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 = C15H18O3.

Santonin belongs to sesquiterpenoid class of terpenoids.

It contains three isoprene units joined head to tail.

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

Hydrogenation of santonin forms tetrahydrosantonin:

C15H18O3 + H2 (catalyst) -> C15H22O3

C15H18O3 + 2H2 -> C15H22O3

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.

C15H18O3 (santonin) + NaOH -> hydroxy acid (santonic acid)