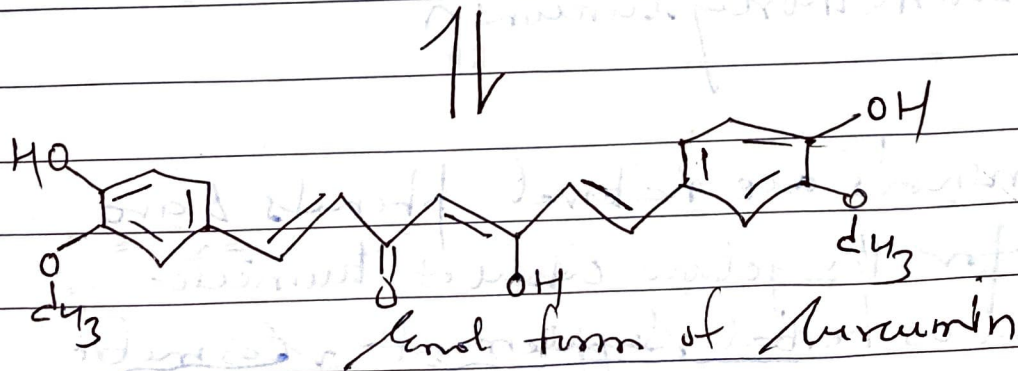
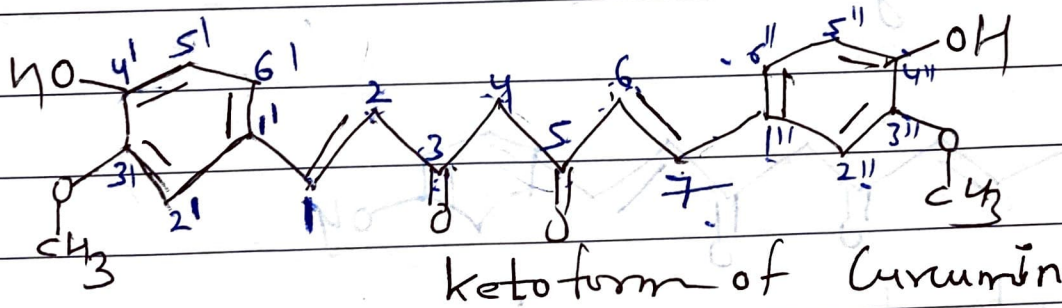


Curcumin (Haldi)

Curcuminoid: Is a linear diarylheptanoid, with molecules such as curcumin or derivatives of curcumin with different chemical groups that have been formed to increase solubility of curcumin & make them suitable for drug formulations.

Curcuminoids are soluble in DMSO, acetone & ethanol but are poorly soluble in lipids. It is possible to increase curcuminoid solubility in aqueous phase with surfactants.



' $C_{21}H_{20}O_6$ ' $\rightarrow$ molecular formula

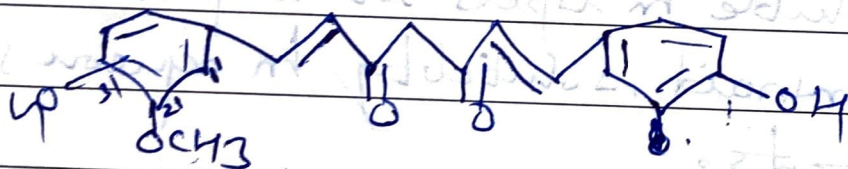
m.p.t $\rightarrow 183^\circ C$

Curcumin

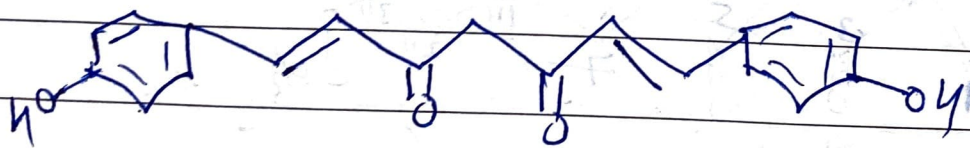
it is the principal curcuminoid of Indian Spice known as turmeric. Turmeric is

the member of the ginger family, Zingiberaceae.

The other two curcuminoids present in turmeric are demethoxycurcumin & bis-demethoxycurcumin.



Demethoxycurcumin



Bisdemethoxycurcumin

The curcuminoids are natural pigments & are responsible for the yellow colour of turmeric. It is useful as herbal supplement, cosmetic ingredient, food flavouring & food colouring. As a food additive, its number is E100.

first isolated by Vogel & pelletier
In 1815, as yellow coloring material
from turmeric

Curcumin structure

$C_{21}H_{20}O_6$

- The structure of curcumin was first identified in 1910. It can exist in various tautomeric forms, including a 1,3-diketone form & two equivalent enol form. The enol form is more stable in the solid phase & in solution.
- Curcumin contains 3 aromatic ring systems, which are polyphenols, are connected by two α, β -unsaturated carbonyl groups.
- The diketone forms stable enols, which can be easily deprotonated & form enolates.
(Michael acceptor)

Medicinal Importance of Curcumin

Turmeric has been used historically as a component of Indian Ayurvedic Medicine since 1900 BC. Research in latter half of 20 Century has identified curcumin as responsible for the most of the biological activity of turmeric.

- 1) Curcumin is pain relieving & is found to be equivalent to ibuprofen for the relief of pain, associated with osteoarthritis.

(Commercial capsules of curcumin contain piperine, a compound found in pepper which aids adsorption of curcumin into blood stream)

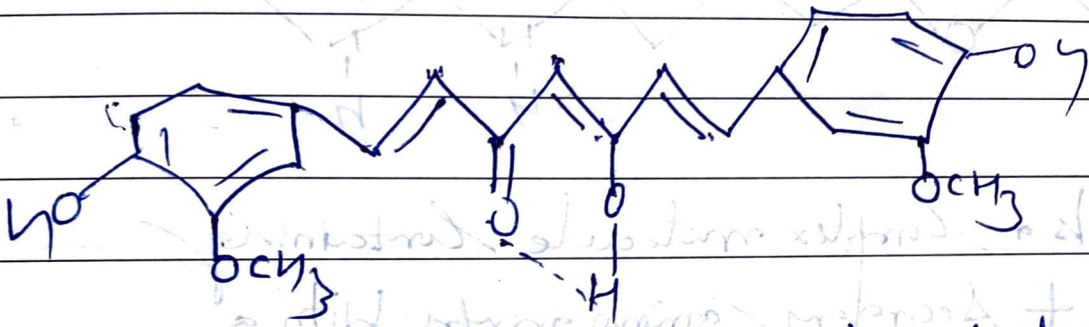
- ② Curcumin has antitumor, antioxidant, antibacterial, antimicrobial (aggregates of protein which loses its activity), anti-ischemic (Restriction in blood supply to tissue causing shortage of O_2 & glucose needed for cellular metabolism), anti-inflammatory properties.
- Also effective in treating malaria, prevention of colorectal cancer & may interfere with replication of Human Immune deficiency Virus (HIV).
 - As antioxidant inhibit lipid peroxidation & oxidative DNA damage.

Curcumin also improves mental functions.

- These all studies are in vitro & animal studies & effectiveness of curcumin has not yet been demonstrated in clinical trials.

- ③ Anti-carcinogenic effects
- Curcumin possesses potential anticancer effects. They arise from its ability to induce apoptosis in cancer cells without cytotoxic effect on healthy cells.

→ Curcumin has recently been shown to have phyto-estrogenic activity that might contribute to activity against breast cancer.



Remembering Via Intramolecular hydrogen bonding