

Brief review of some clerodanes having C-18 carboxylic group or lactonisation at C-19

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Abstract

This paper presents a review of the structural diversification and pharmacological activities related to clerodane-type diterpene to provide a general understanding of these compounds. The review emphasizes the pharmacological and biological activities: antioxidant, antinociceptive, anti-inflammatory, anticancer, and antimicrobial behaviour. The results presented corroborate the importance of using these diterpenes, isolated from plants, as a source of bioactive substances in a promising strategy to contribute to the development of new therapeutic alternatives.

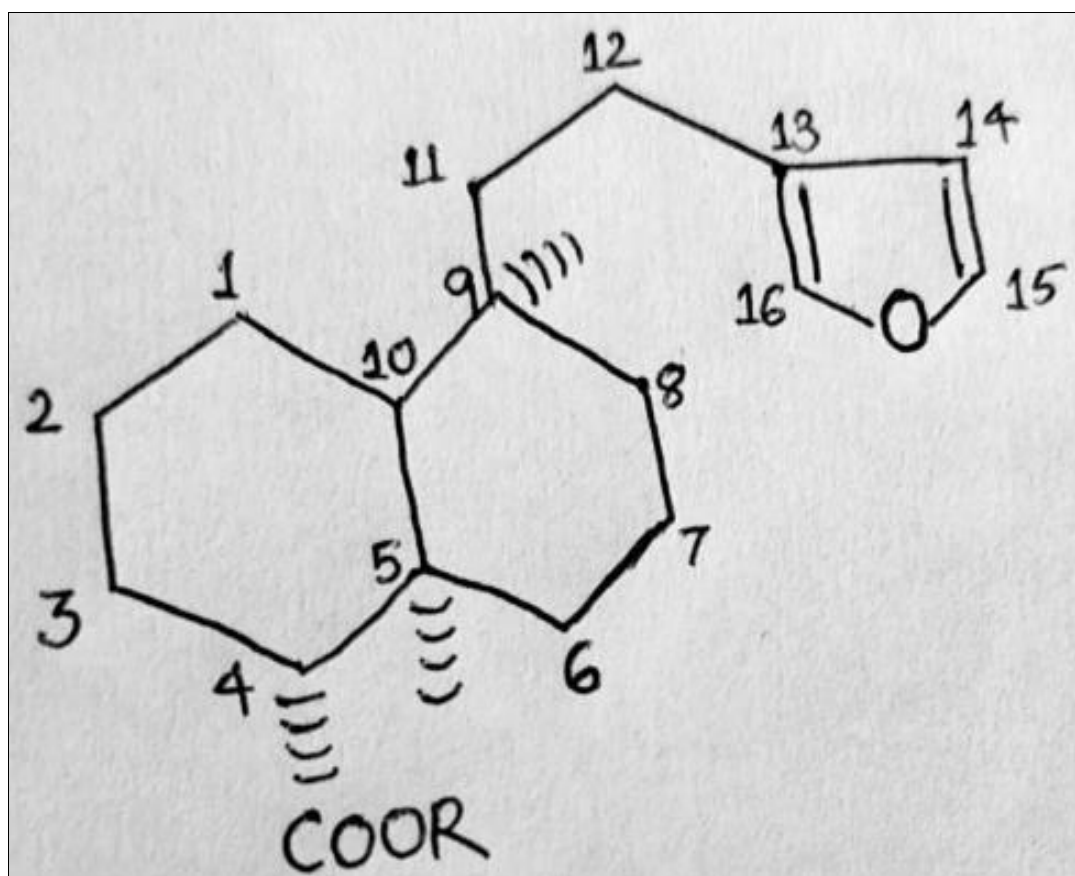
Keywords: pharmacological, carboxylic, anticancer, antioxidant

Introduction

The basic structure of Clerodanes are bicyclic diterpenoids. This skeleton is divided into two fragments i.e.;

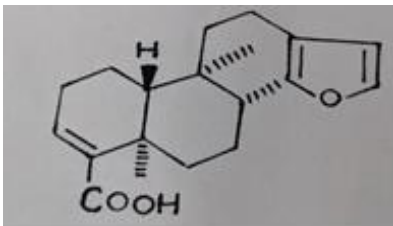
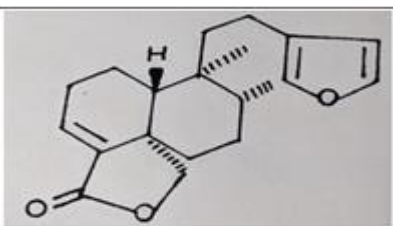
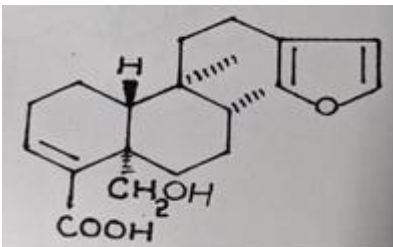
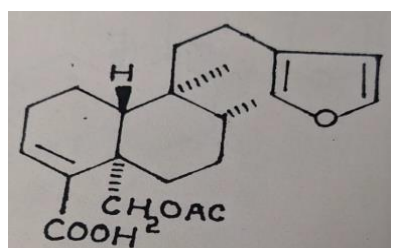
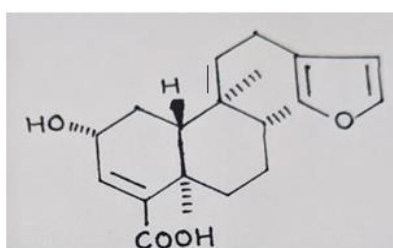
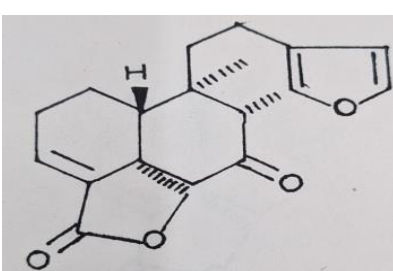
→ a fused ring decalin moiety (C-1-C-10) &

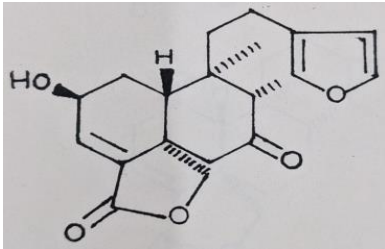
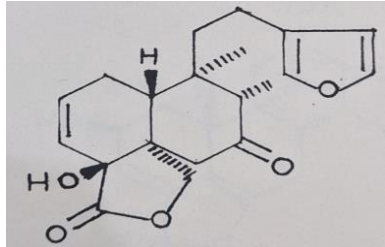
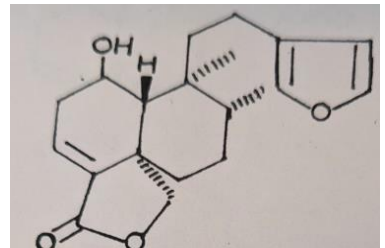
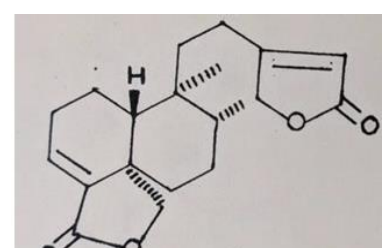
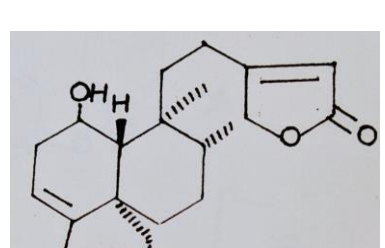
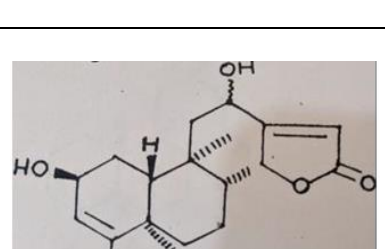
→ Six carbon side chain at C-9 (C-11, C-16), with C-16 attached at C-13 i.e., 3-methyl pentyl.

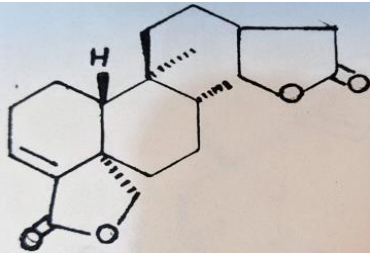
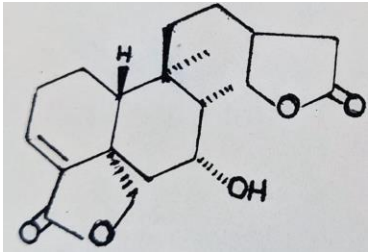
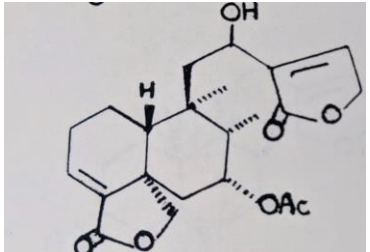
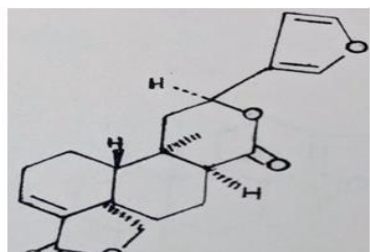
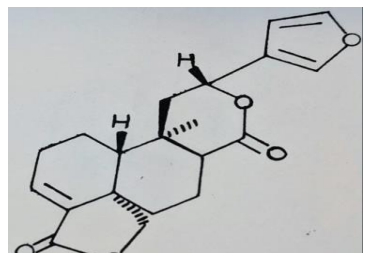
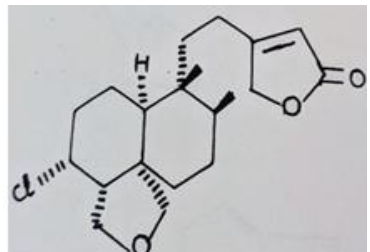


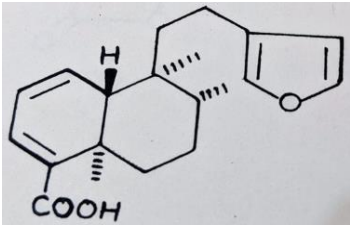
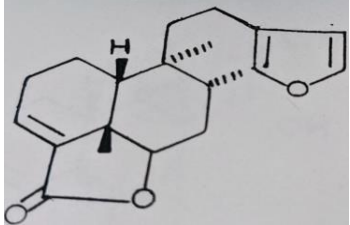
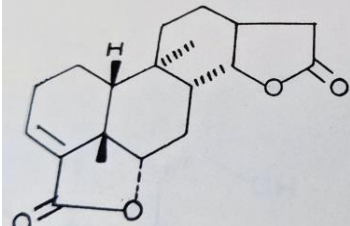
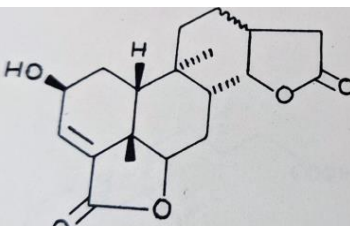
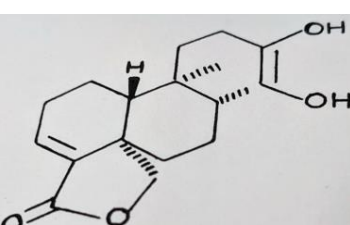
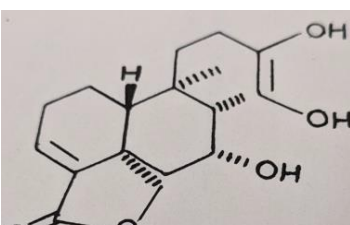
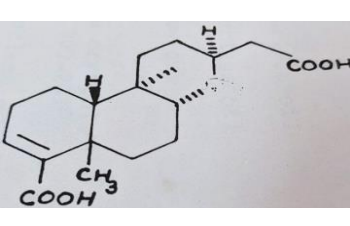
In present review C-18 having carboxylic group ($-\text{COOH}$) with easily lactonize with C-19. These compounds are obtained from natural occurring sources, which we are further reviewing in this review document.

Clerodanes are listed along with their molecular formula, structure, melting point, boiling point; source and references in this review.

S. No.	Name & Molecular Formula	Structure	M.P. & B.P.	Source & References
1	Hardwickiic Acid C ₂₀ H ₂₈ O ₃		144°C	Hardwickia pinnata1 <u>Baccharis macrocarpa</u> 2
2	Hautriwic Acid C ₂₀ H ₂₆ O ₃		120°C	<u>Dodonaea</u> S pp. 3
3	Hautriwaic Acid C ₂₀ H ₂₈ O ₄		Colourless Oil	<u>Baccharis macrocarpa</u> 4,5
4	Hautriwaic Acid Acetate C ₂₂ H ₃₀ O ₅		gum.	Baccharis macrocarpa2
5	2α-Hydroxy Hardwickiic Acid C ₂₀ H ₂₈ O ₄		gum.	Conyza japonica6
6	Bacchasmacranone C ₂₀ H ₂₄ O ₄		126-127°C	<u>Baccharis macrocarpa</u> 4

7.	2-β-Hydroxy- bacchasmaranone C ₂₀ H ₂₄ O ₅		198-199°C	<u>B accha ris macr aei 4</u>
8.	4-β-Hydroxy-iso- bacchasmaranone C ₂₀ H ₂₄ O ₅		178-179°C	<u>B accha ris macr aei 2</u>
9.	Bacchofertin C ₂₀ H ₂₆ O ₄		-	<u>B accha ris confe rata 7</u>
10.	Desoxyarticulin C ₂₀ H ₂₆ O ₄		130-132°C	Baccharis pedicellate ⁸ <u>B accha ris marginaus</u> 8
11.	1-Hydroxy desoxyarticulin C ₂₀ H ₂₆ O ₅		234-235°C	<u>B accha ris</u> <u>rhomboidati s 9</u>
12.	Semiatriin C ₂₀ H ₂₆ O ₆		203-204°C	<u>S alvi a semi atratha 10</u>

13.	Clerodane dilactone C ₂₀ H ₂₈ O ₄		gum.	<u>Baccharis species</u> 5,11,12
14.	7-Hydroxy Clerodanediolactone C ₂₀ H ₂₈ O ₅		203-205°C	<u>Baccharis species</u> 5,11
15.	Kerlinolide C ₂₂ H ₂₈ O ₇		100-102°C	<u>Salvia keerti</u> 13
16.	Bacchotricuneatin A C ₂₀ H ₂₂ O ₅		239-241°C	<u>Baccharis tricuneata</u> 14
17.	Bacchotricuneatin B C ₂₀ H ₂₂ O ₅		192-193°C	<u>Baccharis tricuneata</u> 14
18.	Gutierolide C ₂₀ H ₂₉ O ₃ Cl		-	<u>Gutierrezia dracunculoides</u> 15

19.	Nidoresedic acid C ₂₀ H ₂₆ O ₃		Colourless solid 82-83°C	<u>Nidorella residi folia</u> 16 <u>Koanophyllon adamantum</u> 17 <u>Grangea maderaspatana</u> 6
20.	15,16-Epoxy-cis-cleroda 3,13 (16), 14-trien-19,6 α -olide C ₂₀ H ₂₆ O ₃		142-143°C	<u>Symphopappus itatiayensis</u> 18,19
21.	<u>ent</u> -cis-clerodane C ₂₀ H ₂₆ O ₄		150°C	<u>Symphopappus itatiayensis</u> 18
22.	2- β -Hydroxy <u>ent</u> - <u>cis</u> -clerodane C ₂₀ H ₂₆ O ₅		229-230°C	<u>Symphopappus itatiayensis</u> 18
23.	Portulide B C ₂₀ H ₂₈ O ₃		colourless oil	<u>Portulaca cuneifolia</u> 20
24.	Portulide C C ₂₀ H ₂₈ O ₅		191-192°C	<u>Portulaca cuneifolia</u> 20
25.	Haplociliatic acid C ₂₀ H ₃₂ O ₄		-	<u>Haplopappus cilicatus</u> 21

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