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Review Article

A REVIEW ON *TEPHROSIA* GENUS

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ABSTRACT

The genus *Tephrosia* belonging to the Leguminosae family, is a large pantropical genus of more than 350 species, many of which have important traditional medicinal uses for the treatment of large number of diseases.Wild Indigo or Purple *Tephrosia* or fish poison occurs throughout the Indian subcontinent. The plants of this genus are widely distributed in many tropical and subtropical countries of the world. This review outlines the chemical studies on different species, identification of some phytochemicals like flavonoids, rotenoids etc., because of which the phytochemicals apart from possessing medicinal uses also find their use in agriculture.This study also gives an overview ofvarious pharmacological activities like antioxidant, antimicrobial, anticancer, antiplasmodial, anti-inflammatory, larvicidal and toxicity studies of extracts and fractions.

Keywords: *Tephrosia*, phytochemicals, flavonoids, rotenoids, anti-inflammatory, anticancer.

INTRODUCTION

Indigenous and traditional medicines make extensive use of natural products and derivatives of natural products and provide more than half of all medicines consumed today throughout the world. Ethnopharmacology plays an important role in the discovery of new biologically active compounds. According to World Health Organization (WHO) more than 80% of the world's population uses plants for the treatment of their diseases (Calixto *et al*., 1998; Duraipandiyan *et al*., 2006). The genus Tephrosia, belonging to the Leguminosae family, is a large pantropical genus of more than 350 species, many of which have important traditional uses[1,2].

TAXONOMICAL CLASSIFICATION

Kingdom: Plantae
Division: Tracheophytes
Clade: Eudicots
Clade: Rosids
Order: Fabales
Family: Fabaceae
Subfamily: Faboideae
Genus: *Tephrosia*

Species under this genus count to be approximately 400, of which most of them are poisonous because of the high concentration of Rotenone. Several *Tephrosia* species have been studied in connection with the use of rotenone as an insecticide and pesticide.

The plants in this genus are widely distributed in tropical, sub-tropical and arid regions of the world (Willis, 1973; *et al*- Phytopharmacology 2013, 4(3), 598-637 Touqeer *et al*. © 2013 Inforesights Publishing UK 599 Zahrani, 2007).

The plants are prostate or erect herbs or in the form of soft or woody shrubs (Hacker, 1990). Many plants from this genus have been used traditionally for the treatment of diseases like rheumatic pains, syphilis, dropsy, stomach ache, diarrhea, asthma, abortifacient, respiratory disorders, laxative, diuretic, and inflammation etc (Qureshi *et al.,* 2010; Dzenda *et al.,* 2007).

The main purpose of this review is to provide a comprehensive and up-to-date knowledge of the pharmacological and phytochemical research work performed on the genus *Tephrosia.* The plants of this genus have a large potential for study of its activities and chemical constituents for important leads.

Chemical constituents from plants of genus *Tephrosia*

A great variety of plants belonging to genus *Tephrosia* have been studied for their chemical constituents and pharmacological activities. Phytochemically much more number of species have been studied than those studied pharmacologically. Different classes of organic compounds have been isolated of which some have been tested for their biological activities and some still unknown for their effect. It should be noted that flavonoids are the most abundantly isolated and identified compounds in the genus. Phytochemical investigations have revealed the presence of glucosides, sterols, rotenoids, isoflavones, chalcones, flavanones, flavanols, and prenylated flavonoids[1–9] of chemotaxonomic importance in the genus[10].

Table 1: Chemical constituents from plants of genus *Tephrosia*

Species	Class	Compound	Reference
Tephorsia abbottiate	Flavonoid	Abbotin	Gomez-garibay *etal.,* 1986
Tephrosia aequilata	Flavanoid	Tephrobotin Obovatin methyl ether (E)- PracansoneA Demethylpracansone B 3,4,8,9-dimetylenedioxypterocarpan	Muiva2012 Tarus *et al.,*2002 Atilaw *et al*., 2017
Tephrosia apollinea	Flavanoids	(-)semiglabrin	
		(-)Pseudosemiglabrin (+)-Glabratephrin Appolline (7-methoxy-8-[3"-(2",5"-dihyro-5dimethyl-2"-oxyfuryl)]-flavone Lanceolation-A (+)-apollineanin (-)-semiglabrinol	Hisham *et al..,*2006
	Flavonoid	(−)-Semiglabrin, (−)-Pseudosemiglabrin, (+)-Glabratephrinol, (+)-Glabratephrin, Appollinine (7-methoxy-8- [3″-(2″,5″-dihydro-5″,5″-dimethyl-2″-oxofuryl)]-flavone, Lanceolatin-A, Semiglabrinol, Tephroapollin C, D, E, F, G.	(Ahmed Hassan *et al*., 2014)
Tephrosia barbigeria	Flavonoid	Isopongaflavone Barbigerone	Villain,1980 Villain,1983 Touqeer *et al*., 2013
Tephrosia bibwilli	Flavanoid	(-)-6aR;11aR-maackiain (-)6aR;11aR-4methoxy-maackiain Tephrocaprin Acanthocarpan	Ingham and markham 1980
Tephrosia bracteolata	Flavanoids	Isopongaflavone Trans-tephrostachin Obovatin Trans anhydrotephrostachin	Khalid and waterman, 1981 Babayemi and Bamikole, 2006.
Tephrosia calophylla	Coumestan Flavanoid	7-0-methylglabranin Kaempferol3-o-β-D-glucopyranoside(2S)-5-hydroxy-7,4'-di-O-(gamma,gamma-dimethylallyl) flavanone 6-hydroxy-E-3-(2,5-dimethoxy benzylidine)-2'5'-dimethoxyflavone tephrowatsin C Afrormosin Kaempferol3-o-β-D-glucopyranoside Tephcalostan, Tephcalostan B, C, D 7-0-methylglabranin, CalaphioneA kaempferol 3-O-β-D-glucopyranoside (2S)-5-hydroxy-7,4'-di-O- (gamma, gamma dimethylallyl)flavanone, 6-Hydroxy-E-3-(2,5-	Hari Kishore *et al.,*2003 Reddy *et al.,*2009

		dimethoxybenzylidine)-2',5'-dimethoxyflavanone, Kaempferol 3-O- β -D-glucopyranoside, Tephrowatsin C, Afrormosin,	Devi *et al*., 2017
	Benzil	Calophione A	
		1-(6'-hydroxy-1'3'-benzoidioxol-5'-yl)-2-(6"-hydroxy-2"-isopropenyl-2",3"-dihydro-benzofuran-5"-yl)-ethane-1,2-dione	Ganapathy *et al.,*2009b
	Coumestan	Tephcalostan B Tephcalostan C Tephcalostan D	
Tephrosia candida	Flavanoids	Candidol Candidone Ovalichalcone Dehydrorotenone Candidone Pongachin Flemichapparin-B	Dutt and chibber,1983 Roy *et al.,*1986 Roy *et al.,* 1987
	Sterol Acid Rotenoid	β-sitsterol Caffeic acid 12a-hydroxyrotenone Tephrosin Amorpholone 6a,12a,-dehydodeguelin 12a-hydroxy-β-toxicarol Deguelin α-Toxicarol 6a,12a-dehydrodeguelin 12a-hydroxy-α-toxicarol, 6a 12a-dehydro-α-toxicarol 6a,12a-dehydro-β-toxicarol dehydrodihydrorotenone Roy *et al*., 1987 tephrospirolactone tephrospiroketone 1 tephrospirolactone II	Parmar *et al.,* 1988 Parmar *et al.,* 1988 Kole *et al.,* 1992 Parmar *et al.,* 1988 Andrei *et al.,* 1997 Roy *et al.,* 1987 Andrei *et al.,* 2002
	Sesquiterepenes	1β-Hydroxy-6,7α-dihydroxyeudesm-4(15)-ene	
	Flavonoid	Candidin, 6-Hydroxykaempferol 4'-methyl ether, Candidol, Tephrocandidin A, Tephrocandidin B, Candidone, Ovalichalcone, Dehydrorotenone, 12 α-Hydroxy-β-toxicarol, Candirone, Candidachalcone, Tephrone, Tephrospirolactone, Tephrospiroketone I, II	(Hegazy *et al*., 2011)
Tephrosia cinerea	Flavonoids And Phenolics	Demethylapollinin 7-O-β-D-glucopyranoside, Apollinin, Glabatephrin Semiglabrin, Pseudosemiglabrin, Cineroside-A, 3′-O-methylquercetin, 3,7-di-O-rhamnopyranoside, Kaempferol, 3,7-di-O-rhamnopyranoside, Quercetin, 3,7-di-O-rhamnopyranoside, 3-O-β-glucopyranosylquercetin 7-O-β-D-glucopyranoside Quercetin 3-O-β-glucopyronoside, Quercetin 3-O-α-rhamnopyranoside, Kaempferol, 7-O-methylquercetin 3-O-β-xylopyranosylquercetin 7-O-α-Rhamnopyranoside, 3-O-α-arabinopyranosylquercetin 7-O-α- rhamnopyranoside, 5-O-methylgenistein 7-O-β-D-glucopyranoside, Quercetin 3-O-β-glucopyronoside, Quercetin 3-O-α-rhamnopyranoside.	Maldini *et al.,* 2011
	Sesquiterpene	caryophyllene oxide, Teclenone B (1β,7R*)-opposit-4(15)-ene-1,7-diol,	Arriaga *et al.,* 2008

	Lignan	Pinoresinol	
Tephrosia crassifolia	Flavonoid	Crassifolin Crassichalcone	Gómez-Garibay *et al*., 1999
Tephrosia egreria	Terpenoid	geijerene pregeijerene	Arriaga *et al*., 2005
	Rotenoid	Dehydrorotenone.	Arriaga *et al*., 2009b
		isopongaflavone tephrosin 8-(3,3-dimethylallyl)-5,7- dimethoxy flavanone obovatin methyl ether warangalone elatadihydrochalcone obovatachalcone (S)-elatadihydrochalcone obovatachalcone obovatin obovatin methyl ether	Bentley *et al*., 1987 Lwande *et al*., 1985a Muiva, 2012 Muiva *et al*., 2009 Muiva *et al*., 2009; Muiva,2012 Muiva *et al*., 2009; Muiva, 2012
	Pterocarpan	(+)-pisatin	Lwande *et al*., 1985a
		(-)- maackiain	
	Rotenoid	Deguelin	Muiva *et al*., 2009; Muiva,2012
		rotenone	Muiva, 2012
Tephrosia elata	Flavonoid	Isopongaflavone, Tephrosin, 8-(3,3-dimethylallyl)-5,7- dimethoxy flavanone, Obovatin methyl ether, Elatadihydrochalcone, Obovatachalcone, (S)- elatadihydrochalcone	(Muiva *et al*., 2009)
Tephrosia elongata	Flavonoid	Elongatin	Smalberger *et al*., 1975
Tephrosia emoroides	Flavonoid	Emoroidenone Emoroidone Emoroidocarpan 5-methoxyisolonchocarpin	Machocho *et al*., 1995
	Flavene	Hildegardtene	
Tephrosia falciformis	Flavonoid	Falciformin, 7-hydroxy-8-(γ,γ-dimethylallyl)flavanone	Khan *et al*., 1986
	Alcohol	Triacontanol	Khan *et al*., 1984
Tephrosia fulvinervis	Flavonoid	Fulvinervin C Fulvinervin A Fulvinervin B	Venkataratnam *et al*., 1986 Venkataratnam *et al*., 1986; Venkata *et al*., 1985b
	Rotenoid	α-toxicarol Deguelin Munduserone Cis-12 α-hydroxymunduserone,	Dagne *et al*., 1989
	Pterocarpan	(-)-Maackiain	
Tephrosia hamiltonii	Flavonoid	5,7-Dimethoxy-8-(2, 3-epoxy-3-methylbutyl)-flavanone, Pongamol, Flemichapparin-B, Flemichapparin-C.	Falak and Shoeb 1987 Rajani and Sarma, 1988
	Coumestone	2-methoxy-3,9-dihydroxy coumestone	
Tephrosia hildebrandtii	Pterocarpan	Hildecarpidin Hildecarpin	Lwande *et al*., 1987 Lwande *et al*., 1985b
	Flavonoid	Methylhildardtol B, Hildgardtol B, Hildgardtene, Methylhildgardtol-A, Hildgardtol A Trans-Tephrostachin Trans-Anhydrotephrostachin	Lwande *et al*., 1986
Tephrosia hookeriana	Flavonoid	Hookerianin	Prabhakar *et al*., 1996; Vanangamudi *et al*., 1997b
		(−)semiglabrin Lanceolatin A. Tephrorianin Rutin	Vanangamudi *et al*., 1997b
Tephrosia lanceolata	Flavonoid	Rutin	Rangaswami and Rao,1995
Tephrosia leiocarpa	Flavonoid	Tephroleocarpin A Tephroleocarpin B	Quijano and Rios, 1991 Gomez-Garibay *et al.,* 1991

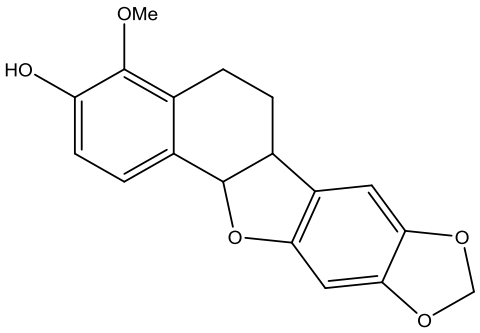
Tephrosia lupinifolia	Flavonoid	Lupinifolinol, Lupinifolinol triacetate, Lupinifolin, 5,4'-O,O-dimethyl-lupinifolin, Lupinifolin diacetate	Smalberger *et al*., 1974
Tephrosia madrensis	Flavonoid	5,7-dimethoxy-8-prenylflavan	Gomez *et al*., 1983
Tephrosia major	Flavonoid Sterol Triterpene	2',6'-dihydroxy-3'-prenyl-4'-methoxy-β-hydroxychalcone, Quercetin, β-Sitosterol, Stigmasterol Lupeol	Gomez-Garibay *et al*., 2002.
Tephroia maxima	Flavonoid	Maxima Flavanone A Maxima Isoflavone A Maxima Isoflavone B Maxima Isoflavone C Maxima Isoflavone D Maxima Isoflavone E Maxima Isoflavone F Maxima Isoflavone G Maxima Isoflavone H Maxima Isoflavone J Maxima Isoflavone T	Venkata *et al*., 1994 Rao *et al*., 1984a Venkata and Sree Rama,1985a Murthy and Rao, 1985; Sandhya *et al.,* 2011.
Tephrosia multijuga	Flavonoid	Multijuginol Multijugin	Vleggaar *et al*., 1975
Tephrosia nubica	Flavonoidal Glycoside	Kaempferol 3,7-dirhamnoside	Sharaby and Ammar, 1997
		Quercetin 3-galactoside 7-rhamnoside Quercetin 3,7-dirhamnoside	
	Flavonoid	Semiglabrin Pseudosemiglabrin Apollinine Lanceolatin A	
	Rotenoid	Rotenones Deguelin	
Tephrosia pentaphylla	Rotenoid	Dihydrostemonal, 9-Demethyldihydrostemonal, 6-Acetoxydihydrostemonal, Villosin, Sumatrol, Rotenone, cis-12α-hydroxyrotenone, 6-hydroxyrotenone α-Toxicarol	Dagne *et al*., 1989
	Flavonoid	Obovatin	
Tephrosia polyphylla	Flavonoid	4′-Demethyltoxicarol isoflavone, Toxicarol isoflavone, 7-Methylglabranin.	Dagne *et al*., 1992
Tephrosia procumbens	Rotenoid	Rotenone, Sumatrol	Venkataratnam *et al*., 1987
	β -diketone	Praecansone A Praecansone B	
	Flavonoid	Obovatin, 7-ethoxy-3,3′,4′-trihydroxyflavone; Fisetin7-ethyl ether, 7,4′-dihydroxy-3′-methoxyisoflavone	
Tephrosia pumila	Flavonoid	Pumilaisoflavone A Pumilaisoflavone B Pumilaisoflavone C PumilaisoflavoneD Pumilanol Tephrinone β-hydroxychalcone Praecansone-A.	Yenesew *et al*., 1989 Ganapaty *et al*., 2008b Dagne *et al*., 1988
	Rotenoid Triterpene Sterol	Rotenone Lupeol Stigmasterol	Ganapaty *et al*., 2008b
Tephrosia purpurea	Flavonoid	Tephrosin Pongaglabol Semiglabrin Purpuritenin Purpureamethide Pongamol	Ahmad *et al*., 1999 Sinha *et al*., 1982

		Karanjin Lanceolatin B	Sinha *et al*., 1982; Chang *et al*., 1997
		(+)-Tephrorins A (+)-Tephrorins B (+)-Tephrosone Purpurenone (+)-Purpurin Quercetin	Chang *et al*., 2000 Rao and Raju, 1984b and Raju, 1984b; Chang *et al*., 1997
		(−)Purpurin Dehydroisoderricin (−)-Maackiain Pseudosemiglabrin (−)-Semiglabrin Terpurinflavone Pongamol	Juma *et al*., 2011 Parmar *et al*., 1989; Chang *et al*., 1997
		(-)-Isolonchocarpin	Rao and Raju, 1979
		7,4‘-dihydroxy-3‘,5‘-dimethoxyisoflavone	Chang *et al*., 1997
		(+)-Tephropurpurin	
		(−)-3-hydroxy-4-methoxy-8,9-methylenedioxypterocarpan (−)-Medicarpin 3‘-Methoxydaidzein	
		Desmoxyphyllin B, 3,9-dihydroxy-8-methoxycoumestan Isoglabratephrin Tephropurpulin A Quercitin Rutin	Hegazy *et al*., 2009 Jain *et al*., 2009
	Ester	Stigmast-5, 22-dien-34, 21diol-34, 21-Dihexadecanoate	Sharma *et al*., 2008
	Neoflavonoid Glycoside Sterol	Serratin 7-O-[β-D-glucopyranosyl-(1→4)-O-β-D-galoctopyranoside β-sitosterol	Saxena and Choubey, 1997 Chang *et al*., 1997; Parmar *et al*., 1989
Tephrosia quercetorum	Acid flavonoid	Spinasterol-A Ursolic Acid Quercetols A Quercetols B Quercetols C	Gómez-Garibay *et al*., 1988
Tephrosia semiglabra	Flavonoid	Glabratephrin Semiglabrinol Semiglabrin	Vleggaar *et al*., 1978 Smalberger *et al*., 1973
Tephrosia sinapou	Flavonoid	Toxicarine 7-O-methylglabranine Tephrowatsin A Quercetol B Flamichapparin B	Martinez *et al*., 2012
	Coumarin Rotenoid	2,3-dihydro-p-coumaric acid Tephrosin Rotenolone Deguelin 6-oxo-6a,12a-dehydrodeguelin 6-oxo-6a,12a-dehydro-α-Toxicarol 6α,12α-dehydrodeguelin Rotenonone Villosone	
Tephrosia spinosa	Flavonoid	Spinoflavanones A Spinoflavanones B Spinochalcone A Spinochalcone B Spinochalcone C Fulvinervin A 3′,5′-diisopentenyl-2′,4′-dihydroxychalcone Tephrospinosin Spinochalcones A Spinochalcones B Flemistrictin A	Rao and Prasad, 1992 Sharma and Rao, 1992 Rao and Prasad, 1992
	Flavonol glycoside	Eupalitin 3-O-b-D-galactopyranoside	Vanangamudi *et al*., 1997a; Chakradhar *et al*.,2005
Tephrosia tepicana	Flavonoid	Tepicanol A	Gómez-Garibay *et al*., 1997

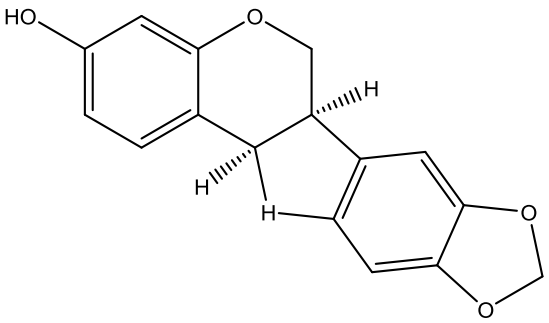
Tephrosia tinctoria	Flavonoid	5,7-di-O-prenylbiochanin A 7-O-methylglabranin Tephrowatsin C Flemichapparin B 2-hydroxy tephrosin tephrinone Lupinifolin 7-O-methyl glabranin	Khalivulla *et al*., 2008 Ganapaty *et al*., 2009 Ganapaty *et al*., 2010
	Rotenoid	Rotenone Dehydrodeguelin	Lakshmi *et al*., 2010; Reddy *et al*., 2014
Tephrosia toxicaria	Sterol Acid Flavonoid	Stigmasterol Betulinic Acid Iso-Obovatin Obovatin	Ribeiro *et al*., 2006
		6a,12a-dehydro-α-toxicarol α-toxicarol Toxicarol (2S)-5-hydroxy-7-methoxy-8-[(E)-3-oxo-1-butenyl]flavanone Isoliquiritigenin Genistein Chrysoeriol Sumatrol	Clark, 1930 Jang *et al*., 2003
	Rotenoid	4‘,5‘-dihydro-11,5‘-dihydroxy-4‘-Methoxytephrosin 11-Hydroxytephrosin	Vasconcelos *et al*., 2009
	Coumarin Triterpene Ester	Marmesin Lupenone Benzyl Benzoate Benzyl trans-cinnamate	
Tephrosia tunicata	Flavonoid	Tunicatachalcone	Andrei *et al*., 2000
Tephrosia uniflora	Flavonoid	Elongatin	Abreu and Luis, 1996
	Rotenoid	12 α-hydroxyrotenone	
	Sterol	β-sitosterol	
		Stigmasterol	
Tephrosia viciodes	Flavonoid	Enantiomultijugin	Gómez-Garibay *et al*., 1992
Tephrosia villosa	Flavonoid	(2S)-5,4′-dihydroxy-7-O-[(E)-3,7-dimethyl-2,6-octadienyl]flavanone, (2S)-5,4′-dihydroxy-7-O-[(E)-3,7-dimethyl-2,6-octa-dienyl]-8-C-[(E)-3,7-dimethyl-2,6-octadienyl]flavanone, 7-O-methylglabranin, Tephcalostan, 12α-dehydro-6-hydroxysumatrol, 7-Methylglabranin Villosin Villosone Villol Villinol Tephrinone	Rao and Srimanarayana,1981 Madhusudhana *et al*., 2010
	Triterpenoid	Lupenone	Prashant and Krupadanam 1993
	Triterpene	Lupeol	Ganapaty *et al*., 2008a
	Sterol	Stigmasterol	
	Rotenoid	12a-dehydro-6-hydroxysumatrol	Prashant and Krupadanam 1993
		Rotenone Dehydrorotenone 6a,12a-dehydro,2,3,6- trimethoxy-8-(3’,3’-dimethylallyl)-9,11dihydroxy rotenone 12a-hydroxy toxicarol	Ganapaty *et al*., 2008a Prashant and Krupadanam, 1993
Tephrosia viridiflora	Flavonoids	Viridiflorin	Gómez *et al*., 1985
Tephrosia vogelii	Sesquiterpene Lignan Rotenoid	(1β,6α,10α)-guai-4(15)-ene-6,7,10-triol , (+)-lariciresinol 9′-stearate Deguelin	Wei *et al*., 2009 alume *et al*., 2012; Delfel *et al*., 1970; Gills,1992
		Tephrosin	
		Toxiconol	
		Tephrosal	
	Flavonoid	Quercitin	

		Pyranosyl(7→6)-β-galactopyranoside-7-O-α-rhamnopyranoside, Pyranosyl(1→2) [α-rhamnopyranosyl(1→6)-β-galactopyranoside, Rhamnopyranosyl (1→2)[(3-O-E-feruloyl)-α-rhamnopyranosyl(1→6)]-β-galacto-pyranosides, (2R,3R)-3-hydroxy-5- methoxy-6'',6''-dimethylpyrano-[2'',3'':7,8]flavanone, (2S)-4'-hydroxy-5-methoxy-6'',6''-dimethylpyrano[2'',3'':7,8]-Flavanone, (2S)-7-hydroxy-5-methoxy-8-prenylflavanone, (2S)-5-methoxy-6'',6''-dimethy1-4'',5''-dihydrocyclopropa[4'',5'']furano[2'',3'':7,8]flavanone, (2S)-5,7-dimethoxy-8-(3-methylbut-1,3-dienyl)flavanone.	
Tephrosia watsoniana	Flavonoid	Tephrowatsin A	Gómez *et al*., 1985
		Tephrowatsin B Tephrowatsin C Tephrowatsin D Tephrowatsin E	
Tephrosia woodii	Flavonoid	Oaxacacin Mixtecacin	Dominguez *et al*.,1983 Chen *et al*., 2014

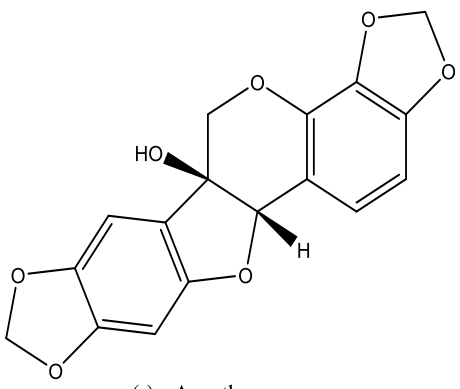
Chemical structures of some isolated compounds



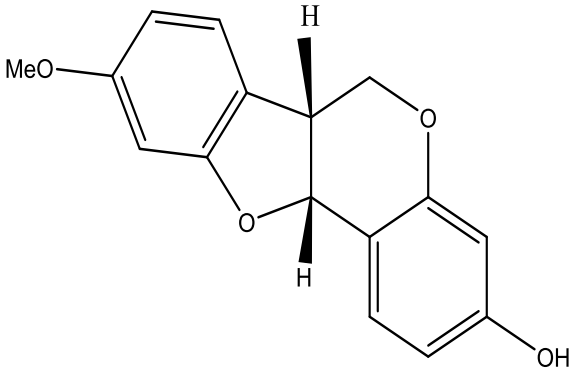
1. (-)- 6aR 11aR 4 Methoxy Maackiaan



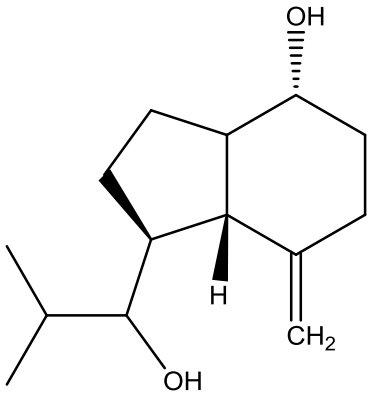
2. (-)- 6aR 11aR Maackiain



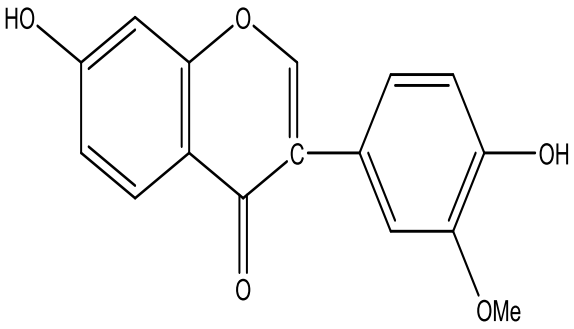
3. (-)- Acanthocarpan



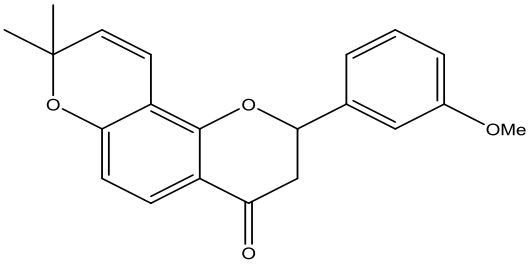
4. (-)- Medicarpin



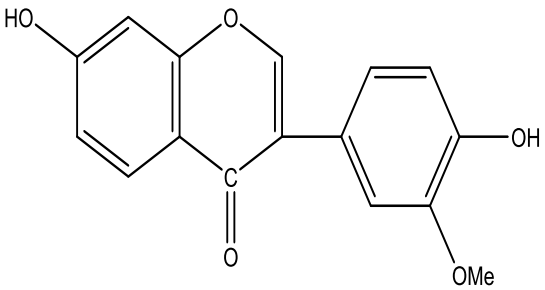
5. (1B, 7R)- opposit-4(15)-ene-1,7-diol



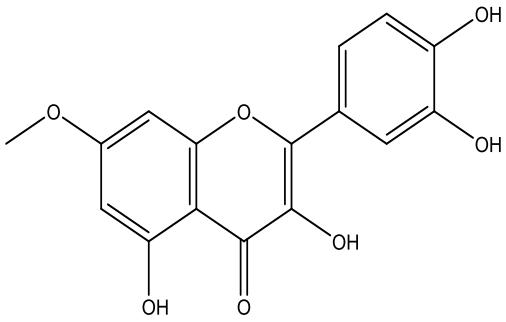
6. 3 methoxy daidzein



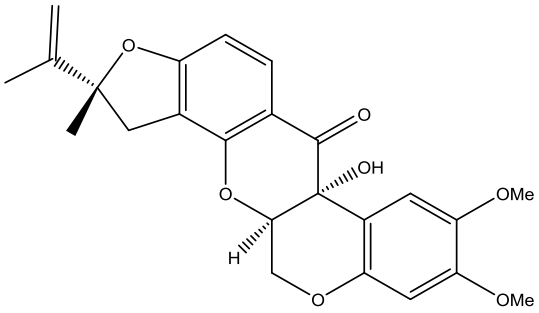
7. 5 Methoxy Isolonchocarpin



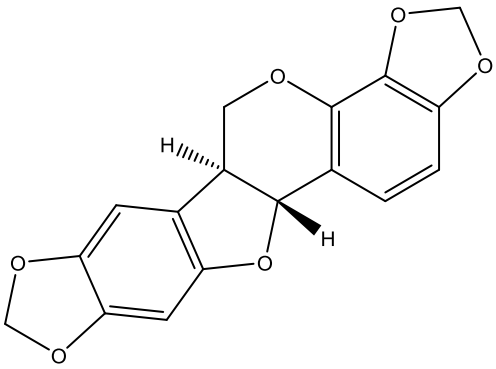
8. 7,4-dihydroxy 3-methoxy isoflavone



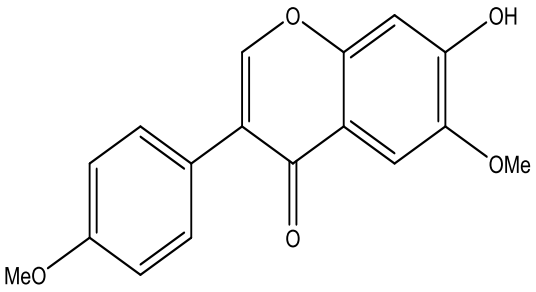
9. 7-O- Methyl quercetin



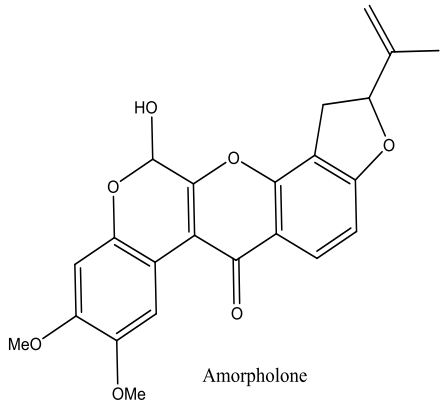
10. 12 a hydroxyrotenone



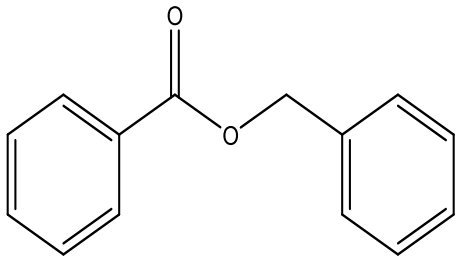
11. 3,4,8,9- dimethylene dioxy pterocarpan



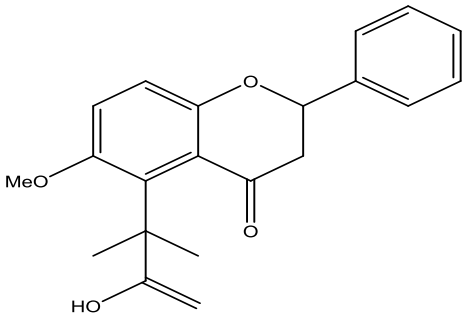
12. Afrormosin

13. 

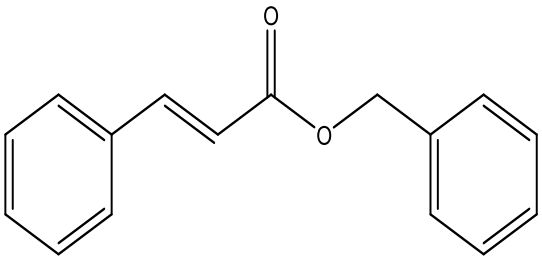
Amorpholone

14. 

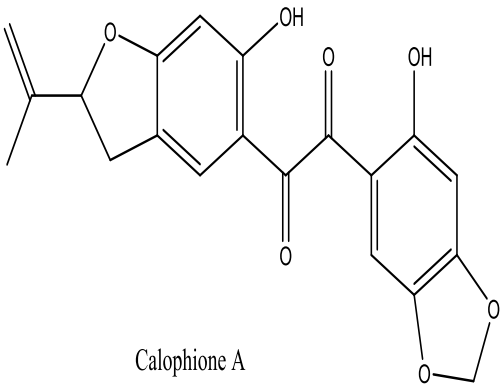
benzyl benzoate

15. 

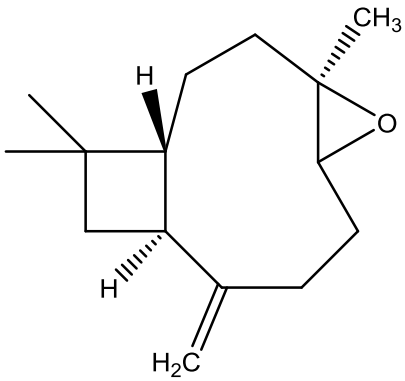
Falciformin

16. 

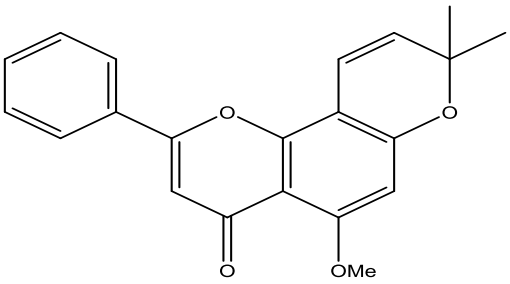
benzyl cinnamate

17. 

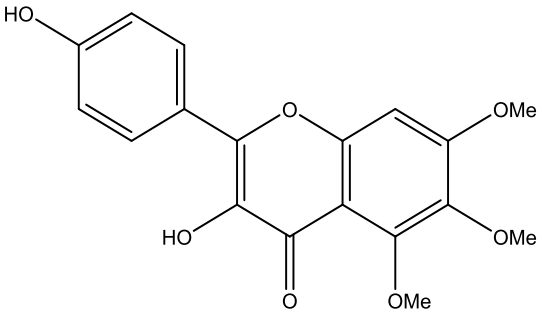
Calophione A

18. 

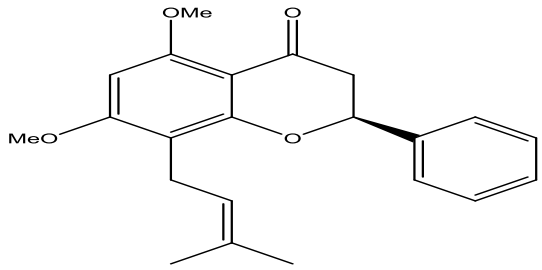
Calophyllene Oxide

19. 

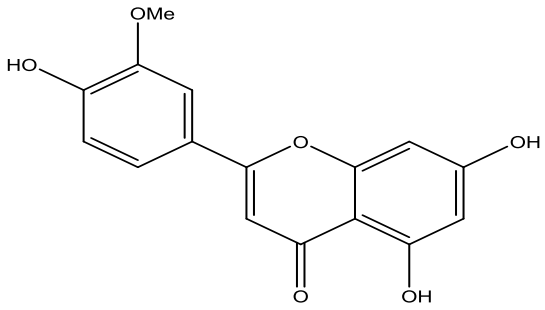
Candidin

20. 

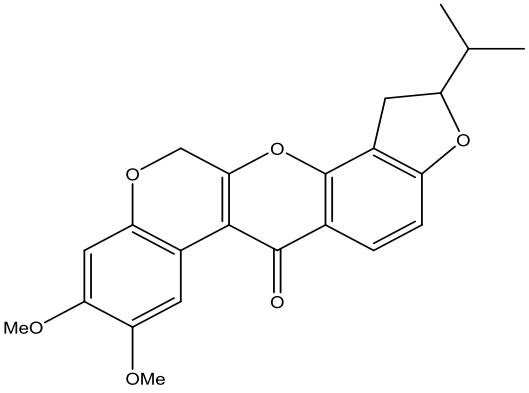
Candiol



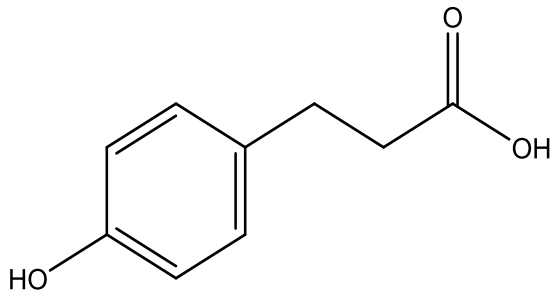
21. Candidone



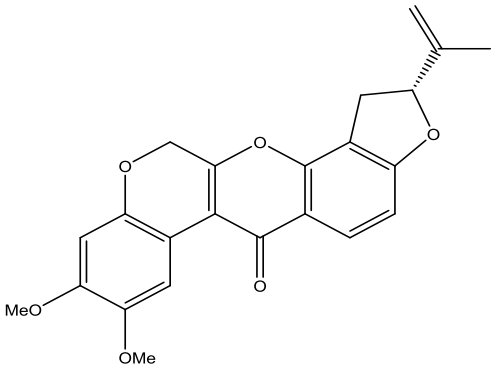
22. Chrysoeriol



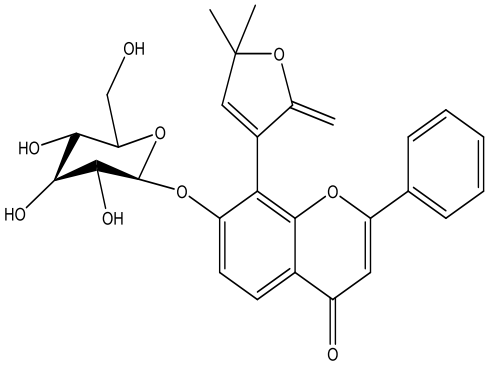
23. Dehydrodihydro Rotenone



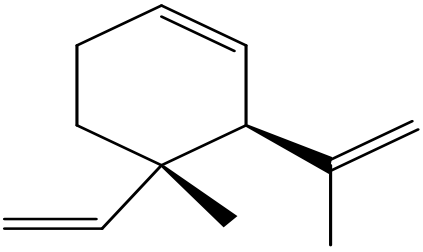
24. dihydro P- coumaric acid



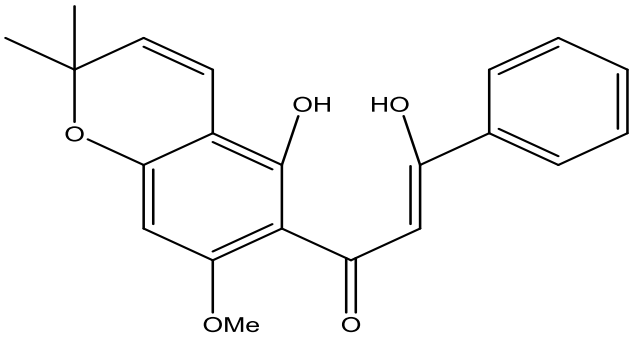
25. Dehydro Rotenone



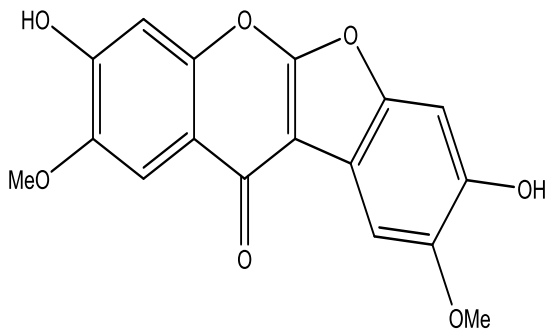
26. Demthyl Apollinin 7-O- Beta- D Glucopyranoside



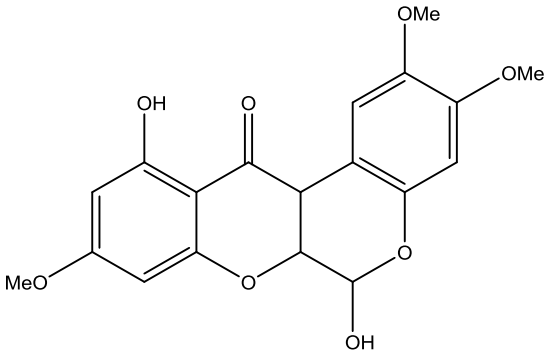
27. Geijerene



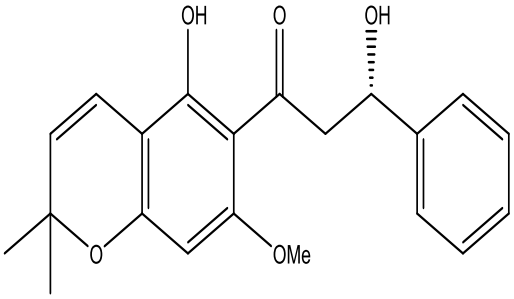
28. Demethyl Praecansone B



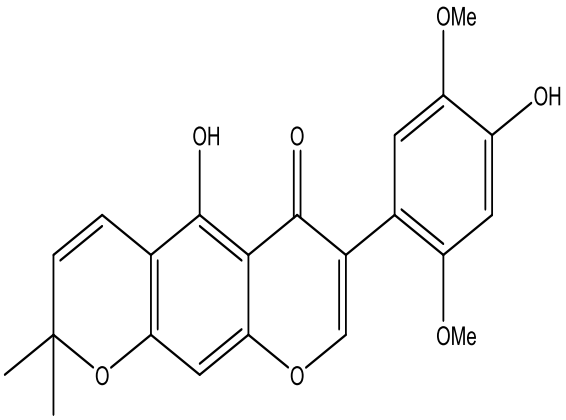
29. Desmoxyphyllin B



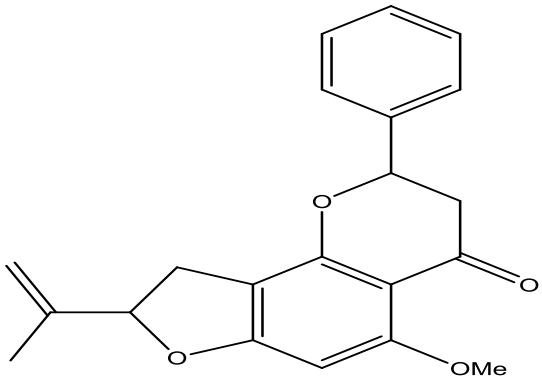
30. Dihydrostemonal



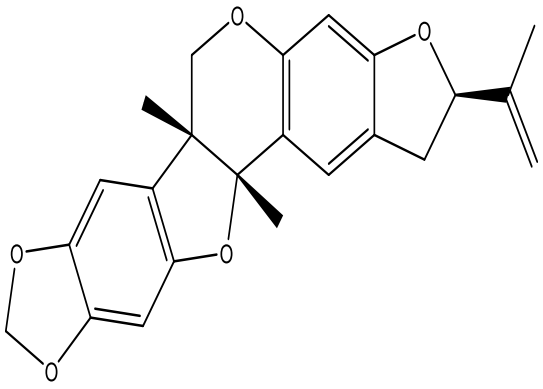
31. Elatadihydrochalcone



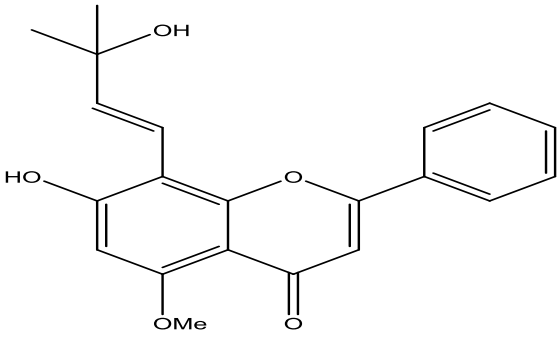
32. Elongatin



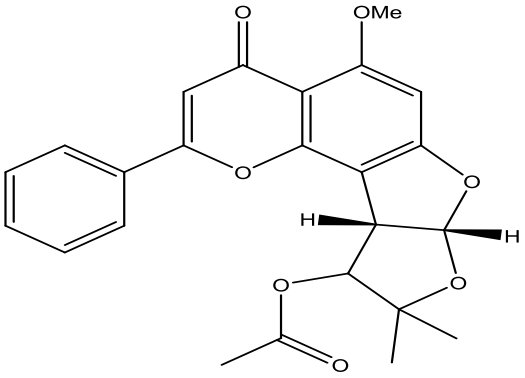
33. Emoroidenone



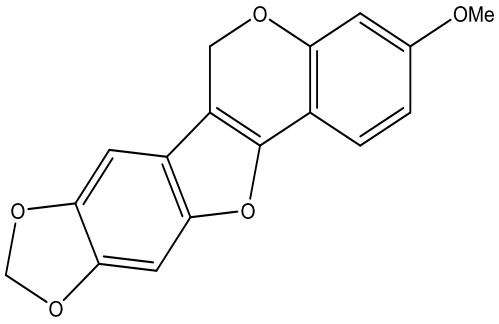
34. Emoroidocarpan



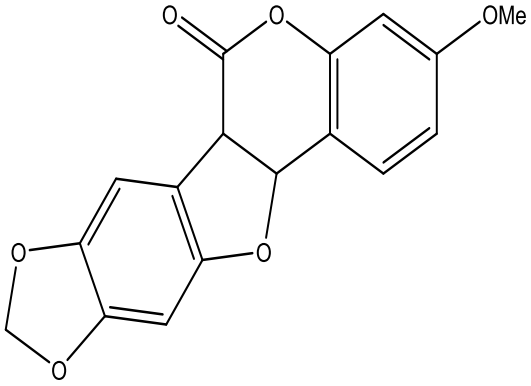
35. Emoroidone



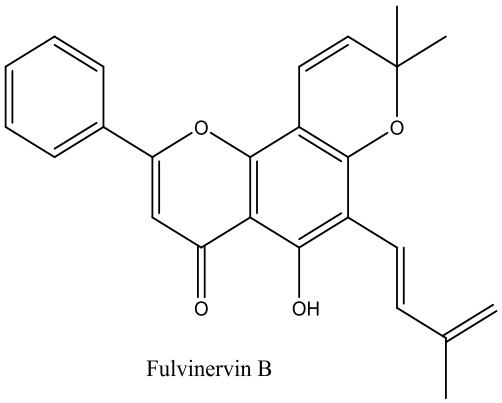
36. Enantiomultijugin



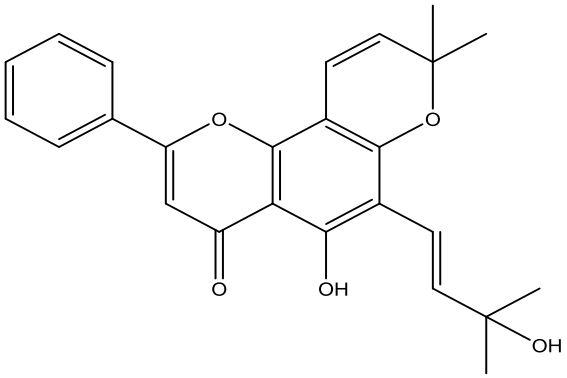
37. Flemichapparin B



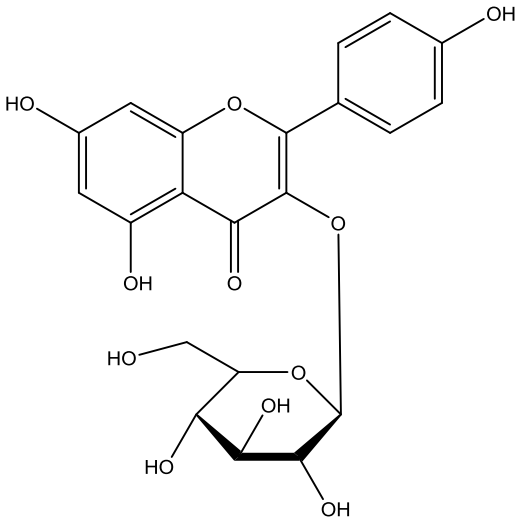
38. Flemichapparin C



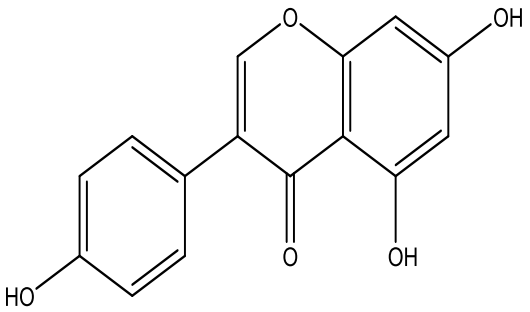
39. Fulvinervin B



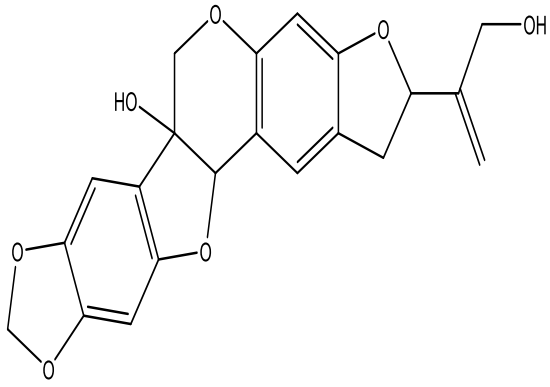
40. Fulvinervin C



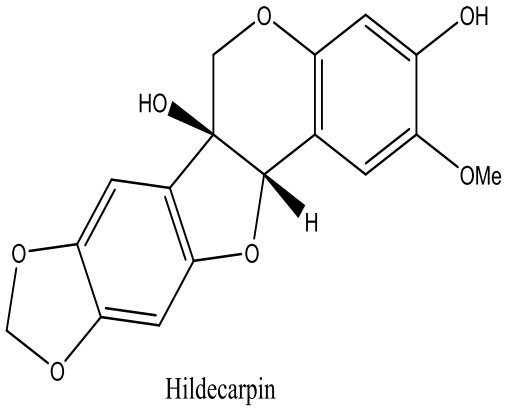
41. Kaempferol 3-O-Beta-D glucopyranoside



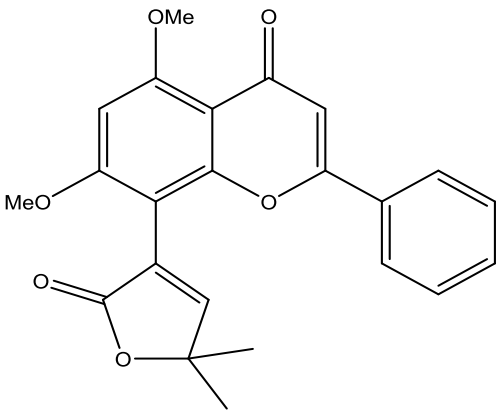
42. Genistein



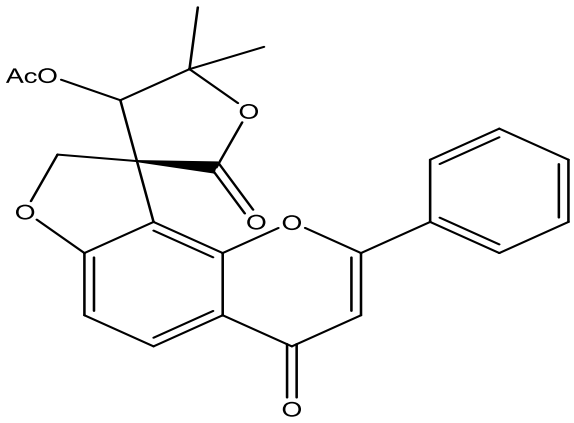
43. Hildecarpidin



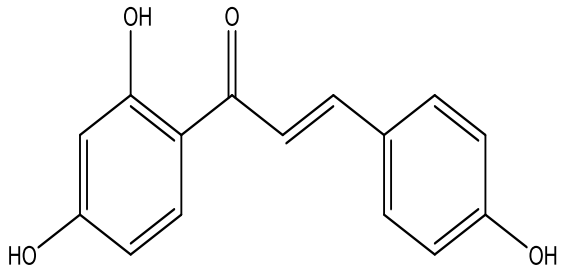
44. Hildecarpin



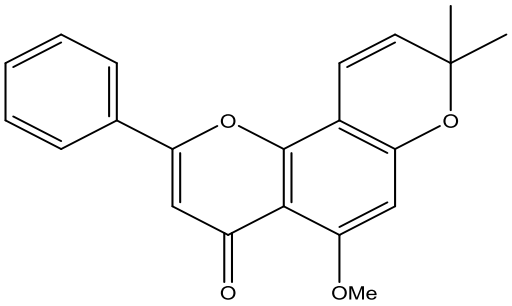
45. Hookerianin



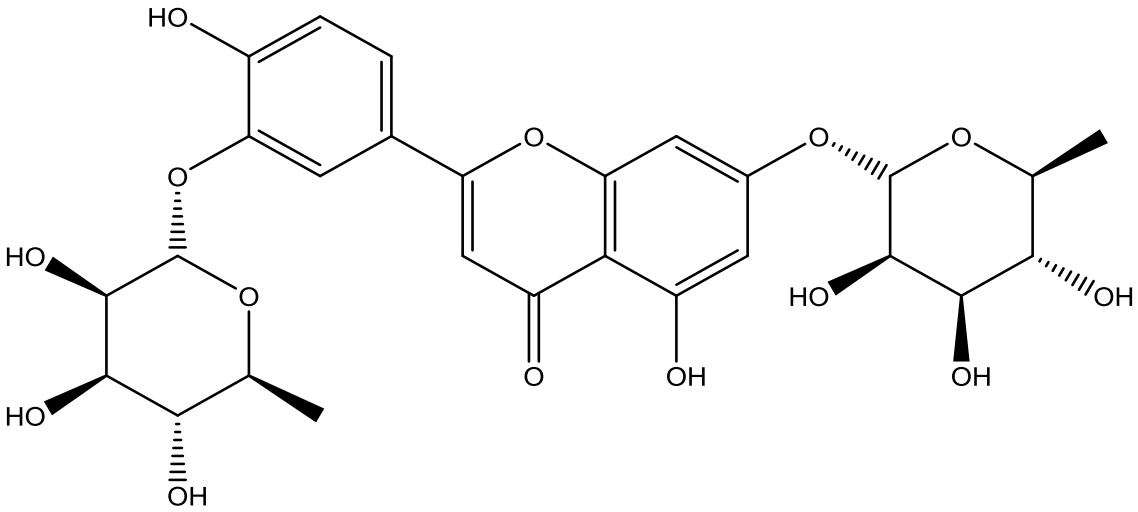
46. Isoglabratephrin



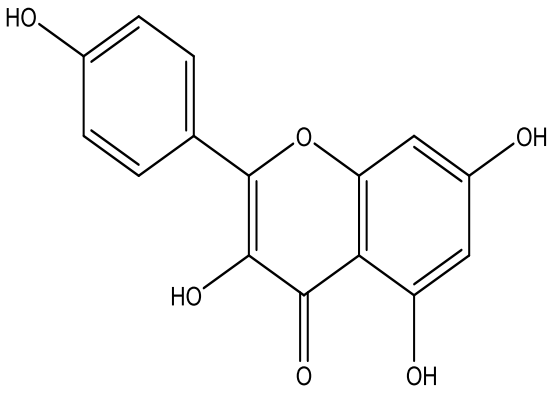
47. Isoliquiritigenin



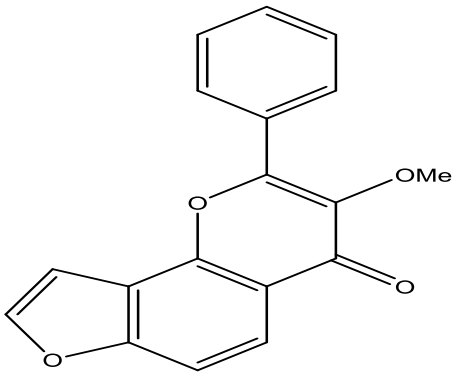
48. Isopongaflavone



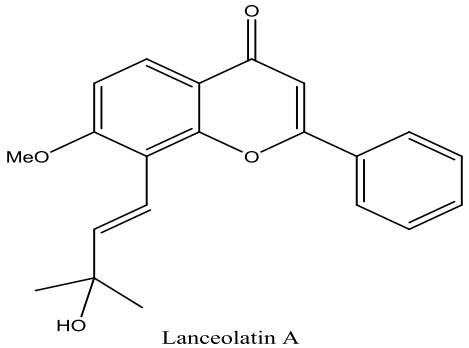
49. Kaemferol 3,7 dirhamnoside



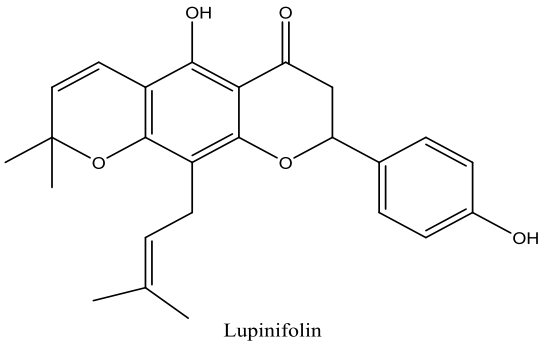
50. Kaempferol



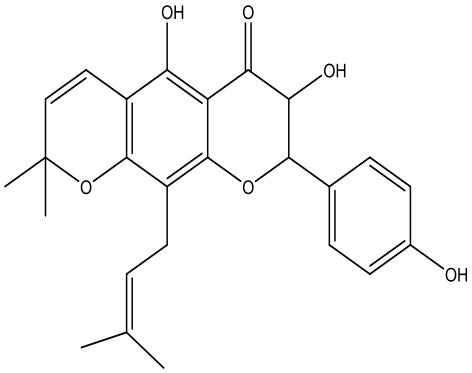
51. Karanjin



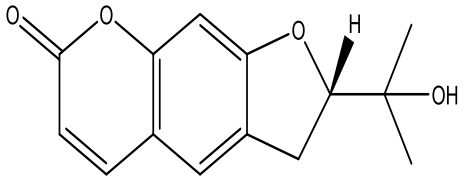
52. Lanceolatin A



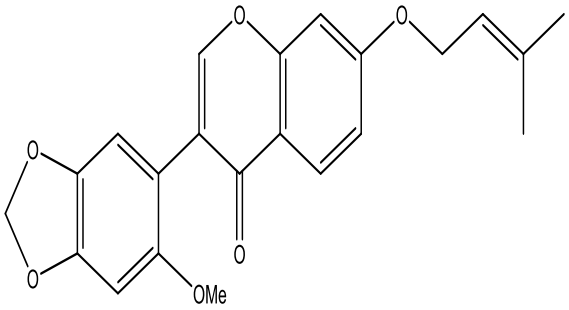
53. Lupinifolin



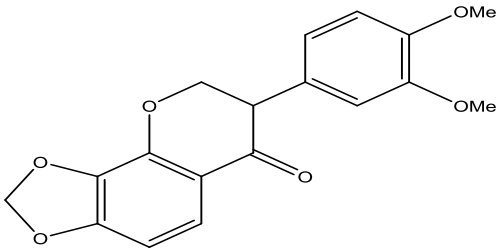
55. Lupinifolinol



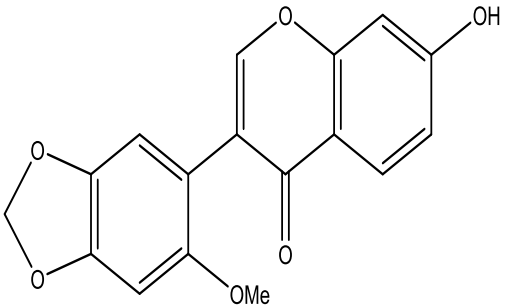
56. Marmesin



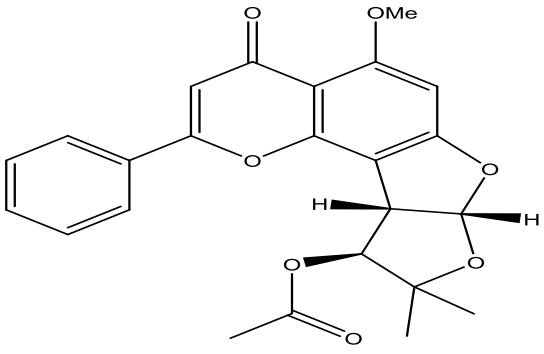
57. Maxima isoflavone C



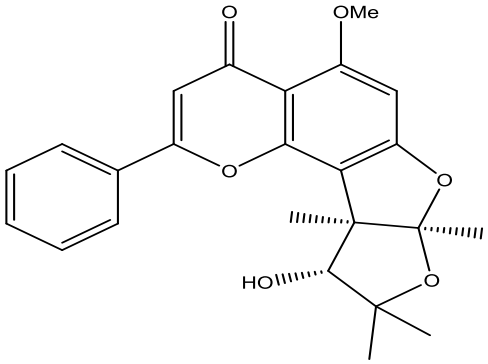
58. Maxima isoflavone D



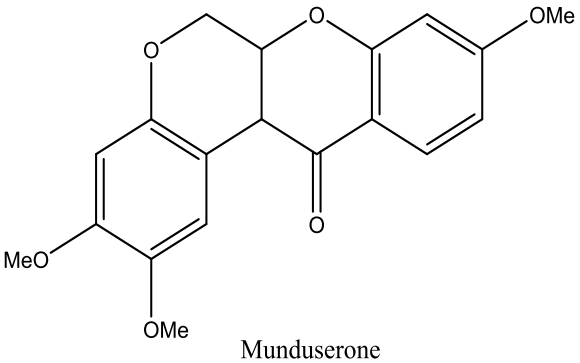
59. Maxima isoflavone G



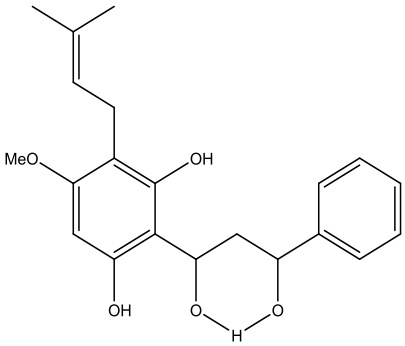
60. multijugin



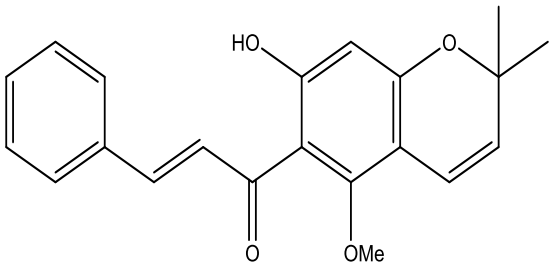
61. Multijuginol



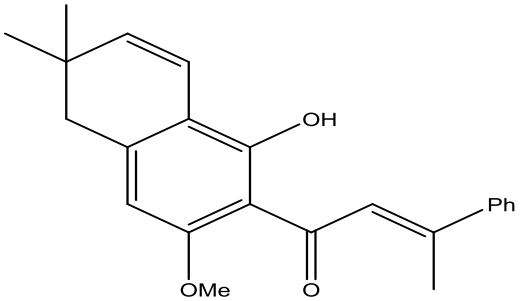
62. Munduserone



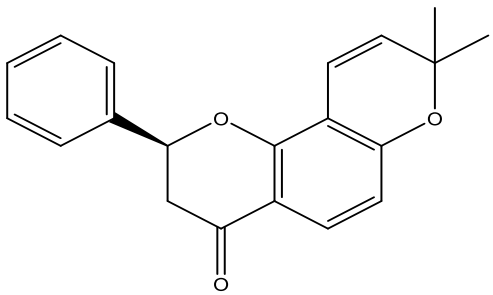
63. 2',6'-dihydroxy-3'-prenyl-4'-methoxy-beta-hydroxychalcone



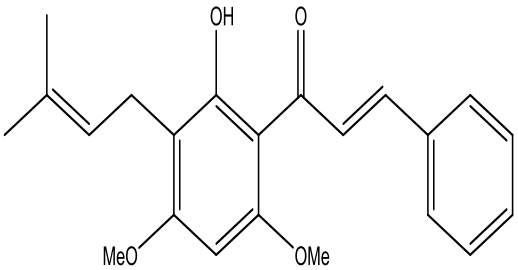
64. Oaxacacin



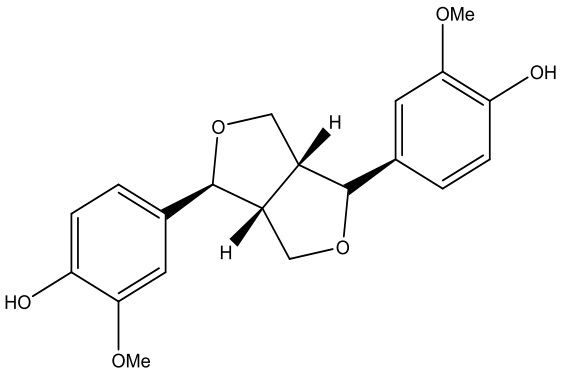
65. Obovatachalcone



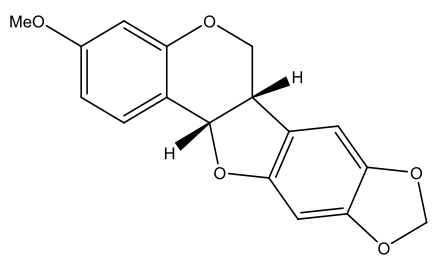
66. Obovatin methyl ether



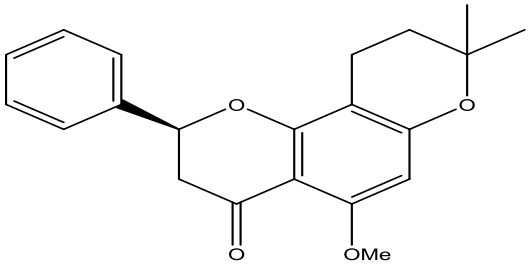
67. Ovalichalcone



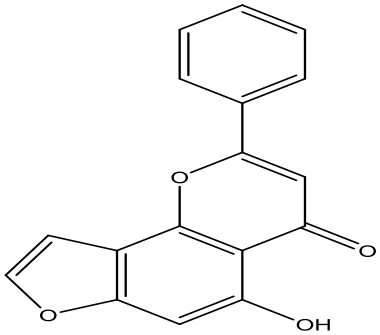
68. Pinoresinol



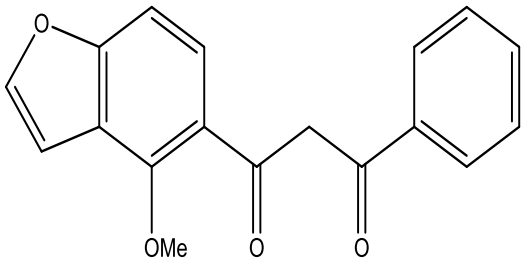
69. Pisatin



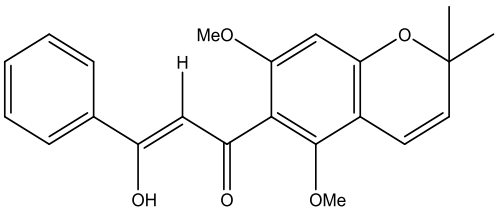
70. Pongachin



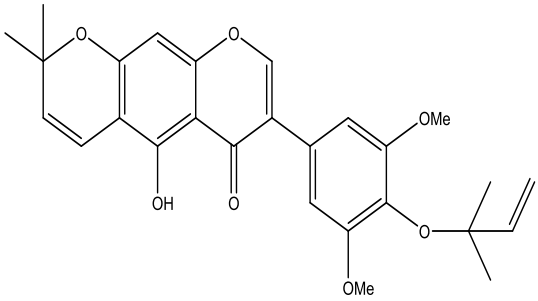
71. pongaglabol



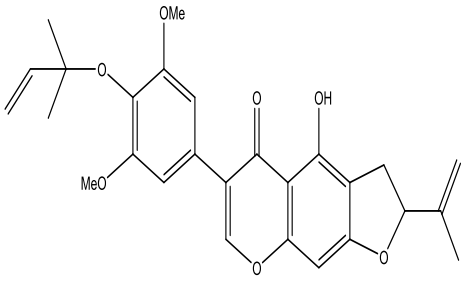
72. Pongamol



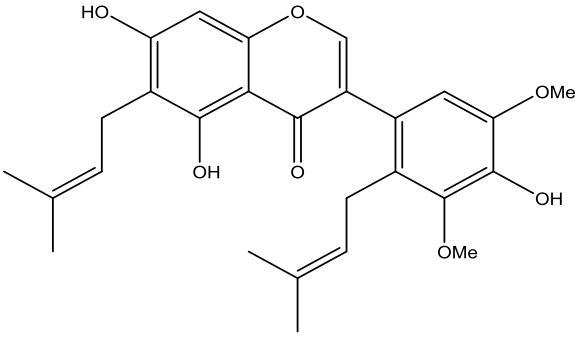
73. Praecansone B



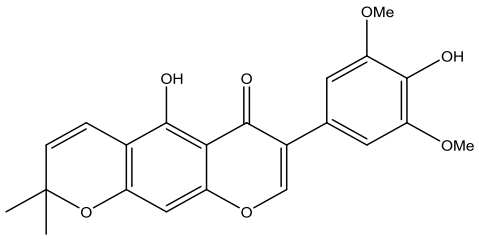
74. Pumilaisoflavone A



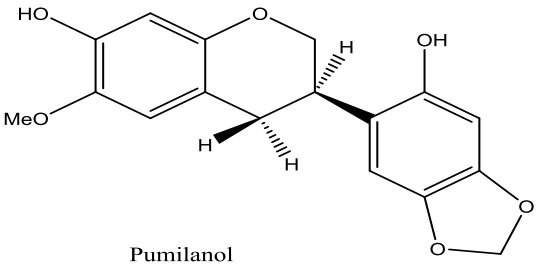
75. Pumilaisoflavone B



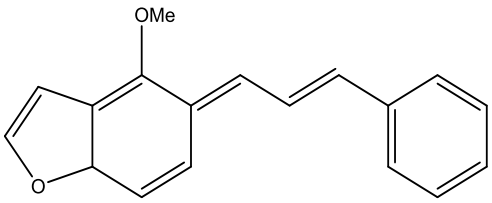
76. Pumilaisoflavone C



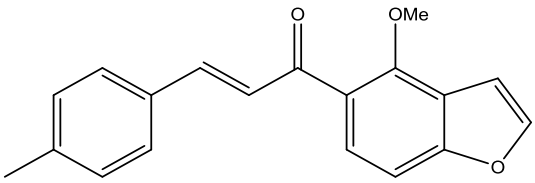
77. Pumilaisoflavone D



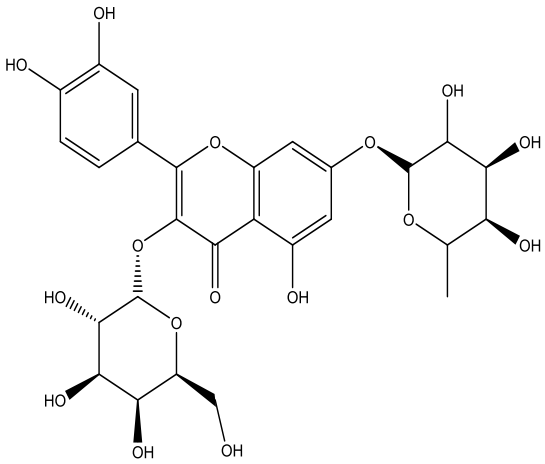
78. Pumilanol



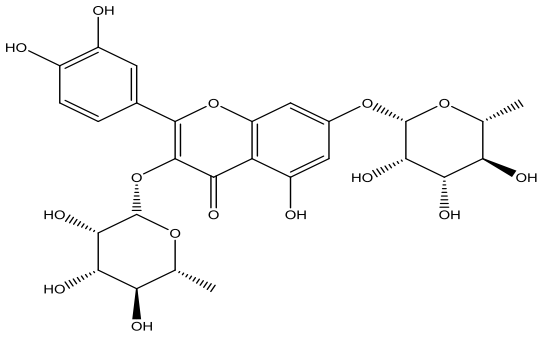
79. Purpureamethide



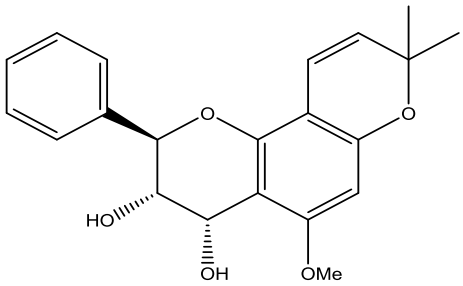
80. Purpuritenin



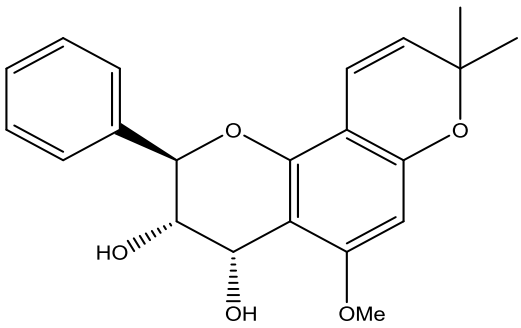
81. Quercetin 3 galactoside 7 rhamnoside



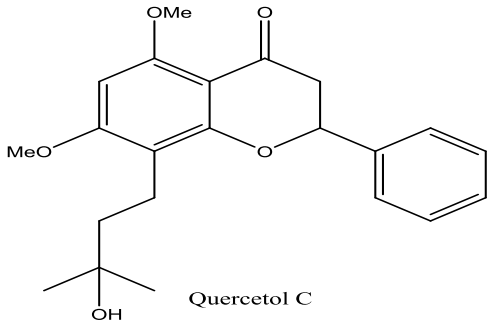
82. Quercetin 3,7- dirhamnoside



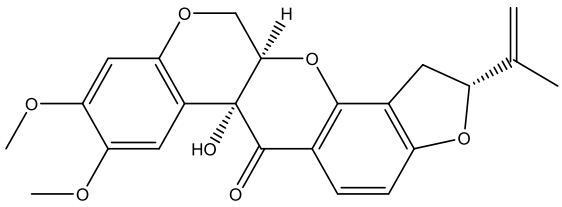
83. Quecetol A



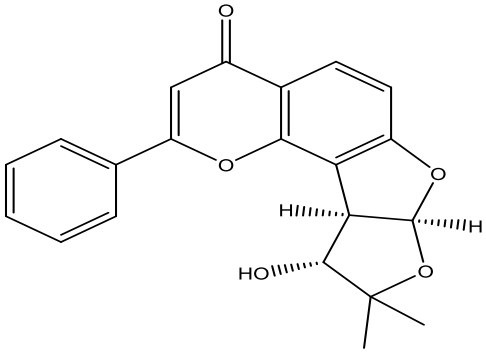
84. Quecetol A

85. 

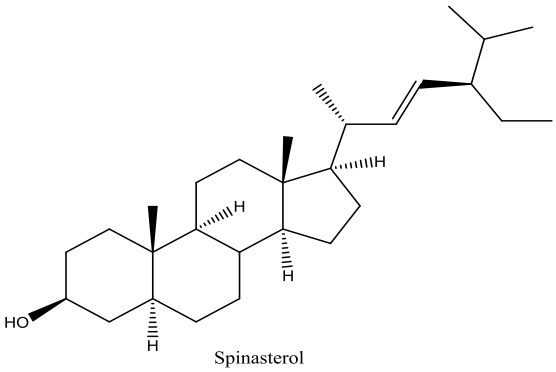
Quercetol C

86. 

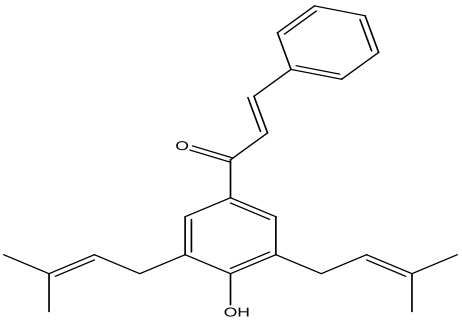
Rotenolone

87. 

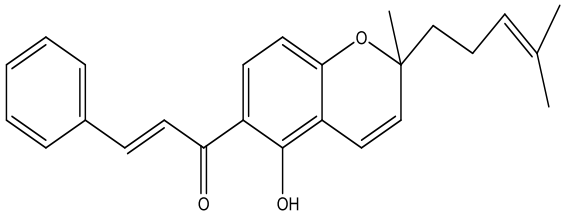
Semiglabrinol

88. 

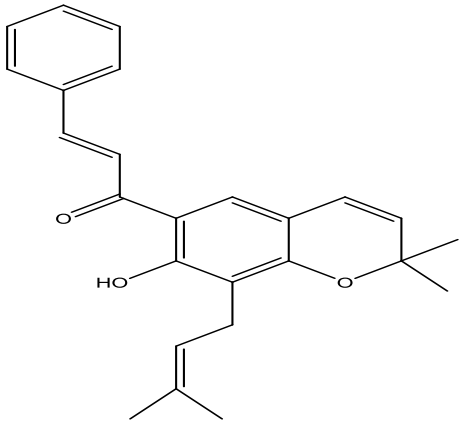
Spinasterol

89. 

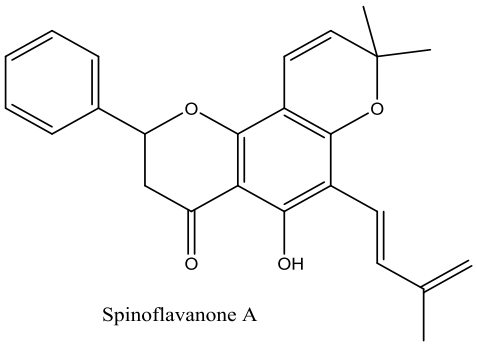
Spinochalcone A

90. 

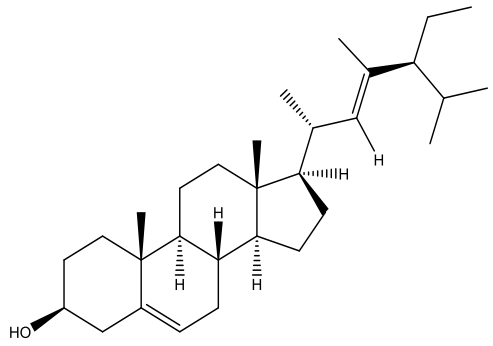
Spinochalcone B

91. 

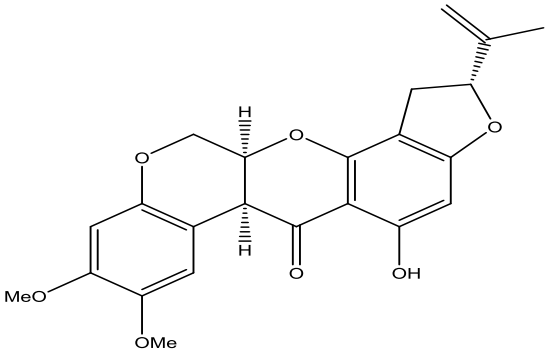
Spinochalcone C

92. 

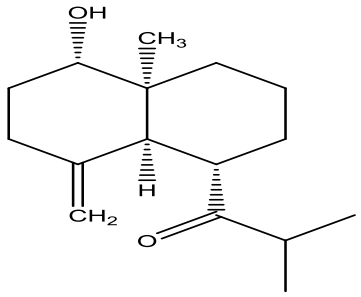
Spinoflavanone A



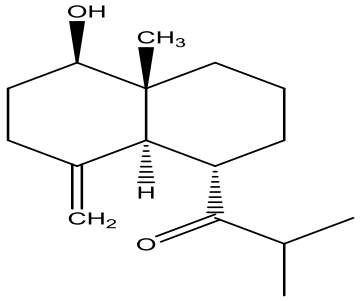
93. stigmasterol



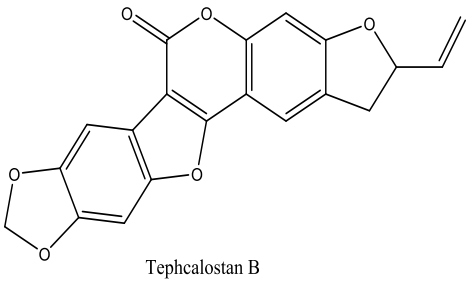
94. Sumatrol



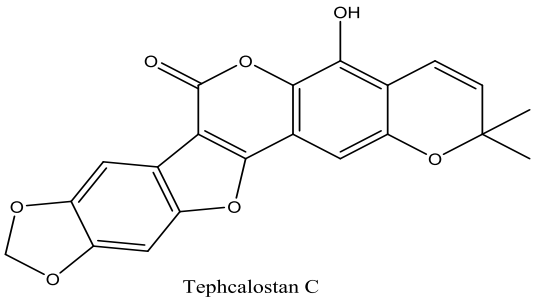
95. Teclenone A



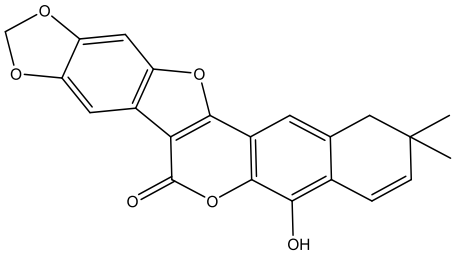
96. Teclenone B



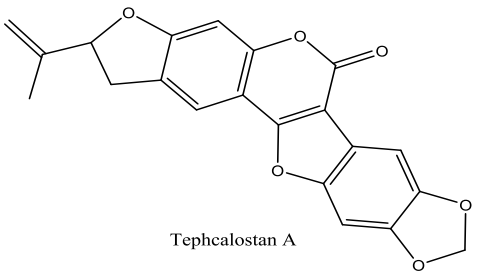
97. Tephcalostan B



98. Tephcalostan C

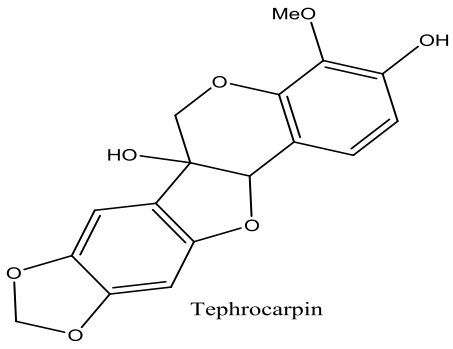


99. Tephcalostan D

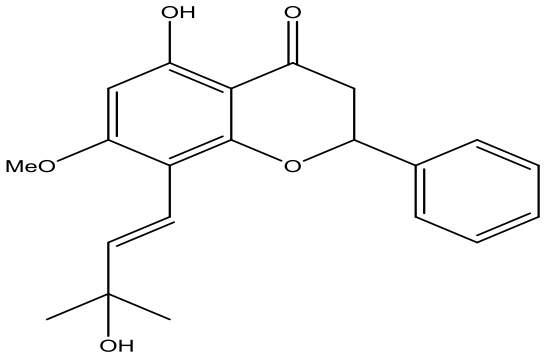


Tephcalostan A

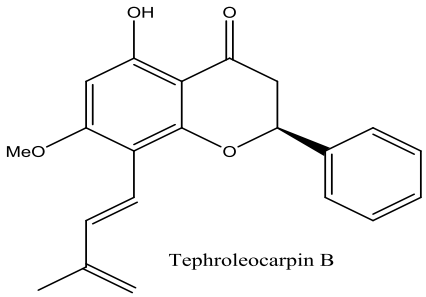
100.



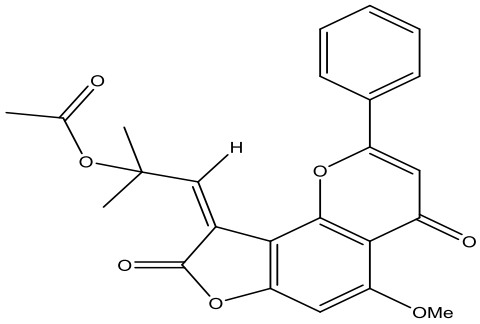
101. Tephrocarpin



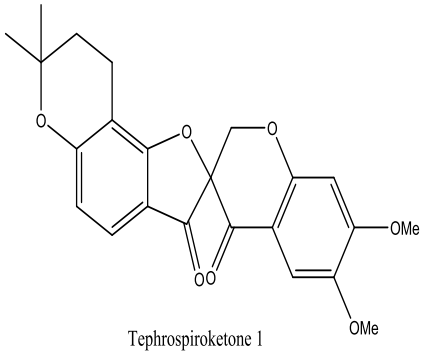
102.



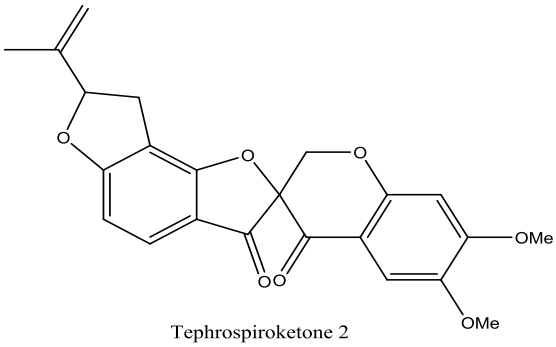
103. Tephroleocarpin B



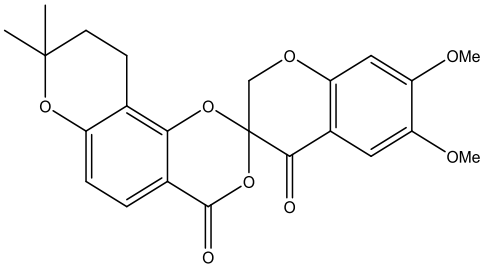
104. Tephrorianin



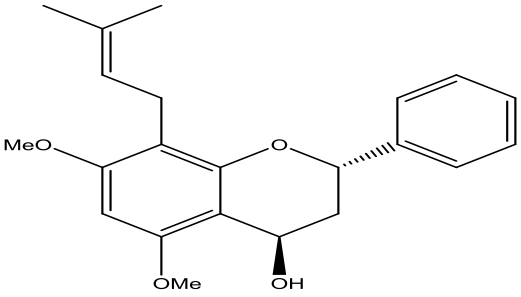
105. Tephrospiroketone 1



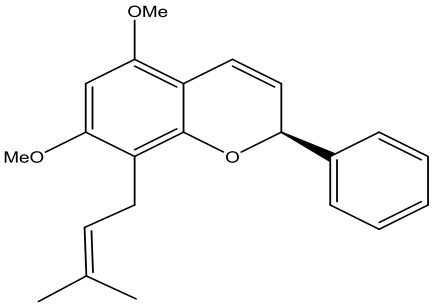
106. Tephrospiroketone 2



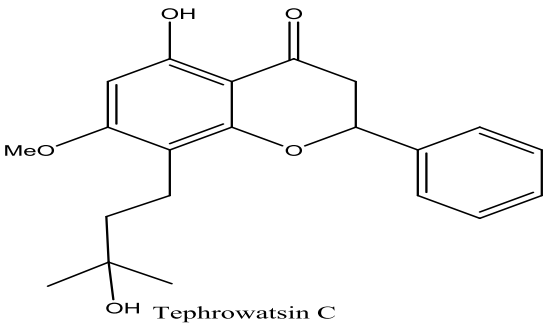
107. Tephrospirolactone



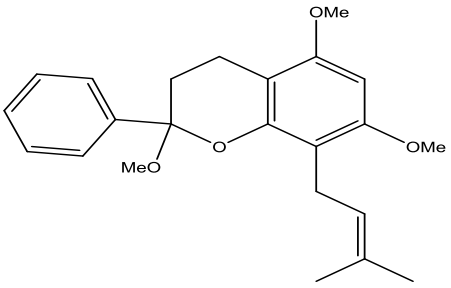
108. Tephrowatsin A



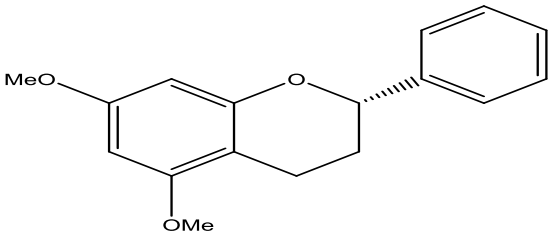
109. Tephrowatsin B



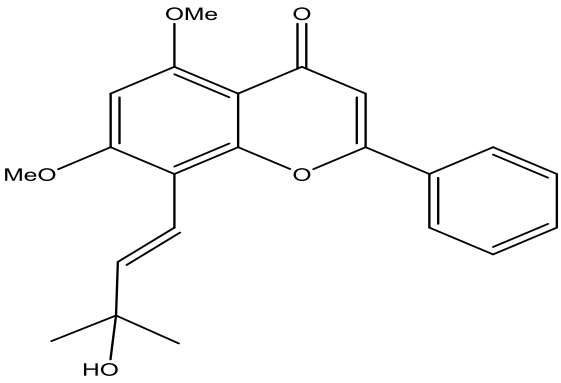
110. Tephrowatsin C



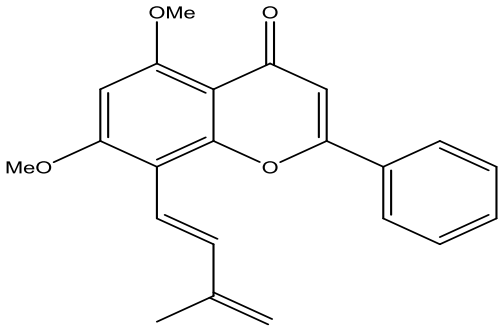
111. Tephrowatsin D



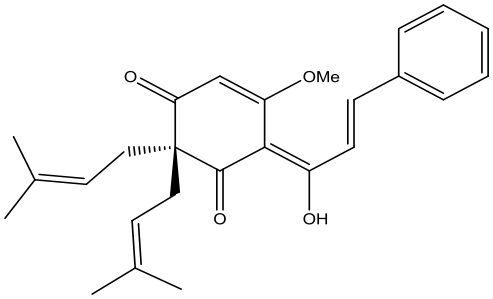
112. Tephrowatsin E



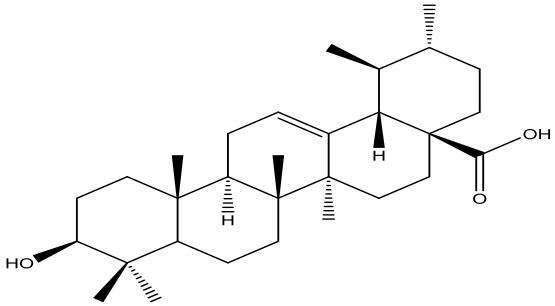
113. Trans tephrostachin



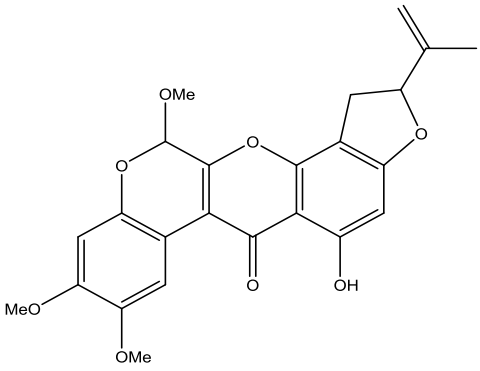
114. trans anhydrotephrostachin



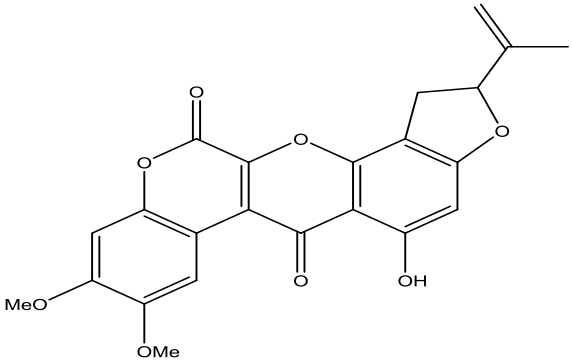
115. Tunicatachalcone



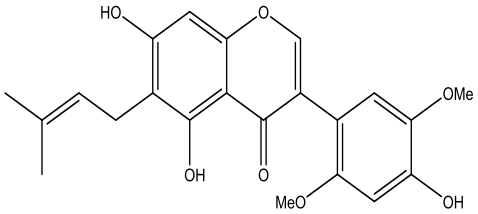
116. ursolic acid



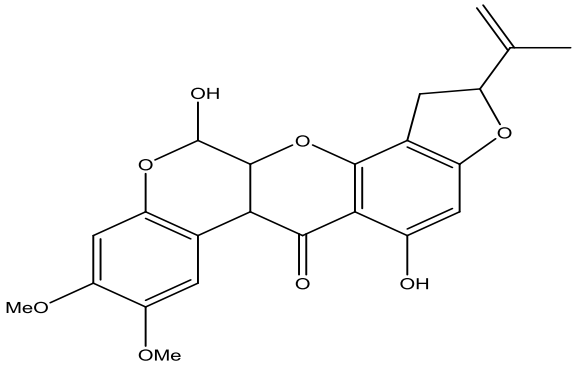
117. Villinol



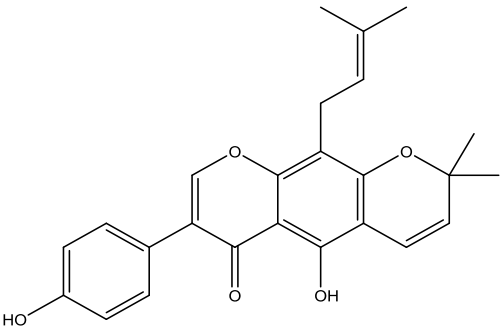
118. villosone



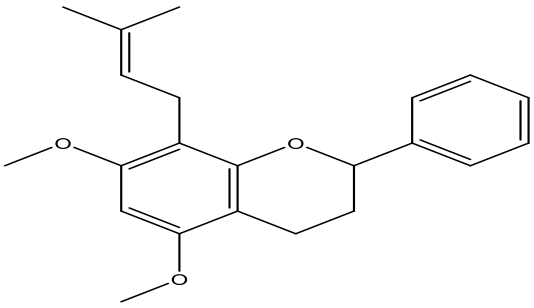
119. viridiflorin



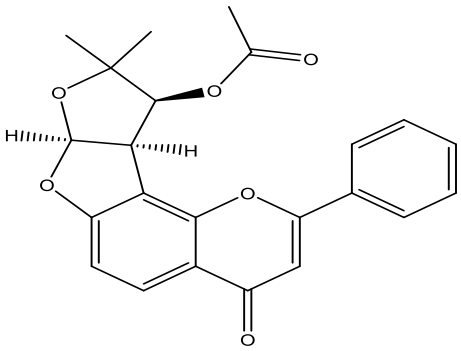
120. Villol



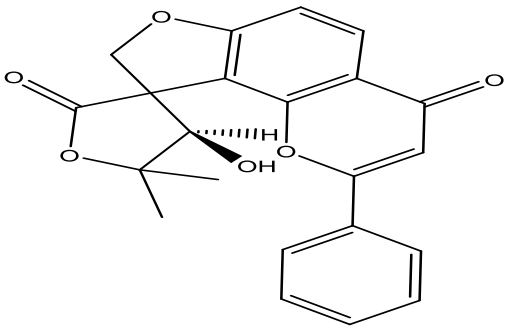
121. warangalone



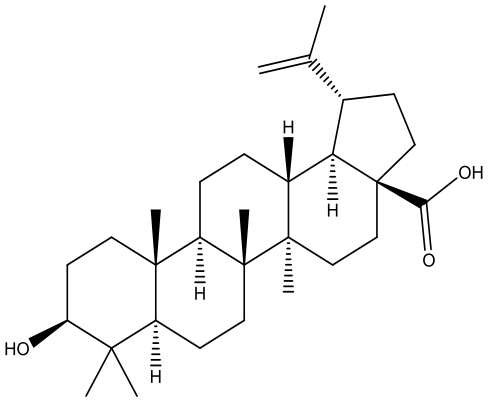
122. 5 7 dimethoxy 8 prenylflavan



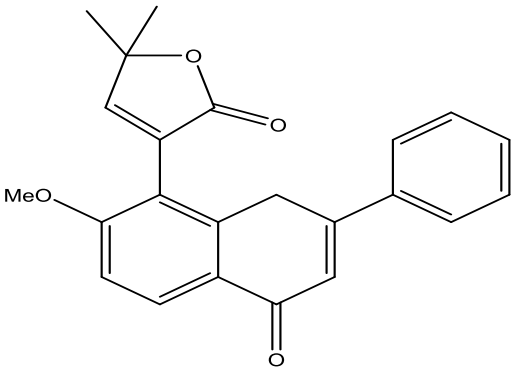
123. (-)-pseudosemiglabrin



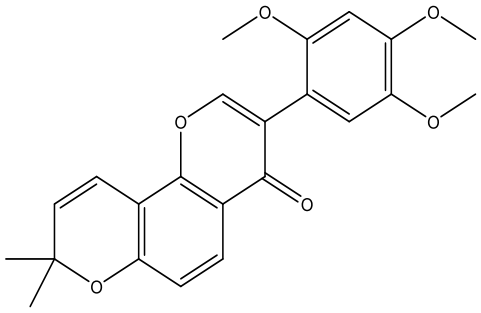
124. (+)- Glabratephrin



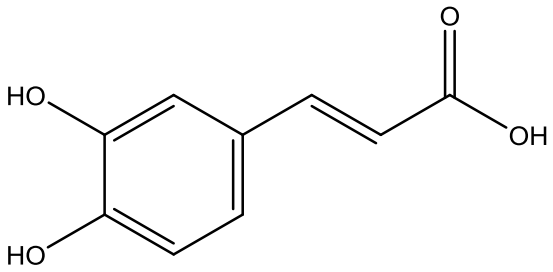
125. betulinic acid



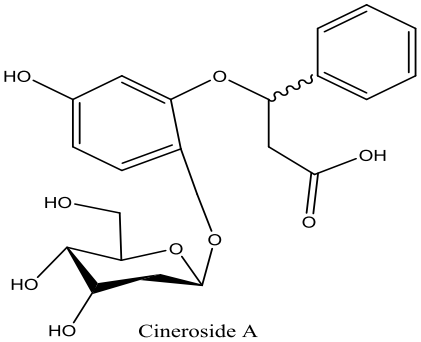
126. Apolinine



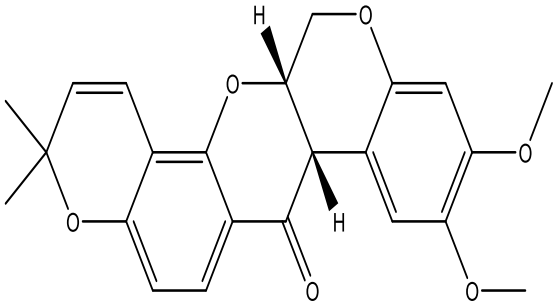
127. barbigerone



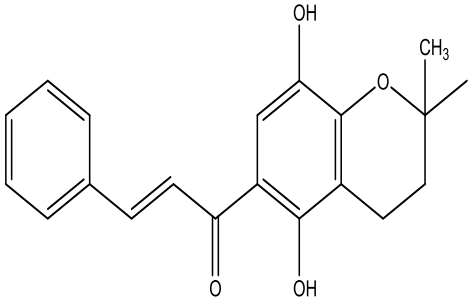
128. caffeic acid



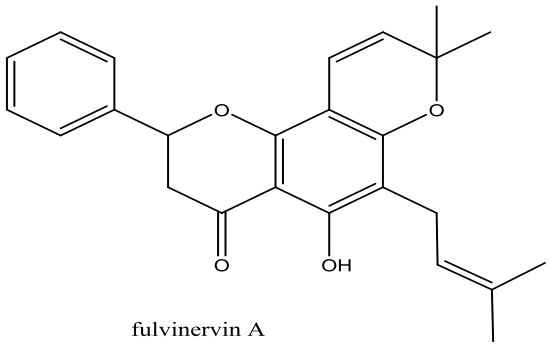
129. Cineroside A



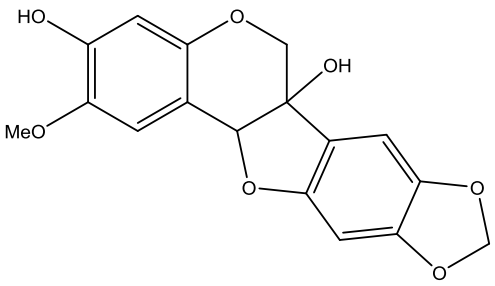
130. deguelin



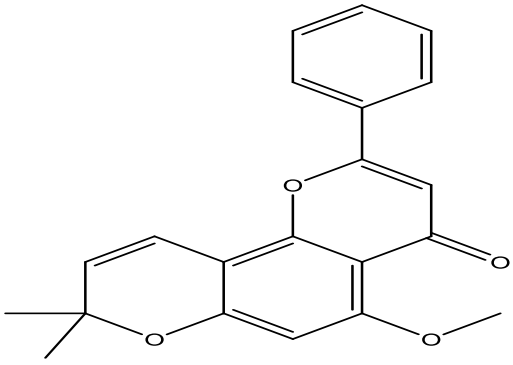
131. Flemichapparin A



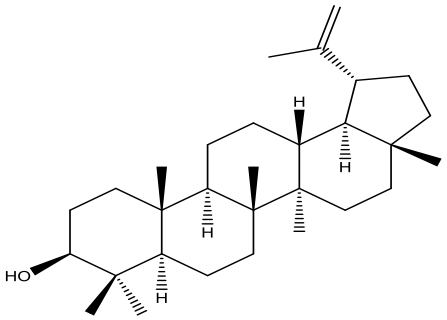
132. fulvinervin A



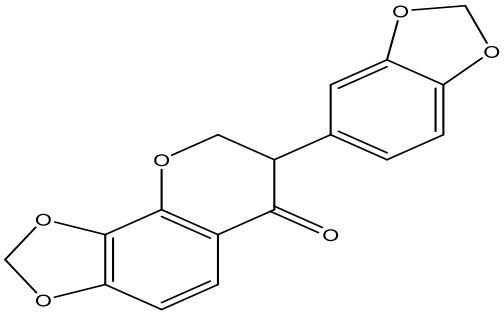
133. Hildecarpin



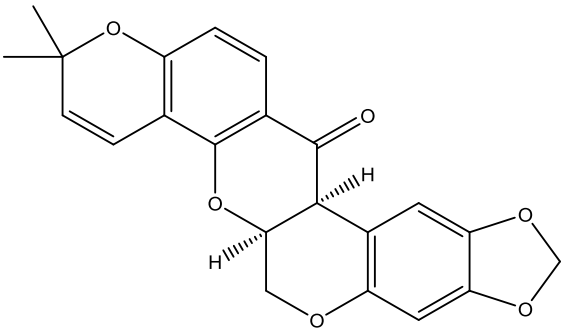
134. isopongaflavone



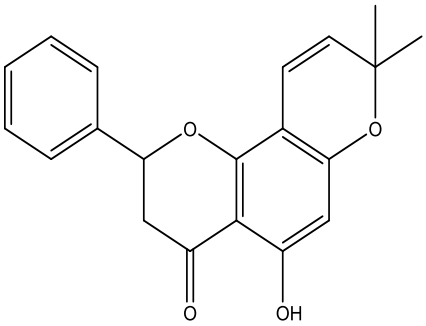
135. lupeol



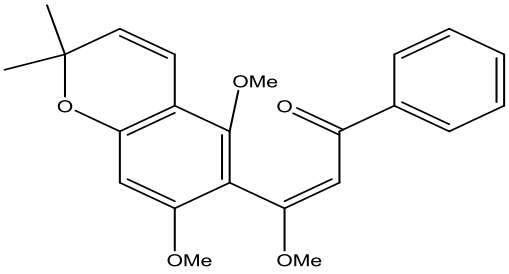
136. Maxima isoflavone A



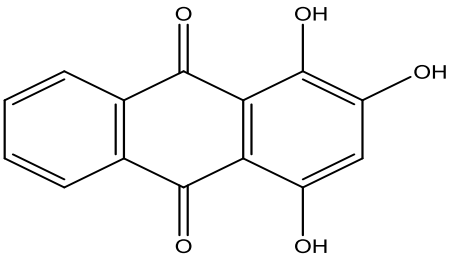
137. millettone



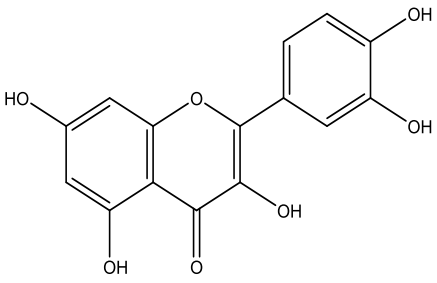
138. Obovatin



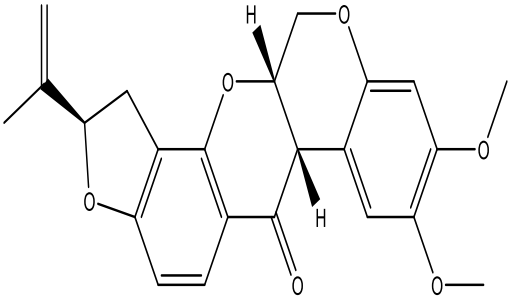
139. Praecansone A



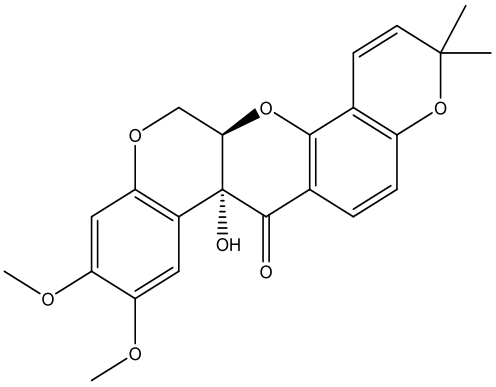
140. purpurin



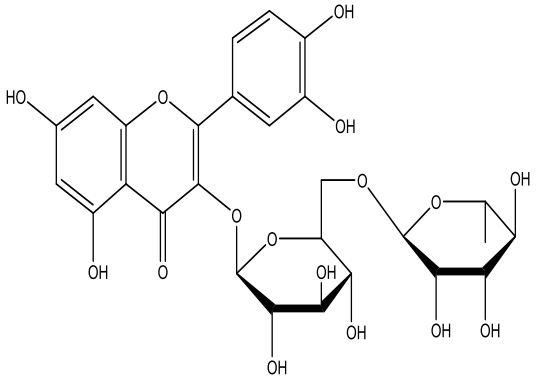
141. quercetin



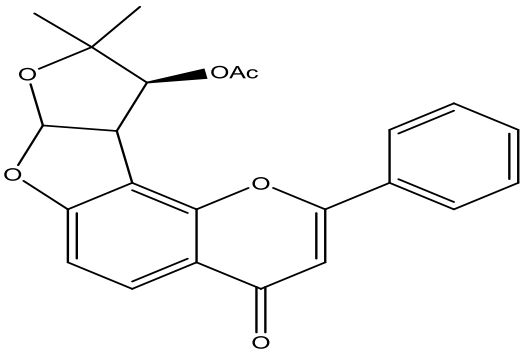
142. Rotenone



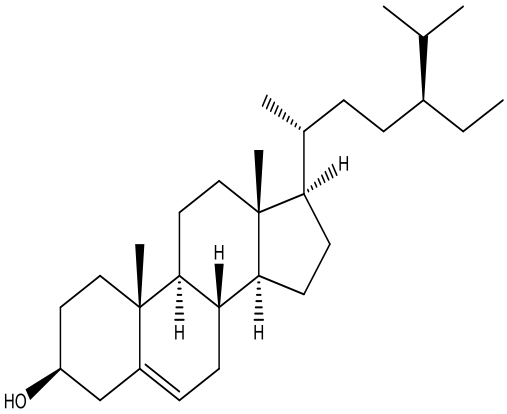
143. tephrosin



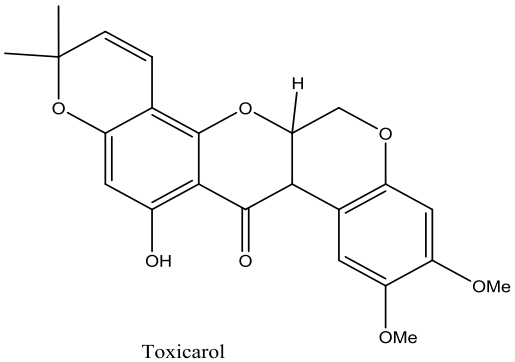
144. rutin



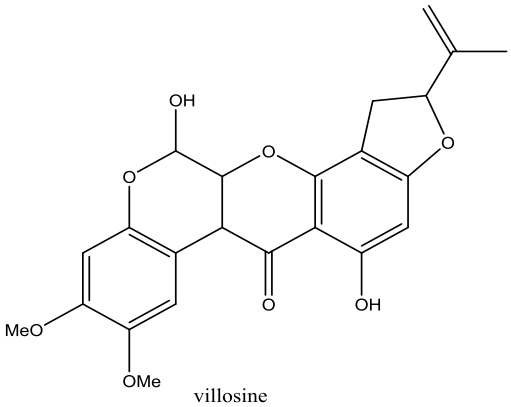
145. Semiglabrin



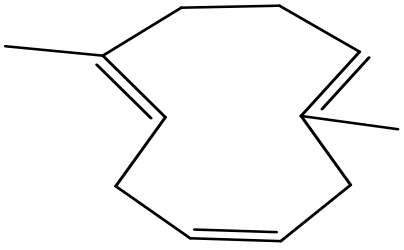
146. b-sitosterol



147. Toxicarol



148. villosine



149. Pregeijerene

150.

triacontanol

There are many compounds in Table 1 which have been isolated but the pharmacological activities have not been studied under the genus Tephrosia for most of the species; but if we look into the literature, we find their presence in other genera and their activities determined. Some of the compounds which are isolated have been studied for their pharmacological actions (refer table 2).

Table 2: Pharmacological activities of isolated compounds from genus *Tephrosia*

Species	Compound	Activity	Reference
Tephrosia calophylla *Tephrosia candida*	Calophione A	Cytotoxic	Ganapaty *et al*., 2009 Ganapaty *et al*., 2009; Roy *et al*., 1986 Ganapaty *et al*., 2009; Parmar *et al*., 1988
Tephrosia elata	Candidachalcone Tephrosin Isopongaflavone Rotenone	Estrogenic activity Antifeedant Larvicidal, antifeedant	Hegazy *et al*.,2011 Bentley *et al*.,1987 Muiva, 2012; Bentley et al., 1987
	(S)-elatadihydrochalcone obovatin methyl ether Praecansone	Antiplasmodial	Muiva, 2012 Muiva, 2012
Tephrosia emoroides	Emoroidenone	Antifeedant	Machocho *et al*., 1995
Tephrosia ergeria	Dehydrorotenone	Antioxidant, larivcidal	Arriaga *et al*., 2009a
Tephrosia hildebrandtii	Hildecarpin	Insect antifeedant Antifungal	Lwande *et al*., 1985
Tephrosia pulcherrima	Pulcherrimin	Cytotoxic	Ganapaty *et al*., 2009
Tephrosia pumila	Pumilanol	Antiprotozoal	Ganapaty *et al*., 2008
Tephrosia purpurea	(+)-tephrorin A	Cancer chemopreventive Activity	
	(+)-tephrorin B (+)-tephrosone 7,4‘-dihydroxy-3‘,5‘-dimethoxyisoflavone (+)-tephropurpurin (+)-purpurin pongamol lanceolatin B (−)-maackiain (−)-3-hydroxy-4-methoxy - 8, 9- methylenedioxy pterocarpan (−)-medicarpin Terpurinflavone	Antiplasmodial	Chang *et al*., 2000 Juma *et al*., 2011
Tephrosia spinosa	Eupalitin-3-O-β-D-glucoside	Anti-inflammatory	Chakradhar *et al*., 2005
Tephrosia tinctoria	2-hydroxy tephrosin Tephrinone	Antiplasmodial	Ganapaty *et al*., 2009
Tephrosia toxicaria	(2S)-5-hydroxy-7-methoxy-8-[(E)-3-oxo-1-butenyl]flavanone 4‘,5‘-dihydro-11,5‘-dihydroxy-4‘-methoxytephrosin, Isoliquiritigenin Genistein Chrysoeriol Obovatin Toxicarol A-Toxicarol	Cancer chemopreventive Activity Antioxidant Fish poison Larvicidal	Jang *et al*., 2003 Vasconcelos *et al*., 2009 Clark, 1930 Vasconcelos *et al*., 2009
Tephrosia vogelii	Deguelin	Larvicidal	Muiva, 2012; Kalume et al., 2012

Pharmacological activities of plants from the genus *Tephrosia*

Antioxidant activity

Only a few species of Genus *Tephrosia* have been studied for their antioxidant activity. In 2007, G.P. Choudhary studied the ethanolic extract of *Tephrosia purpurea* for its antioxidant activity (Choudhary, 2007). The aqueous extract of the whole plant of *Tephrosia purpurea* also showed free radical scavenging activity in DPPH test (Gunjegaonkar *et al*., 2010). The anti-oxidant and cytotoxic properties were evaluated using DPPH, ferric reducing anti-oxidant power (FRAP), reducing power assay, and anti-hemolytic assay of four major parts of methanolic extracts of *T. purpurea* including leaves, root, stem, and seed are investigated and compared. The results revealed that, among the four extracts studied, leaves extract showed the highest anti-oxidant activity, and there was no significant difference observed in anti-hemolytic activity. Leaves extract showed effective cytotoxicity on colorectal cancer cells and also had the higher total phenolic and flavonoid content, thus proving higher anti-oxidant and cytotoxic activities of leaf extract when compared with other extracts (Padmapriya *et al*., 2017).*T. purpurea* possessed anti-oxidant activity in an in-vitro study where it exhibited free radical scavenging in 1,1-diphenyl-2- picrylhydrazyl (DPPH) assay and anti-lipid peroxidation properties in carbon-tetrachloride-induced LPO assay. Macrophages have been involved in the inflammation process and during the inflammation there is an increased production of superoxide ions. Many reports suggested the mild anti-inflammatory activities of *T. purpurea*. Based on these reports, researchers concluded that it may be possible that the inhibition of superoxide generation is related to anti-inflammatory activity of *T. purpurea* (Soni *et al*., 2006).From *Tephrosia egregia* the ethyl acetate and methanol extracts showed high antioxidant activities (Arriaga *et al*., 2009a). Obovatin, a flavonoid present in *Tephrosia toxicaria* showed significant antioxidant acivity of IC50 3.370 µg/mL. It was also seen that the methanol fraction of the ethanol extract from roots had the highest antioxidant activity (Vasconcelos *et al*., 2009). *Tephrosia villosa* also possess antioxidant activity due to the presence of 20(29)-lupen-3-one, a compound also identified in Daedaleopsis tricolor where it inhibited lipid peroxidation by 6.4% (Prashant and Krupadanam 1993; Kim *et al*., 2001). The ethanol ether extract of *Tephrosia vogelii* seeds also showed antioxidant and free radical scavenging activity (Li *et al*., 2010). The ethyl acetate extract of *T. bracteolata* leaves exhibited significant $DPPH^{+}$ and $ABTS^{\cdot+}$ antioxidant activity with IC_{50} of 24.96 µg/ml and 6.48 µg/ml as compared to Ascorbic acid and Trolox (12.24 µg/ml and 5.91 µg/ml) respectively(Godshelp Osas Egharevba,2019).The ethanol ether extract of *Tephrosia vogelii* seeds also showed anti-oxidant and free radical scavenging and this was mainly due to the presence of flavonoid present in the extracts (Li *et al*., 2010). An evaluation of the antioxidant activity of ethanolic extracts of *Tephrosia cinerea* was carried out. Furthermore, the total phenolic content was determined by the Folin–Ciocalteu method, and the relationship between phenolic content and activity was also statistically investigated (Juan C Argoti, 2011).*Tephrosia apollinea* was used to evaluate the anti-oxidant, anti-angiogenic, and cytotoxic activities. The results supported the ethnobotanical uses of the plant *T. apollinea* to cure the oxidative stress and paraneoplastic symptoms caused by the cancer (Hassan *et al*., 2014). The various organic extracts of leaf, stem, and root of *T. apollinea* were assayed for radical scavenging, total anti-oxidant capacity, antilipid peroxidation, and reduced glutathione, and was found to be ameliorating the oxidative stress developed during the generation of reactive oxygen species (Rizvi *et al*., 2018).Quantitative determination of the total phenolic and total flavonoid contents of the methanolic leaf, root and stem extracts was done using the Folin Ciocalteu method and aluminum chloride complex forming assays, with the results expressed in mg of gallic acid equivalents and mg of quercetin equivalents. The methanolic stems extract showed the highest total phenolic content whereas the highest total flavonoid content was shown from the methanol leaves extract(Nanhapo, David,2018). Chloroform and methanolic extract of *T. calophylla* was investigated for its anti-oxidant activity using albino Wistar rats. The result revealed an increase in the levels of catalase, superoxide dismutase and decrease in LPO which can be attributed due to its anti-oxidant mechanism. Flavonoid present in the extracts was responsible for its anti-oxidant mechanism (Ramesh and Rani, 2018). The ethanol ether extract of *Tephrosia vogelii* seeds also showed anti-oxidant and free radical scavenging and this was mainly due to the presence of flavonoid present in the extracts (Li *et al*., 2010). In-vitro anti-oxidant activity of the different parts (Leaf, Stem, and Root) of *T. tinctoria* was studied by extracting with various solvents like hexane, chloroform, ethyl acetate, and ethanol. Among the various fractions tested using DPPH assay, the ethyl acetate fraction of stem of *T. tinctoria* exhibited maximum anti-oxidant activity (Rajaram and Suresh, 2011).*T. purpurea* possessed anti-oxidant activity in an in-vitro study where it exhibited free radical scavenging in 1,1-diphenyl-2- picrylhydrazyl (DPPH) assay and anti-lipid peroxidation properties in carbon-tetrachloride-induced LPO assay. Macrophages have been involved in the inflammation process and during the inflammation there is an increased production of superoxide ions. Many reports suggested the mild anti-inflammatory activities of *T. purpurea*. Based on these reports, researchers concluded that it may be possible that the

inhibition of superoxide generation is related to anti-inflammatory activity of *T. purpurea* (Soni *et al*., 2006). The chloroform extract of leaf and aerial parts of *T. villosa* showed anti-oxidant activity when examined by DPPH assay method. This may be attributed due to the secondary metabolites like phenols, glycosides, tannins, reducing sugars, terpenoids, flavonoids present in the extract (Mani *et al*., 2017). In-vitro anti-oxidant activity of the different parts (Leaf, Stem, and Root) of *T. tinctoria* was studied by extracting with various solvents like hexane, chloroform, ethyl acetate, and ethanol. Among the various fractions tested using DPPH assay, the ethyl acetate fraction of stem of *T. tinctoria* exhibited maximum anti-oxidant activity (Rajaram and Suresh, 2011). The anti-oxidant and cytotoxic properties were evaluated using DPPH, ferric reducing anti-oxidant power (FRAP), reducing power assay, and anti-hemolytic assay of four major parts of methanolic extracts of *T. purpurea* including leaves, root, stem, and seed are investigated and compared. The results revealed that, among the four extracts studied, leaves extract showed the highest anti-oxidant activity, and there was no significant difference observed in anti-hemolytic activity. Leaves extract showed effective cytotoxicity on colorectal cancer cells and also had the higher total phenolic and flavonoid content, thus proving higher anti-oxidant and cytotoxic activities of leaf extract when compared with other extracts (Padmapriya *et al*., 2017).

Anti-bacterial activity

The species from Genus *Tephrosia* have also been studied for their anti-bacterial activity. *Tephrosia vogelii* was found to possess antimicrobial activity (Wanga *et al*., 2007). The dichloromethane extract from the roots and leaves was tested against *S. aureus, E. coli* and *F. phoseolida*. Hu *et al*., in 2011 also studied the antimicrobial and bactereostatic activity of ethanol and aqueous extract from *Tephrosia vogelii* seeds on *E. coli, S. aureus* and *S. paratyphi B*, and proved the antibacterial efficacy of the plant to be significant at high doses (Hu *et al*., 2011). The root extract of *Tephrosia villosa* showed moderate antibacterial and anti fungal activity (Ganapaty *et al*., 2008a). In another study on *Tephrosia villosa* the fruit, leaf, and root extract showed activity against *C.neoformans, E.coli* and *B.anthracis* respectively. The ethanolic twig extract was most active against *C.neoformans* and *S.typhi* (Nondo *et al*., 2011). In case of *Tephrosia purpurea*, studies have been made on the antimicrobial activity of methanolic extract of Tephrosia purpurea roots on *B. subtilis, S. aureus, M. luteus*, the gram positive bacteria and the gram negative including *E. coli*,*P. aeruginosa, and S. typhimurium* (Gupta *et al*., 2008). In another study on *Tephrosia purpurea*, the roots showed antimicrobial activity against *P. aeruginosa* and no activity against *S. aureus* and *E.coli* (BNLD Rangama *et al*., 2009). Chinniah *et al*., in 2009 and Annalakshmi *et al*., in 2009 proved *Tephrosia purpurea* to have marked activity against *H. pylori*, an agent responsible for GIT ulcers (Chinniah *et al*., 2009; Annalakshmi *et al*., 2009). The methanolic leaf extract from *Tephrosia tinctoria* showed activity against *B. subtilis, S. marceseans*, and low activity for *B. cereus* and *P. aeuriginosa* (Ganapaty *et al*., 2010). *Tephrosia deflexa* and its isolated compounds were studied for antibacterial activity (Kare *et al*., 2006). The antibacterial activity of *Tephrosia linearis* has also been reported (Ratsimamanga *et al*., 1994). The MICs of *Tephrosia toxicaria* extract, showed antimicrobial activity against Grampositive and Gram-negative bacteria, with the best effect of 12a-hydroxy-α-toxicarol against to the grown of Gram-positive *S. aureus* 358 with MIC 256 µg/mL, while Deguelin is responsible for the best result, the Gram-negative bacteria, *P. aeruginosa* was inhibited at 64 µg/ml(ARRIAGA *et al*, 2017). The organic solvents of leaves of *T. cinerea* were tested against *E. coli*&*Pseudomonas aeruginosa*& the MIC'S were recorded as the lowest concentration of the extract showing no visible growth of the broth. The various extracts of *T. villosa* roots showed a moderate anti-bacterial and anti-fungal activity (Ganapaty *et al*., 2008. The chloroform root extract of *T. calophylla* were tested for anti-bacterial and anti-fungal activity and showed moderate activity. The activity of the extracts increased with increasing concentrations (Abayasekara *et al*., 2009; Ramadevi, *et al*., 2014).

Anti-fungal activity

Tephrosia purpurea exhibited anti-fungal activity. This was found against 61 endophytic fungus strains with different colony morphologies isolated from the leaves, stem, and root of *T. purpurea*. Anti-fungal activity when measured by dual culture testing, out of 61 isolates, depending on the colony morphologies, the isolates exhibited broadest anti-fungal spectrum of activity, hence proving promising anti-fungal activity of the bioactive components present in *T. purpurea* (Luo *et al*., 2015). *Tephrosia hildebrandtii* showed anti-fungal activity against *Cladosporium cucumerinum*. The activity was found to be related to a chemical constituent isolated from its roots (Lwande *et al*., 1985). *Tephrosia tinctoria* also showed activity against *Aspergillus niger* and *Candida albicans* (Lakshmi *et al*., 2010. The methanolic extract was found to be more active against the aforementioned organisms. However the methanolic extract showed no activity against *S. cerevisiae* (Ganapaty *et al*., 2010).

Antiprotozoal and antiplasmodial activity

Extract from the seed pods of *Tephrosia elata* showed antiplasmodial activity (Muiva *et al*., 2009; Muiva, 2012). Flavonoid extracted from the roots of *Tephrosia pumila* also showed activity against *L. donovani*,*T. b. rhodesiense* and *T. cruzi* (Ganapaty *et al*., 2008b). Isolated flavonoids from the root of*Tephrosia tinctoria* were studied for antiprotozoal and antiplasmodial activities against *T. b. rhodesiense*,*T. cruzi, L. donovani*, and *P. falciparum* (Ganapaty *et al*., 2009a). Ganapaty also studied the antiprotozoal activity of three Tephrosia species, namely, *T. pulcherrima, T. pumila*, and *T. calophylla* on Leishmania, Trypanosoma and Plasmodium parasites (Ganapaty *et al*., 2009c). Chloroquine sensitive and chloroquine resistant strains of *P. falciparum* were inhibited by the extracts from the stem of *Tephrosia purpurea* with IC50 values of 10.47 ± 2.22 µg/ml and 12.06 ± 2.54 µg/ml, respectively (Juma *et al*., 2011). Tephrosia purpurea has also been studied for antileishmanial activity in hamsters and Indian langular monkeys infected by *L. donovani* (Sharma *et al*., 2003).Pumilanol (12) from *T. pumila* exhibited significant antiprotozoal activity against *T. rhodensiense, T. cruzi and L. donovani* with IC50 of 3.7, 3.35 and 17.2 µg/mL, respectively. The crude extract of the seedpods of *T. elata* showed antiplasmodial activities against D6 and W2 strains of *P. falciparum* with IC50 values of 8.4 ± 0.3 and 8.6 ± 1.0 µg/mL, respectively[14].

Anti-pyretic and Anti-inflammatory activity

In 2010, Sandhya *et al*., studied the anti-inflammatory activity of two species of Tephrosia namely *Tephrosia maxima* and *Tephrosia purpurea* by HRBC membrane stabilizing method. Both plants showed almost equal activity at doses of 500ug/ml. *Tephrosia maxima* giving 79.49% and *Tephrosia purpurea* giving 79.01% protection (Sandhya *et al*., 2010). Another study on Tephrosia purpurea root extracts showed its antipyretic and anti inflammatory activity (Valli *et al*., 2011). The methanolic extract of *Tephrosia vogelii* showed significant analgesic and anti-inflammatory activity in mice and rats using hot plate method and egg albumin induced oedema respectively (Adaudi *et al*., 2009). The root extract of *Tephrosia sinapou* showed to possess significant anti-inflammatory activity. The extract reduced inflammatory leukocyte recruitment, oxidative stress and other parameters involved directly or indirectly to the process of inflammation (Martinez *et al*., 2012). *Tephrosia spinosa* also showed anti inflammatory activity in an experimental model of carrageenin induced paw edema. The standard drug used was indomethacin (Chakradhar *et al*., 2005). The antipyretic activity of *Tephrosia bracteolata* has also been reported (Onaolapo *et al*., 2009).The chloroform fraction of the methanol crude extract of *Tephrosia bracteolata* possesses analgesic and anti-inflammatory activities(sadam, a. a.,2020).Literature survey revealed the anti-inflammatory activity of ethanolic extract of the *T. purpurea* root using carrageenaninduced model. It was found that the inflammation was significantly reduced in the extract treated when compared with the inflamed group rats (Praveena *et al*., 2011). The ethyl acetate extract of *T. sinapou* was evaluated for the anti-inflammatory activity. The anti-inflammatory activity was proven by inhibiting the recruitment of total leukocytes and neutrophils, induced by a variety of inflammatory stimulus. This action may be attributed due to the presence of flavonoid and phenolic components present in the extract (Martinez *et al*., 2012). (-)-pseudosemiglabrin which is a major phytoconstituent isolated from *Tephrosia apollinea* possesses anti-inflammatory activity that was confirmed by measuring the levels of interleukin-1 (IL-1), tumor necrosis factor-α (TNF-α), and nitric oxide (NO) in in-vitro method. In-vivo activity was confirmed by the potential inhibition of granuloma tissue, thereby lowering the production of cytokines (Hassan *et al*., 2016)

Anti-cancer and cytotoxic activity

Cytotoxicity of some chemical compounds found in*Tephrosia calophylla* and *Tephrosia candida* have been studied using different cell lines (Ganapaty *et al*., 2009a; Ganapaty *et al*., 2009b; Roy *et al*., 1986; Parmar *et al*., 1988). The cytotoxicity of *Tephrosia pulcherrima* and *Tephrosia pumila* has also been studied by Ganapaty *et al*., in 2009 using HT-29 and RAW cell lines (Ganapaty *et al*., 2009c). In 2011 Kishore *et al*., mentioned *Tephrosia purpurea* containing an important chemical, B-sitosterol having anticancer and cancer protective activities against prostatic, breast and colonic carcinomas. In addition to the aforementioned activities of B-sitosterol, it is also an antioxidant and has significant effect on hypercholesterolemia and BPH (Kishore and Roy, 2011). In another study the anticarcinogenic activity of *Tephrosia purpurea* extract was tested in an experimental model of hepatocarcinoma in rats. The extract showed significant cancer chemoprevention (Hussain *et al*., 2012). Shanmugapriya *et al*., also studied the anticarcinogenic potential of Tephrosia purpurea in HELA cervical cancerous cell line. Different extracts were tested out of which ethyl acetate produced the most potent effect (Shanmugapriya *et al*., 2011). In a study by Subhadra, three species namely, *Tephrosia calophylla, Tephrosia maxima* and *Tephrosia purpurea* showed significant cytotoxic activity out of which *Tephrosia calophylla* showed the maximum activity (Subhadra *et al*., 2011). The

ethanolic fruit and root extract of *Tephrosia villosa* showed toxicity to brine shrimp whereas the extract from leaves and twigs was found to be non toxic (Nondo *et al*., 2011). The ethyl acetate extract from stems of Tephrosia toxicaria possess flavonoids having cancer chemopreventive activities (Jang *et al*., 2003). The flavonoids extracted from *Tephrosia tinctoria* possess cytotoxic activity tested in Cell line L-6 (Rat skeletal muscle myoblasts) (Ganapaty *et al*., 2009a). *Tephrosia calophylla* was also found to possess anticancer activity. The root extract inhibited growth and induced apoptosis in the human breast carcinoma (Adinarayana *et al*., 2009). *Tephrosia vogelii* root and leaf extract was found to be toxic to brine shrimps at doses of LC50: 0.960; 0.958 µg/ml, respectively (Wanga *et al*., 2007).*Tephrosia purpurea* exhibited better anti-cancer activity when tested using human MCF 7 cell lines (estrogen receptor dependent and carries the tumor suppressor p53 gene), an in-vitro method. Mainly due to the presence of flavonoids, this genus exhibits the chemo preventive role which effects proliferation and angiogenesis (Gulecha and Sivakuma, 2011). The other species, *T. apollinea* also demonstrated the anti-cancer activity. After carrying out many investigations, it is evident that the plants are a good source of anti-cancer agents. A prenylated flavone, isoglabratephrin was isolated using bioassay guided technique from the aerial parts of *T. apollinea*. The three human cancer cell lines, namely, prostate (PC3), pancreatic (PANC-1), colon (HCT116), and one normal cell line (human fibroblast) were used for the study. It was observed that the isoglabratephrin displayed inhibitory activity against proliferation of PC3 and PANC-1 by inducing chromatin dissolution, nuclear condensation, and fragmentation, thus providing an evidence to treat human prostate and pancreatic malignancies (Hassan *et al*., 2017). The cytotoxicity of isolated compound from *Tephrosia apollinea* was evaluated against nine cancer cell lines. In addition, human fibroblast was used as a model cell line for normal cells. The results showed that (-)-pseudosemiglabrin exhibited dose-dependent antiproliferative effect on most of the tested cancer cell lines. Selectively, the compound showed significant inhibitory effect on the proliferation of leukemia, prostate and breast cancer cell lines. Further studies revealed that, the compound exhibited proapoptotic phenomenon of cytotoxicity.

Hepatoprotective activity

The hydro-alcoholic extract of aerial parts of *T. purpurea* was studied for its hepatoprotective activity against arsenic induced hepatotoxicity which causes acute hepatic injury and hepatocellular necrosis, thereby causing leakage of cellular enzyme (Gora *et al*., 2014). The stems of T. purpurea were extracted using methanol and investigated for its hepatoprotective activity (Verma *et al*., 2017). The ethyl acetate fraction of ethanolic extract of *T. purpurea* was investigated for its hepatoprotective activity against carbon tetrachloride induced hepatocellular injury. In all the above investigations, it was observed that the extracts significantly reduced the serum alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, total bilirubin and also reduced necrosis and inflammation when compared with the toxic group. It was also observed that there was also a higher lipid peroxidation (LPO) and lower glutathione levels. These activities were due to the presence of polyphenolic compounds and flavonoids in the extracts of *T. purpurea* (Shah *et al*., 2011). The methanolic extract of *Tephrosia calophylla* also possesses hepatoprotective activity due to the presence of flavonoids (Adinarayana *et al*., 2011).

Animal feed

In an effort to find new and cheap sources of food for animals, several species of genus *Tephrosia* have been studied. The nutritive value of three species of *Tephrosia*, namely, *Tephrosia candida, Tephrosia bracteolata*, and *Tephrosia linearis* have been studied (Babayemi *et al*., 2003). According to Babayemi and Bamikole, a mixture of *Tephrosia candida* leaves and guinea grass can serve as a good animal feed. The mixture has an additional benefit of low methane production upon fermentation (Babayemi and Bamikole. 2006b). *Tephrosia bracteolata* can serve as a good diet in laying hens both from nutritive and economic aspect (Akande *et al*., 2008). *Tephrosia vogelii, Tephrosia candida*, and *Tephrosia purpurea* can also be a good addition in the diet of ruminants (Mbomi *et al*., 2011). The use of *Tephrosia candida* and *Tephrosia bracteolata* in goats has also been established (Babayemi and Bamikole 2006a). A study on *Tephrosia candida* seeds has also been reported (Babayemi and Bamikole 2007).

Larvicidal, insecticidal and anti-feedant activity

Different species from the genus have been studied for larvicidal, insecticidal, and anti-feedant activities. There is an extensive work on the study of *Tephrosia* as an agent to control the population of insects harmful to animals and plants. The hexane extract from *Tephrosia egregia* showed potent larvicidal activity against *Aedes aegypti* (Arriaga *et al*., 2009a). The whole plant extract of *Tephrosia purpurea* was tested for its larvicidal activity against the larvae of *Culex quinquefasiciatus*. The extract showed 100% mortality in very small doses suggesting its beneficial use in controlling the mosquito

reproduction (Deepak Kumar *et al*., 2012). The extracts of *Tephrosia vogelii* also possess larvicidal activity and therefore can be used to control mosquitoes (Matovu and Olila. 2007). The ethanolic extract of roots, leaves, fruit and twigs of *Tephrosia villosa* showed significant activity against *C. quinquefasciatus* larvae (Nondo *et al*., 2011). The ethanol extract from roots, stems, leaves, and pods and some fractions of *Tephrosia toxicaria* were tested for lavicidal activity with the larvae of *Aedes aegypti*. The ethanolic root extract, hexane and chloroform fractions had (LC50 47.86 ppm), (LC50 23.99 ppm) and (LC50 13.80 ppm) respectively (Vasconcelos *et al*., 2009). *Tephrosia nyikensis* have been reported to possess larvicidal activity on Anopheles mosquito's larvae (Wanjala *et al*., 2006). The oil obtained from *Tephrosia cinerea* showed larvicidal activity against *Aedes aegypti* larvae (Arriaga *et al*., 2008). The chloroform and methanol extracts of *Tephrosia nubica* were tested against *Spodoptera littoralis* and *Agrotis ipsilon*. The population of the pests was reduced due to the effect of the extract on all the stages of growth (Sharaby and Ammar, 1997). *Tephrosia vogelii* leaf extract was found to be effective in controlling ticks, an important insect and ectoparasite (Gadzirayi *et al*., 2010). *Tephrosia magropoda* is also reported to have insecticidal properties (Tatteksfield and Gimingham, 1932). In 2012, Kalume *et al*., reported the acaricidal activity of leaf extracts of *Tephrosia vogelii* on tick *Rhipicephalus appendiculatus* and mentioned its advantage of being economical than synthetic compounds (Kalume *et al*., 2012). The insecticidal property of *Tephrosia purpurea* whole plant was tested against *Callosobruchus maculates* the pest on *Phaseolus mungo* (Diwan and Saxena, 2010). In 1992, Kole *et al*., isolated a rotenoid, amorpholone from *Tephrosia candida* having potent insecticidal properties (Kole *et al*., 1992). *Tephrosia elata* showed significant antifeedant activity against *M. testulalis, S. exempta* and*E. sacchariana*. The antifeedant activity is attributed to the presence of rotenoid compounds (Bentley *et al*., 1987). The larvicidal activity from seed pods of *Tephrosia elata* and *Tephrosia aequilata* has also been studied by Muiva, against the larvae of *Aedes aegypti* (Muiva, 2012). Antifeedant activity of flavonoids from *Tephrosia emoroides* was tested against *Chilo partellus*, a very destructive pest of maize. Emoroidenone, a flavonoid isolated showed strong feeding deterrence of 66.1% against the larvae at a dose of 100 µg (Machocho *et al*., 1995). The roots of *Tephrosia hidebrandtii* also possess antifeedant activity against the pest, *Maruca testulalis* (Lwande *et al*., 1985).

Antidiabetic activity

The aqueous seed extract of *Tephrosia purpurea* showed significant antihyperglycemic activity in streptozotocin induced diabetic rats (Pavana *et al*., 2009). The ethanolic extract of from *Tephrosia villosa* leaves showed reduction in glucose level and pancreatic cell regeneration in alloxan induced diabetes in rats (Ahmad *et al*., 2009). Balakrishnan *et al*., also repoted antidiabetic activity of extract from root of *Tephrosia villosa* (Balakrishnan *et al*., 2007).The anti-diabetic activity of methanolic extract of *T. calophylla* was carried out both by in-vitro and in-vivo methods against alloxan-induced diabetes in albino Wistar rats. The results showed that there was a significant reduction in the blood glucose levels when compared with the diabetic control group. The extract was also effective in reducing the serum concentrations of serum glutamic oxaloacetic transaminase, triglycerides (TG), total cholesterol (TC) and urea, and increased insulin level. *Tephrosia calophylla* could also inhibit the in-vitro α-glucosidase and α-amylase activity (Ramesh and Rani, 2018). The flavonoid rich fraction of the ethanolic extract of *T. purpurea* was used to evaluate the anti-diabetic activity (Bhadada and Goyal, 2016). The extract was well effective in providing the beneficiary effects on diabetes-induced cardiovascular complications as well as in the treatment of cataract and these activities may be attributed due to the presence of flavonoid, quercetin, and rutin present in this genus (Bhadada *et al.,* 2016). The anti-diabetic activity of the silver nanoparticles using aqueous extract of *Tephrosia tinctoria* was tested and the results showed significant free radical scavenging ability, inhibition of carbohydrate digestive enzymes (α-Glucosidase and α-amylase), and enhancement of glucose uptake rate (Rajaram *et al*., 2015)

GIT activity

Aqueous extract of *Tephrosia purpurea* root showed gastric ulcer healing and cytoprotective activities (Deshpande and Shah 2008). The extract of *Tephrosia calophylla* leaves showed significant antiulcer and cytoprotective activity at doses of 50mg/kg and 100mg/kg (Divya, *et al*.,). An investigation was carried out to analyze the stimulant effect on the Gastro Intestinal Tract (GIT) smooth muscles of methanolic extract of *T. vogelii*. This was demonstrated on the isolated rabbit jejunum which increased the contractions of intestinal smooth muscle. The extract, potentiates the contractile effect of acetylcholine (ACh) on intestinal smooth muscle by acting through the muscarinic cholinergic receptors, involving the mobilization of extracellular calcium ions. This result strongly provides the evidence for the purgative activity of *T. vogelii* (Dzenda *et al*., 2007; 2008b; 2015).

Antihyperlipidemic effect

The antihyperlipidemic effect of *Tephrosia calophylla* has been studied in wistar albino rats (Mohan, 2011). The leaf extract of *Tephrosia purpurea* showed antihyperlipidemic activity in an experimental model of diabetic rats (Pavana *et al*., 2007). Akhtar *et al*., also studied *Tephrosia purpurea* for the same purpose and found a significant reduction in all the parameters (Akthar *et al*., 2011). Toxicity of *Tephrosia purpurea* extract was evaluated by Talib *et al*., in 2012 for its toxicity in rodents. A dose up to 2000mg/kg was well tolerated in the acute toxicity studies whereas in sub acute toxicity studies, a dose 200mg/kg and 400 mg/kg showed no significant change in any of the parameters thus concluding that the plant is safe for use in treatment of different diseases (Talib Hussain *et al*., 2012). *Tephrosia toxicaria* used as a fish poison was studied by Clark in 1930. A compound, Toxicarol was identified as the major component (Clark, 1930). The toxicity of *Tephrosia vogelii* was reported on mice. The signs were similar to those associated with the toxicity from rotenone. The LD50 of leaf extract calculated was 134.16 mg/kg (Dzenda *et al*., 2008a). The chloroform extract of *Tephrosia tinctoria* leaves exhibited significant piscicidal activity compared to methanolic extract in gold fish (Ganapaty *et al*., 2010). Toxic hepatopathy was reported in sheep grazing on *Tephrosia cinerea*. The disease was also experimentally induced in the sheep in order to confirm the results (Santos *et al*., 2007). *Tephrosia apollinea* was also found to be toxic in a study on goats (Suliman *et al*., 1982). The toxicity of *Tephrosia bracteolata* has also been studied (Onaolapo *et al*., 2009). In a study on mice Cai *et al*., found *Tephrosia candida* to be safe and no significant signs of toxicity were observed (Cai *et al.,* 2010).

Anthelmintic activity

The ethanolic extract of *T. calophylla* roots was screened for anthelmintic activity at various concentrations against adult Indian earthworm, *Pheretimaposthuma*, as it shows anatomical and physiology resemblance with intestinal round worm's parasite of human beings. The results obtained in this study proved that the efficacy of ethanolic extract *T. calophylla* taken at the dose of 100 mg/ml showed significant anthelmintic activity and it is a dose dependent activity which may be due to the presence of flavonoids (Devi *et al*., 2017). In another study, the methanolic and aqueous leaf extract of *T. purpurea* also demonstrated invitro anthelmintic activity (Manjula *et al*., 2013).

Larvicidal activity

Extensive work has been done on *Tephrosia* as an agent to control the population of insects harmful to animals and plants. The larvicidal activities of *T. egregia* extracts and its major component, dehydrorotenone, were tested against *Aedes aegypti* larvae. The hexane extract of stems of *T. egregia* showed potent larvicidal activity (Arriaga *et al.,* 2009). The larvicidal activity of petroleum ether and ethyl acetate extract of *T. purpurea* was tested against the larvae of *Culex quinquefasiciatus* thus proving to be the most promising, more selective and biodegradable agent (Kumar *et al.,* 2012). The ethanol extract of roots, stems, leaves, and pods and some fractions of *T. toxicaria* were tested for lavicidal activity with the larvae of *A. aegypti.* It was found that rotenoids from *T. toxicaria* were responsible for larvicidal activity (Santiago *et al.,* 2012). The extracts of *T. villosa* and *T. pumila* also possess larvicidal activity and therefore can be used to control mosquitoes (Kidukuli *et al.,* 2015). The oil obtained from *Tephrosia cinerea* showed larvicidal activity against *A. aegypti* larvae (Arriaga *et al.,* 2008). Flavonoids from the seedpods of *T. elata* and *Tephrosia aequilata* were found to possess anti-plasmodial and larvicidal activity. *Tephrosia elata* showed significant anti-feedant activity against *M. testulalis, S. exempta* and *E. sacchariana* (Atilaw *et al.,* 2017; Muiva *et al*., 2009).

Anti-ulcer activity

The ethanolic extract of *T. calophylla* leaves is reported to have anti-ulcer activity, when investigated using pylorus ligation, ethanol induced, and indomethacin-induced ulcer models. The extract was tested at two different doses. The results revealed that in all the three models, the extract showed dose dependent reduction in gastric volume, free acidity, ulcer index, and total acidity, thus proving the potential anti-ulcer activity. This activity is may be due to anti-secretory property of flavonoids present in the extract (Divya *et al.*, 2011). The aqueous extract of roots of *T. purpurea* was evaluated for anti-ulcer activity using different models of gastric and duodenal ulceration in rats. The results suggested that the extract possesses significant anti-ulcer property which could be either due to cytoprotective action of the drug or by strengthening of gastric and duodenal mucosa, and thus enhancing mucosal defense (Deshpande *et al.,* 2003).

Anti-nociceptive activity

Ethyl acetate extract of *T. sinapou* possessed antinociceptive effect when tested against acetic acid, phenyl-pbenzoquinone, formalin, and complete freund's adjuvant-induced writhing response by

causing mast cell activation leading to the release of inflammatory cytokines (TNF-α, IL-1β, and eicosanoids) resulted in inhibition of inflammatory overt pain-like behavior in mice. The analgesic property was due to the presence of phenolic compound, thus proving promising anti-nociceptive activity (Martinez *et al.,* 2012). The ethanolic extract of *Tephrosia falcliformis* root was screened for anti-inflammatory activity by three different models. The result revealed the reliving effect through peripheral action of the extract (Kumar *et al.,* 2007).

Wound healing

Upon many literature surveys, researchers have even found the cutaneous wound healing (a complex physiological process) activity of ethyl acetate extract of *T. purpurea*. The extract was prepared and applied externally in the form of ointment (5%w/w) to rats. The study showed the extract processed healing action which was reflected by the improved collagen (predominant extracellular protein in granulation tissue of wounds) maturation by increased cross-linking and increased levels of hydroxyproline, a major constituent of collagen which serves as the indicator of replacement of collagen tissue, thereby promoting rapid wound healing process (Lodhi *et al.,* 2006). Since flavonoids have been reported to have anti-oxidant and anti-inflammatory properties, *T. purpurea* is also believed to act as a health promoting substance and are reported to have important role in healing of wound (Lodhi *et al.,* 2016).

Miscellaneous activities

The root extract of *Tephrosia purpurea* showed xanthine oxidase inhibitory activity compare with standard, Allopurinol (Nile and Khobragade, 2011). Patel *et al.,* studied the effect of *Tephrosia purpurea* on polycystic ovary syndrome (PCOS) in rats. (PCOS) was induced by the administration of Letrozole. The dried seed powder given orally showed normalization in the estrous cycle and reduction in the weight of the reproductive system as well as of the ovary (Patel and Thakor, 2012). Kumar *et al.,* found*Tephrosia purpurea* to be effective anxiolytic agent and comparable to the standard drug, Diazepam. The hydroalcoholic extract at a dose of 200mg/kg and 400mg/kg orally was administered to mice in different maze models in the study (Kumar, *et al.,* 2011). The acetylcholinesterase inhibitory activity of *Tephrosia purpurea* and neurobehavioral studies were made on zebra fish, a model for the study of neurodegenerative activities (Kannan and Vincent, 2012). *Tephrosia purpurea* has also been proved for its antiepileptic effect (Asuntha *et al.,* 2010). Lodhi *et al.,* studied the flavonoidal extract of *Tephrosia purpurea* and proved its potential for healing burn wounds. This activity is supposed to be due to its free radical scavenging property (Lodhi *et al.,* 2010). The anti allergic effect of *Tephrosia purpurea* has been reported (Gokhale and Saraf 2000). The extract of *Tephrosia purpurea* stabilized mast cells significantly showing its usefulness in the treatment and management of asthma (Gajera Paresh Lallubhai and Dalal Mittal, 2011). In another study *Tephrosia purpurea* showed spasmolytic activity in the trachea of guinea pigs thus strengthening the view of its use in asthma (Soni *et al.,* 2004). Tephrosia purpurea has also been studied for its immunomodulatory effect (Damre *et al.,* 2003). Ashokkumar *et al.,* studied the diuretic activity of methanol extract of Tephrosia purpurea (Ashokkumar *et al.,* 2012). Theaqueousextract from roots of *Tephrosia purpurea* also posses antilithiatic activity (Swathi *et al.,* 2008). Still another study was made on the *Tephrosia purpurea* leaves for its protective and curative ability for renal injury in rats (Jain and Singhai, 2009). Study on chemical constituents of *Tephrosia candida* revealed a sesquiterpene having significant estrogenic activtity (Hegazy *et al.,* 2011). The chloroform and methanolic extract of *Tephrosia spinosa* showed significant ant helmintic activity against earth worms (*Pheretima posthuma*) (Ilango *et al.,* 2011). The leaf extract of *Tephrosia vogelii* was found to possess significant anthelmintic activity against *Ascaridia galli*, a parasite in chicken (Siamba *et al.,* 2007). The methanol extract of *Tephrosia vogelii* produced significant reduction in the blood pressure of cats (Adaudi *et al.,* 2009).

Toxicity

Tephrosia purpurea extract was evaluated by Talib *et al.,* in 2012 for its toxicity in rodents. A dose up to 2000mg/kg was well tolerated in the acute toxicity studies whereas in sub acute toxicity studies, a dose 200mg/kg and 400 mg/kg showed no significant change in any of the parameters thus concluding that the plant is safe for use in treatment of different diseases (Talib Hussain *et al.,* 2012). *Tephrosia toxicaria* used as a fish poison was studied by Clark in 1930. A compound, Toxicarol was identified as the major component (Clark, 1930). The toxicity of *Tephrosia vogelii* was reported on mice. The signs were similar to those associated with the toxicity from rotenone. The LD50 of leaf extract calculated was 134.16 mg/kg (Dzenda *et al.,* 2008a). The chloroform extract of *Tephrosia tinctoria* leaves exhibited significant piscicidal activity compared to methanolic extract in gold fish (Ganapaty *et al.,* 2010). Toxic hepatopathy was reported in sheep grazing on *Tephrosia cinerea*. The

disease was also experimentally induced in the sheep in order to confirm the results (Santos *et al.,* 2007). *Tephrosia apollinea* was also found to be toxic in a study on goats (Suliman *et al.,* 1982). The toxicity of *Tephrosia bracteolata* has also been studied (Onaolapo *et al*., 2009). In a study on mice Cai *et al*., found *Tephrosia candida* to be safe and no significant signs of toxicity were observed (Cai *et al.,* 2010).

CONCLUSION

The plants of genus *Tephrosia* are of high therapeutic importance. We can see that a large number of species are studied for their chemical constituents. Mostly studied compounds flavonoids, terpenoids, sterols, rotenoids, etc which are present in different species and also their diverse pharmacological activities such as hepatoprotective, anti-diabetic, anti-oxidant,anti-cancer, anti-hyperlipidemic, anti-ulcer, antibacterial, anti-fungal, larvicidal, anti-inflammatory, wound healing and anti-feedant activities of few species. Among all the phytoconstituents, flavonoids were the major constituent isolated from most of the species. Hence, the present review summarized the significant research works conducted on the *Tephrosia* genus, its phytoconstituents and biological uses which can be further studied to explore potent bioactive molecules in search of newer herbal drugs with great therapeutic significance.

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