

Santonin

Source:

It is obtained from the dried unexpanded flower heads of *Artemisia cina* (Wormseed); (family: Compositae).

Uses:

1. It is mostly used as an anthelmintic (Nematodes).
2. It is very efficient in its action on round worms (e.g. *Ascaris*) in doses of 60 to 200 mg daily for 3 days; but shows less effect on the thread worms and none on taenia.
3. Due to its toxicity it is now replaced by other anthelmintics.

Structure Determination of Santonin:

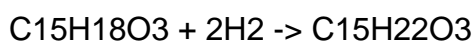
Elemental analysis shows that MF of santonin = $C_{15}H_{18}O_3$.

Santonin belongs to sesquiterpenoid class of terpenoids.

It contains three isoprene units joined head to tail.

$$DBE = x + 1 - y/2 = 16 - 09 = 07 \quad (C_xH_yO_z)$$

Hydrogenation of santonin forms tetrahydrosantonin:



Santonin contains two C=C double bonds (DBE = 02).

Formation of 7-ethyl-1-methylnaphthalene:

Formation of 7-ethyl-1-methylnaphthalene from santonin was achieved by two different ways.

This suggests the presence of 7-ethyl-1-methylnaphthalene (hydrogenated form) skeleton in santonin.

$$DBE = 07$$

Two double bonds (02)

Lactone (02)

Keto (01)

Naphthalene skeleton (02)

Nature of Oxygen:

Presence of lactone group: Santonin dissolves in alkali to form the salt of the hydroxy acid, santonic acid.

This indicates that santonin is a lactone (DBE = 02).

IR spectra shows a carbonyl band at 1770 cm^{-1} characteristic of saturated gamma-lactone.

$\text{C}_{15}\text{H}_{18}\text{O}_3$ (santonin) + NaOH \rightarrow hydroxy acid (santonic acid)