

RESEARCH ARTICLE

SALVIA GENUS: MINOR ISOLATED TRITERPENOID(S)

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ABSTRACT

In this review article, our focus is on the Minor avail triterpenoids, found in *Salvia* species such as *Dammarens*, and other critical structure type triterpenoids. This review article compiled almost 28 triterpenoids from about 15 species of *salvia* which were reported from literature survey till date. This review is an effort to attract natural product chemist to give their contribution on isolation of these critical structure type triterpenoid's for better understanding of natural product chemistry.

KEY WORDS: *Salvia*, Triterpenoids, Species, Review.

INTRODUCTION

Salvia L., is one of the largest genera from Lamiaceae (Labiatae) family which comprises 900 species and is widely distributed in various regions of the world like in America, Europe, Asia. The plants are typically 30-150 cm tall, herbaceous or suffruticose, and perennial, rarely biennial, or annual, with attractive flowers in various colors. *Salvia*, in Latin named "salvare", which means "to heal" so by name its medicinal importance was understand, since from ancient times different *salvia* species were used to cure more than sixty different ailments ranging from aches to epilepsy, and mainly to treat colds, bronchitis, tuberculosis, hemorrhage, and menstrual disorders. In this review article, our focus is on the Minor avail triterpenoids, found in *Salvia* species such as *Dammarens*, and other critical structure type triterpenoids. This review article compiled almost 28 triterpenoids from about 15 species of *salvia* which were reported from literature survey till date. This review is an effort to attract natural product chemist to give their contribution on isolation of these critical structure type triterpenoid's for better understanding of natural product chemistry. (Valverde *et al.*, 1985; Pan *et al.*, 2010; Pedreros *et al.*, 1990; Ahmad *et al.*, 1999; Farimani *et al.*, 2012; Ahmad *et al.*, 1999; Ahmad *et al.*, 2000; Farimani *et al.*, 2011; Topcu *et al.*, 1997; Ulubelen *et al.*, 1994; Kuzma and Wysokinska, 2003; Kolak *et al.*, 2005; Ulubelen *et al.*, 1998; Taylor, 1967; Wollenweber, 1974; Romanova *et al.*, 1972; Gonzalez *et al.*, 1989; Gonzalez *et al.*, 1991; Gonzalez *et al.*, 1971; Fraga *et al.*, 1991; Gonzalez *et al.*, 1972)

MATERIALS AND METHODS

The olean triterpenoid isolated and identified from *Salvia* genus, were searched across the Medline (National Library of Medicine) and Science Direct databases, Pubmed, Google and Google Scholar, cheminfo Wiley, Plos one.

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The data were updated in Jan 2016, using the search terms *Salvia* triterpenoid, critical structure of triterpenoid, phytochemical, chemical constituents, from *Salvia* species as keywords. In addition, the reference lists of all papers identified were thoroughly reviewed.

RESULTS AND DISCUSSION

List of triterpenoid(s) & their Structure(s) from *salvia* genus

This review article compiled almost 28 triterpenoids from 15 species of *salvia* which are listed in **table-I**, with structure no. and species from where these were isolated. In **figure-I** chemical structure of compounds were given. (Valverde *et al.*, 1985; Pan *et al.*, 2010; Pedreros *et al.*, 1990; Ahmad *et al.*, 1999; Farimani *et al.*, 2012; Ahmad *et al.*, 1999; Ahmad *et al.*, 2000; Farimani *et al.*, 2011; Topcu *et al.*, 1997; Ulubelen *et al.*, 1994; Kuzma and Wysokinska, 2003; Kolak *et al.*, 2005; Ulubelen *et al.*, 1998; Taylor, 1967; Wollenweber, 1974; Romanova *et al.*, 1972; Gonzalez *et al.*, 1989; Gonzalez *et al.*, 1991; Gonzalez *et al.*, 1971; Fraga *et al.*, 1991; Gonzalez *et al.*, 1972)

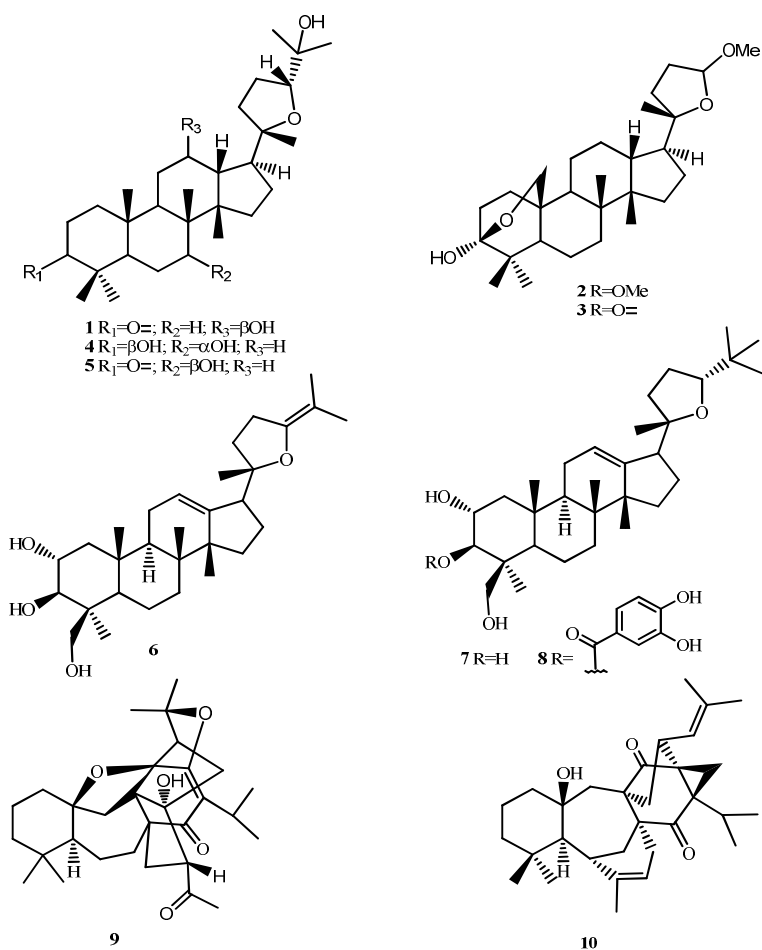
Conclusions

The present review deals with up to date literature on less isolated triterpenoid from *Salvia* genus plant extracts. We are quite optimistic that this review article will surely stimulate present day researcher to undertake more systematic research work on this important genus for isolation of these critical and less avail triterpenoids, other significant biological activities of the plants.

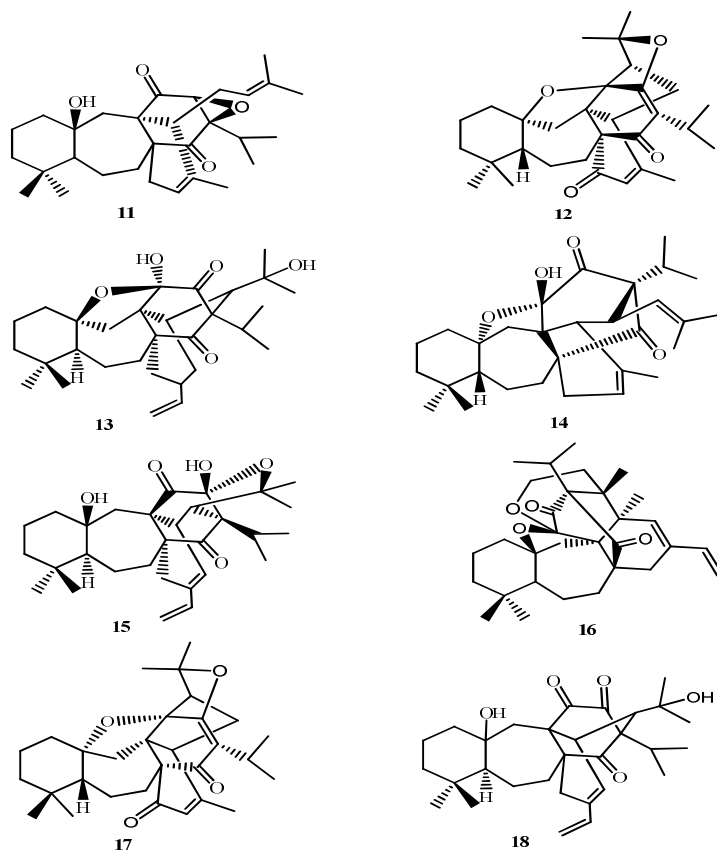
Authors' Statements

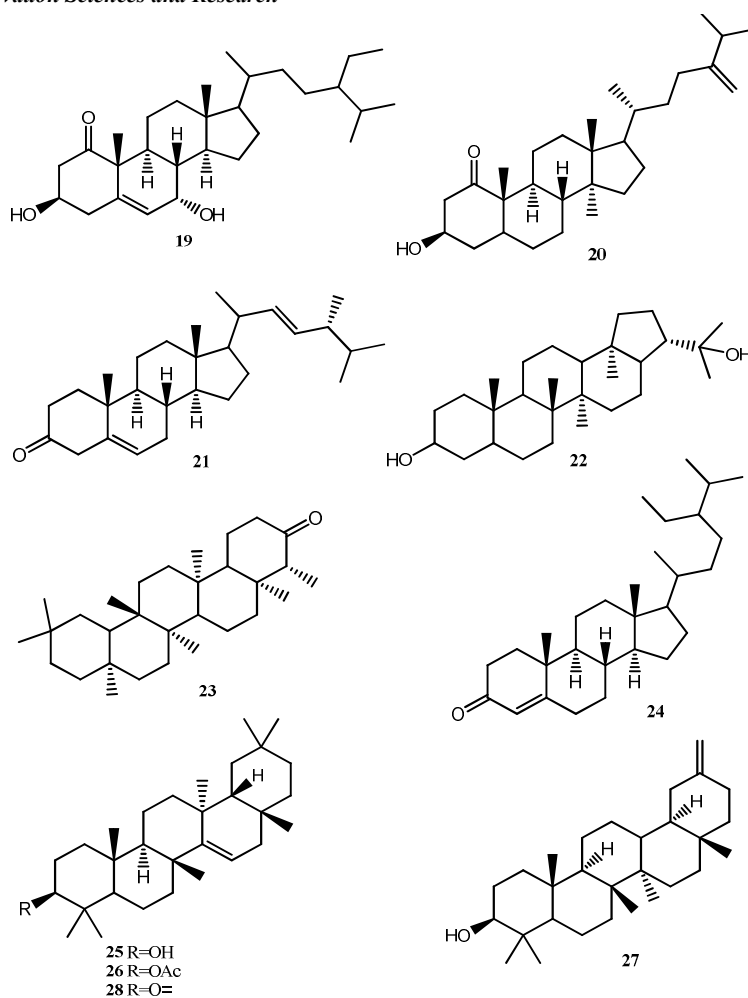
Competing Interests

The authors declare no conflict of interest.



Structure of olean triterpenoids Figure 1.



Table 1. List of Minor triterpenoids from *salvia*

Dammaranes	Species	
20 <i>S</i> ,24 <i>R</i> -epoxydammar-12,25-diol-3-one (1)	<i>S. bicolor</i>	[1]
Amblyol (2)	<i>S. aspera</i> M. et G.	[2]
Amblyone (3)	<i>S. aspera</i> M. et G.	[2]
Salvilymitol (4)	<i>S. hierosolymitana</i> Boiss.	[3]
Salvilymitone (5)	<i>S. hierosolymitana</i> Boiss.	[3]
Santolin B (6)	<i>S. santolinifolia</i>	[4]
Santolin A (7)	<i>S. santolinifolia</i>	[4]
Santolin C (8)	<i>S. santolinifolia</i>	[4]
Critical triterpenoid(s)		
Hydrangenone (9)	<i>S. hydrangea</i>	5
Isoperadione (10)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Peradione (11)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Perovskone (12)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Salvadiol (13)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Salvadione-A (14)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Salvadione-B (15)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Salvadione C (16)	<i>S. hydrangea</i> DC. ex Benth.	[8]
Perovskone B (17)	<i>S. hydrangea</i> DC. ex Benth.	[8]
Salvatrione (18)	<i>S. bucharica</i> M. Pop.	[4, 6, 7]
Miscellaneous triterpenoid(s)		
1-oxo-7 <i>α</i> -hydroxystosterol (19)	<i>S. glutinosa</i> L.	[9]
24-methylenecycloartanol (20)	<i>S. nemorosa</i> L.	[10, 11, 112]
Brassicasterone (21)	<i>S. multicaulis</i> Vahl.	[13]
Friedelin (22)	<i>S. nilotica</i> Juss. ex Jacq. <i>S. plebeia</i> R. Br. <i>S. viridis</i> L.	[14, 15, 16]
Hopanone (23)	<i>S. multicaulis</i> Vahl.	[13]
Stigmast-4-en-3-one (24)	<i>S. amplexicaulis</i> Lam.	[4, 6, 7]
taraxerol (25)	<i>S. palaefolia</i> H. B. K. β	17, 18
taraxerol acetate (26)	<i>S. broussonetii</i> Benth.	19, 20, 21
taraxasterol (27)	<i>S. pomifera</i> L.	[4, 7, 8]
taraxerone (28)	<i>S. palaefolia</i> H. B. K.	17, 18

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