

# Benzoin

Not to be confused with **Benzoin resin**.

**Benzoin** (/ˈbenzoʊ.n/ or /-ɔɪn/) is an organic compound with the formula PhCH(OH)C(O)Ph. It is a hydroxy ketone attached to two phenyl groups. It appears as off-white crystals, with a light camphor-like odor. Benzoin is synthesized from benzaldehyde in the benzoin condensation. It is chiral and it exists as a pair of enantiomers: (*R*)-benzoin and (*S*)-benzoin.

Benzoin is *not* a constituent of benzoin resin obtained from the benzoin tree (*Styrax*) or tincture of benzoin. The main component in these natural products is benzoic acid.

## 1 History

Benzoin was first reported in 1832 by Justus von Liebig and Friedrich Woehler during their research on oil of bitter almond, which is benzaldehyde with traces of hydrocyanic acid.<sup>[2]</sup> The catalytic synthesis by the benzoin condensation was improved by Nikolay Zinin during his time with Liebig.<sup>[3][4]</sup>

## 2 Uses

The main uses of benzoin are as a precursor to benzil, which is a photoinitiator.<sup>[5]</sup> The conversion proceeds by organic oxidation using copper(II),<sup>[6]</sup> nitric acid, or oxone. In one study, this reaction is carried out with atmospheric oxygen and basic alumina in dichloromethane.<sup>[7]</sup>

## 3 Preparation

Benzoin is prepared from benzaldehyde via the benzoin condensation.<sup>[8]</sup>

## 4 References

- [1] "Benzoin" (PDF). *FischerSci*. FischerSci.
- [2] Wöhler, Liebig; Liebig (1832). "Untersuchungen über das Radikal der Benzoessäure". *Annalen der Pharmacie* **3** (3): 249–282. doi:10.1002/jlac.18320030302.

- [3] N. Zinin (1839). "Beiträge zur Kenntniss einiger Verbindungen aus der Benzoylreihe". *Annalen der Pharmacie* **31** (3): 329–332. doi:10.1002/jlac.18390310312.
- [4] N. Zinin (1840). "Ueber einige Zersetzungsprodukte des Bittermandelöls". *Annalen der Pharmacie* **34** (2): 186–192. doi:10.1002/jlac.18400340205.
- [5] Hardo Siegel, Manfred Eggersdorfer "Ketones" in Ullmann's Encyclopedia of Industrial Chemistry Wiley-VCH, 2002 by Wiley-VCH, Weinheim. doi:10.1002/14356007.a15\_077
- [6] Clarke, H. T.; Dreger.E. E. (1941). "Benzil". *Org. Synth.; Coll. Vol. 1*, p. 87
- [7] Konstantinos Skobridis; Vassiliki Theodorou; Edwin Weber (2006). "A very simple and chemoselective air oxidation of benzoin to benzil using alumina". *Arkivoc*. 06-1798JP: 102–106.
- [8] Clarke, H. T.; Dreger.E. E. (1941). "Benzil". *Org. Synth.; Coll. Vol. 1*, p. 87

## 5 External links

- Benzoin synthesis, *Organic Syntheses*, Coll. Vol. 1, p. 94 (1941); Vol. 1, p. 33 (1921)

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