and used. It is used as an insecticide, in the production of PVC, industrial bleaching and incineration.

**General Population Exposure:** Fish and dairy intake also have been studied to be related with body burden of dibenzofuran in pregnant women. Consumption of contaminated water and food are the primary sources of exposure.

## RESULT AND CONCLUSIONS

Dibenzofuran is cited in the Clean Air Act 1990 Amendments -Hazardous Air Pollutants as a volatile hazardous air pollutant of potential concern. The Superfund Amendment Reauthorization Act (SARA) Section 110 placed dibenzofuran on the revised Agency for Toxic Substances and Disease Registry (ATSDR) priority list of hazardous substances to be the subject of a toxicological profile. The listing was based on the substance's frequency of occurrence at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List sites, its toxicity, and/or its potential for human exposure. Dibenzofuran is also listed in the Massachusetts Substance List for Right-to-Know Law, the New Jersey Department of Health Hazard Right-to-Know Program Hazardous Substance List, and the Pennsylvania Department of Labor and Industry Hazardous Substance List. California's Air Toxics "Hot Spots" List (Assembly Bill).

**Testing process** No medical test exists to identify dibenzofuran. But if symptoms of eye, nose, throat or skin irritation occurs after exposure (accidentally / workplace) medical attention is recommended. EPA uses High Performance Liquid Chromatography (HPLC) to monitor samples.

### Dibenzofuran

#### Identifiers

CAS number	132-64-9
PubChem	568
Chem Spider	551
KEGG	C07729
ChEBI	CHEBI:28145
ChEMBL	CHEMBL277497
Jmol-3Dimages	
SMILES [show]	Image 1
InChI [show]	

**Properties**

Molecular formula	C <sub>12</sub> H <sub>8</sub> O
Molar mass	168.19 g/mol
Appearance	White to pale yellow crystalline powder
Melting point	81 - 85 °C
Boiling point	285 °C
Solubility in water	Insoluble

**Hazards**

R-phrases	R51/53
S-phrases	S24/25 S29 S61

**Related compounds**

Related compounds	Furan Benzofuran Dibenzodioxin Dibenzothiophene Carbazole Polyozellin (compound with a kernel with two dibenzofurans that share the same benzene ring)
-------------------	---

✓ (verify) (what is: / ?) ✓ ✗

Except where noted otherwise, data are given for materials in their standard state (at 25 °C, 100 kPa) Info box references

**REFERENCES**

- ❖ ^ McMurry J. (2008). *Organic chemistry (7 ed.)*. Thomson. p. 661. ISBN 0-495-11258-5.
- ❖ ^ Norris, J.F. (1919). "The Manufacture of War Gases in Germany". *Journal of Industrial and Engineering Chemistry* **11** (9): 817. doi:10.1021/ie50117a002.
- ❖ ^ **a b** Weissermel K., Arpe H-J. (2003). *Industrial organic chemistry (4 ed.)*. Weinheim: Wiley-VCH. pp. 145–148. ISBN 978-3-527-30578-0.
- ❖ ^ "Process Economics Program Report 2D". PEP Report. SRI Consulting. February 1985. Retrieved 2009-11-19.
- ❖ ^ **a b c d** Yukelson I.I. (1968). *The technology of basic organic synthesis*. Khimiya. pp. 554–559.
- ❖ ^ Eley, D.D.; Pines, H. and Weisz, P.B., ed. (1967). "Catalytic Oxidation of Olefins". *Advances in catalysis and related subjects* **17**. New York: Academic Press Inc. pp. 156–157.