**INTRODUCTION**

Triterpenoids are widely distributed in nature. They have been isolated from many plants in the free state, as saponins or as esters of fatty acids. A few triterpenes have been isolated from animal source e.g. lanosterol, squalene, lambrane. Tetrahymanol (I) has been isolated from ciliated protozoa\(^1\). The triterpenoid antibiotic, fusidic acid (II) has been isolated from a strain of *Fusidium coccinum*\(^2\) and dustanin (III) is a fungal metabolite\(^3\).

![Chemical structures](image-url)
Previously acyclic, tricyclic, tetracyclic and pentacyclic triterpenes were known. It is only very recently that the first bicyclic triterpene, lansic acid (II) has been isolated from <i>Lansium domesticum</i>.^4

The structural complexities of triterpenoids fascinated a member of research groups which led to the tremendous advancement in our knowledge of this class of compounds during the last three decades. Such a rapid advancement has been possible mainly because of the application of improved method of isolation and purification, more specific reagents and use of physical methods like ultra-violet and infra-red spectroscopy,^5,6,7 molecular rotation difference,^8,9 optical rotatory dispersion,^10,11 circular dichroism,^12,13 together with n.m.r. ^14,15 and mass spectrometry in the structure determination of this type of compounds.

It is beyond the scope of the present thesis to give a detailed account of the voluminous work carried out in the field.
of triterpenes and hence only the different types of triterpenes that are now recognized will be very briefly mentioned here.

The pace of progress in the field of triterpenes can perhaps be measured in terms of the new groups of triterpenes discovered during the last decade. Among pentacyclic triterpenes which form the largest family among the triterpenoids, only six different types were recognized till 1956. These are oleanane (V), ursane (VI), lupane (VII), taraxerane (VIII), taraxastane (IX) and friedelane (X).
Not less than twelve new distinct types e.g. glutane (XI), baurennane (XII), multiflorane (XIII), hopane (XIV), isoppane (XV), neohopane (XVI), fernane (XVII), filicane (XVIII), seratane (XIX), adianane (XX), arborane (XXI) and gammacerane (XXII) have now been added to the above list.
Among these groups, those of oleanane series are perhaps the most frequently encountered. Surprisingly enough the members of the closely related ursane series are not so abundant. Nyctanthic acid (XXIII)\textsuperscript{18} isolated from \textit{Nyctanthes arbor-tristis} seeds, is the first example of a triterpene of the oleanane group which has suffered oxidative opening of ring A. Roburic acid (XXIV)\textsuperscript{19} isolated from the exudate from red purple galls of common oak (\textit{Quercus robur}) is the $\alpha$-amyrin analogue of nyctanthic acid and canaric acid (XXV)\textsuperscript{20} is the corresponding member of lupane series.
Two altered types of triterpenes are the ceanothic acid (XXVI) and ceanothenic acid (XXVII), which are of lupeol type but have undergone a ring A contraction.

The difference between hopane (XIV) and isohopane (XV) types of triterpenes lies in the configuration of the isopropyl side chain which was previously considered as α for hopane and β for isohopane. According to the recent concept based mainly on x-ray analysis, the configuration of the isopropyl side chain has been reversed in these two groups of pentacyclic triterpenes. Hopane and isohopane derivatives are biogenetically interesting as examples of the simplest kind of squalene cyclization i.e., cyclization without any rearrangement of all trans squalene in chair-chair-chair-chair-chair conformational sequences.
Until recently the lone member of the tricyclic group of triterpenes was ambrein (XXVIII) isolated from ambergris, but very recently a series of triterpenes of this group have been reported by Dev and collaborators from Ailanthus malabaricum\textsuperscript{22,23}. The structure of one of these triterpenes, malabáricol (XXIX) has been elucidated.

The acyclic triterpene squalene which is considered to be the precursor\textsuperscript{24} of steroids and triterpenoids occurs in shark liver oil.

Among the tetracyclic triterpenes are diacenerin (XXX) and members of the lanostane (XXXI), euphane (XXXII) and tirucallane (XXXIII) series. A group of tetranortriterpenoids have recently been isolated which correspond to ring cleavage products in the euphol series. Typical examples are swietenine (XXXIV)\textsuperscript{25}.
androbin (XXXV) and methyl angolensate (XXXVI), which have the ring B cleaved; nimbin (XXXVII) and galanine (XXXVIII) are compounds with ring C cleaved. If we take into account limonin (XXXIX) in which the ring A is cleaved and gedunin (XI) and khivorin (XII) which have the D ring cleaved, there are now examples within this group of ring cleavage corresponding to each of the rings of euphol.
The tetranor tetracyclic triterpenes of gedunin type are considered as the biogenetic precursors\textsuperscript{32} of the C-20 bitter principles of quassin (XLII) type isolated from the Simaroubaceae family.

The only two members of quinonoid type triterpenes are pristimerin (XLIII) and celestrol (XLIV)\textsuperscript{33}.
It may not be very irrational to foresee the discovery of many triterpenes having novel carbon skeletons in near future as the various possible modes of squalene cyclization, reorganization by methyl migration and secondary oxidative transformations are not yet exhausted.
REFERENCES


