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Review Article

Pharmacological Activities of the Genus *Globimetula* and *Scurrula*

Kamal Ja'afar Muhammad*

Chemistry Advanced Research Centre, Sheda Science and Technology Complex, Garki, Abuja-Nigeria
*Corresponding author: kamaljmohd83@gmail.com

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ABSTRACT

This article aims to deliver updates on the pharmacological activities of *Globimetula* and *Scurrula* species and their usage as ethnomedicine worldwide. About 13 species of *Globimetula* and 10 species of *Scurrula* are spread in Africa and Asia respectively. There is a need to establish the pharmacological properties of the plant extracts and isolated compounds from these species. Research on the biological activities of *Globimetula* and *Scurrula* species showed considerable disease-related enzyme (tyrosinase) inhibition as well as antioxidant, anti-inflammatory, antimicrobial, anticonvulsant, central nervous system depressant, and cytotoxic activities. This review also affords important information for the future growth of isolated compounds from *Globimetula* and *Scurrula* species.

Keywords: Loranthaceae, phytochemicals, alkaloids, triterpenes, flavonoids

1. INTRODUCTION

Medicinal plants have customarily taken an imperative position in the socio-cultural, religious, and medicinal arena of rural and ethnic lives worldwide (Ramawat, 2004). An estimation by the World Health Organization (WHO) shows that 80% of the population in developing nations depends on conventional remedies, mainly plant-based drugs for their primary health care need. Also, contemporary pharmacopeia was of natural origin and still comprises at least 25% of remedies originated from plants while numerous drugs are synthetic analogs developed on prototype compounds isolated from plants (Philipson, 2001). The Ayurvedic medicinal system of herbal medication in India and Sri Lanka recorded in Susruta and Charaka has more than 8000 plant medications. Similarly, China has excellently exhibited the use of conventional medicine in maintaining health care. It has been pharmacologically certified and enhanced numerous traditional herbal medications thus ultimately assimilating them into the authorized healthcare system (Ebadi, 2007; Kumar et al., 1997). Therapeutic practices of naturally occurring medicinal plants vary from the administration of the leaves, plants barks, roots, stems, and seeds to the use of oils, extracts, and decoctions in different forms (Ogbulie et al., 2004). Various complex chemical constituents of plant such as alkaloids, essential oils, flavonoids, saponins, tannins, triterpenes and other chemical compounds, which possesses preventive and medicinal properties are commercially essential and are used in several pharmaceutical companies. Plants can provide pronounced biologically active molecules and lead structures for the development of enhanced derivatives with improved activity for healing benefits compared to allopathic drugs (Newman et al., 2000; Newman et

al., 2003). Surveys into the biological and pharmacological activities of therapeutic plants for many decades have yielded compounds for the growth of modern synthetic organic chemistry and the increase of medicinal chemistry as a leading route for the discovery of novel and numerous active therapeutic agents. Moreover, the isolation and identification of the active constituents and elucidation of the mechanism of actions of a drug are very important (Newman et al., 2000; Newman et al., 2003; Ogbulie et al., 2004).

Genus *Globimetula* and *Scurrula* are one of the important groups of plants belonging to the Loranthaceae family. The common practice is the use of a group name called mistletoe for all these plants that obtain nutrients and water from their host plants *via* a well-developed system known as haustoria to connect to the host plants (Adesina et al., 2013). A total of 13 *Globimetula* and 10 *Scurrula* species are spread across tropical Africa and South-East Asia respectively. The similarities of Genus *Scurrula* are very noticeable with Afro-Asian in origin within which they represent some relatively unspecialized components (The Plant List, 2015; Barlow, 1991). Numerous species of these hemi parasitic plants parasitizing other cultivated, economic, and medicinal plants such as *P. thonningii*, *K. acuminata*, *Thea sinensis*, and *P. pinnata* have been perceived as disreputable and disturbing which pose severe damage to economically valuable plants. Very often, host trees that have many mistletoes suffer from them as the triumph of mistletoes leads to poor growth, productivity, and the ultimate death of such plants, especially during adverse climatic conditions. Parasitic plants can offer a valuable feedstock for pharmaceutical industries, consequently, their medicinal values should be considered in taking into account the nature of host species they are parasitizing as well as regional specificity (Lim et al., 2016). The information in this study includes the biological studies of both Genus *Globimeula* and *Scurrula* growing on different hosts based as reported in the literature.

2. ETHNOMEDICINE

Ethnomedicine broadly refers to the evaluation or comparison of traditional medicine based on bioactive compounds by various cultures for healing practices (Pieroni et al., 2005). There are several reports on ethnomedicine practices using different parts of *Globimetula* and *Scurrula* species by certain cultures in Africa, Asia, and other specific parts of the world. Table 1 highlights the available species of *Globimeula* and *Scurrula* discovered including their ethnomedicine practices and location.

3. PHYTOCHEMISTRY

The reports on the chemical constituents of *Globimetula* and *Scurrula* species were on *G. dinklagei*, *G. braunii*, *S. paracitica*, *S. ferruginea*, and *S. atropurpurea*. The investigations of their chemical constituents led to the discovery of several secondary metabolites such as alkaloids, flavonoids, phenolic compounds, sterols, and triterpenoids. Quercitrin or quercetin 3-*O*-α-L-rhamnoside isolated from numerous species of Loranthaceae plants has been reported to be their taxonomic marker (Tilne and Lubke, 1974; Lin and Lin, 1999; Francoise et al., 2002; Kazuyoshi et al., 2003; Young-Kyoon et al., 2004; Hassan et al., 2006; Mallavadhani et al., 2006; Yang et al, 2011; Bruno et al., 2015; Quan-Yu et al., 2015). The total compounds isolated from *Globimetula* and *Scurrula* species collectively from different locations in Africa and Asia were previously reported (Francoise et al., 2002; Kazuyoshi et al., 2003; Quan-Yu et al., 2015; Quan-Yu et al., 2016; Ja'afar et al., 2017; Muhammad et al., 2020; Danladi et al, 2022).

Table 1. Ethnomedicinal claims of *Globimetula* and *Scurrula* plants

Ailments	**Species**	**Location**	**References**
Cancer	*G. braunii*	Nigeria	Tizhe et al., 2015; Erukainure et al., 2011; Okpuzor and Kareem, 2009
	G. dinklagei	Cameroun	Mkounga et al., 2016
	G. oreophila	Nigeria	Osungunna et al., 2013
	S. parasitica	Indonesia	Francoise et al., 2002
	S. fusca	Indonesia	Takashi et al., 2001
	S. atropurpurea	Indonesia	Kazuyoshi et al., 2003; Nour et al., 2014
	S. atropurpurea	India	Puneetha and Amruthesh, 2016
Hypertension	*G. braunii*	Nigeria	Tizhe et al., 2015; Erukainure et al., 2011; Oboh and Nworgu, 2008; Fred-Jaiyesimi et al., 2008
	G. oreophila	Nigeria	
	G. cupulata	Nigeria	Okpuzor et al 2009
	S. ferruginea	Malaysia, China, Indonesia	Osungunna et al., 2013 Afolabi et al., 2016
	S. parasitica	India	Mohsen et al., 2014 Puneetha and Amruthesh, 2016
Ulcer	*G. brauni*	Nigeria	Tizhe et al., 2015; Erukainure et al., 2011; Okpuzor and Kareem, 2009
	S. parasitica	India	Puneetha and Amruthesh, 2016
Diabetes	*G. dinklagei*	Cameroun	Mkounga et al., 2016; Oboh and Nworgu,
	G. braunii	Niger	2008 Fred-Jaiyesimi et al., 2008; Okpuzor et
	G. oreophila	Nigeria	al., 2009
	G. cupulata	Nigeria	Osungunna et al., 2013 Afolabi et al., 2016
Malaria	*G. dinklagei*	Cameroun	Mkounga et al., 2016
	S. ferruginea	Malaysia, China, Indonesia	Mohsen et al., 2014
Headache	*G. braunii*	Nigeria	Tizhe et al., 2015; Erukainure et al., 2011
Rheumatism	*G. braunii*	Nigeria	Musa et al., 2014; Tizhe et al., 2015; Erukainure et al., 2011; Fred-Jaiyesimi et al., 2008
Pulmonary troubles	*G. braunii*	Nigeria	Tizhe et al., 2015; Erukaine et al., 2011
Cardiovascular disease	*G. braunii*	Nigeria	Okpuzor et al., 2009; Erukainure et al., 2011,
	G. oreophila	Nigeria	Osungunna et al., 2013
Epilepsy	*G. braunii*	Nigeria	Musa et al., 2014; Oboh and Nworgu, 2008
Infertility	*G. braunii*	Nigeria	Musa et al., 2014; Fred-Jaiyesimi et al., 2008
	G. oreophila	Nigeria	Osungunna et al., 2013
Stomach Problem	*G. braunii*	Nigeria	Musa et al., 2014; Fred-Jaiyesimi et al., 2008
Digestive aid	*G. braunii*	Nigeria	Fred-Jaiyesimi et al., 2008
Laxative	*G. braunii*	Nigeria	Musa et al., 2014; Fred-Jaiyesimi et al., 2008
Diarrhea	*G. braunii*	Nigeria	Oboh and Nworgu, 2008
Arthritis	*G. oreophila*	Nigeria	Osungunna et al., 2013
Insomnia	*G. oreophila*	Nigeria	Osungunna et al., 2013
Pneumonia	*G. oreophila*	Nigeria	Osungunna et al., 2013
Sickle cell anemia	*G. braunii*	Nigeria	Okpuzor et al., 2009
Cardiotonic	*S. parasitica*	China	Quan-Yu et al., 2015
Antioxidants	*S. parasitica*	China	Quan-Yu et al., 2015
Antineoplastic	*S. parasitica*	China	Quan-Yu et al., 2015
Gastrointestinal malfunction	*S. ferruginea*	Malaysia, China, Indonesia	Mohsen et al., 2014

4. PHARMACOLOGICAL ACTIVITIES

Genus *Globimetula and Scurrula* species have been exploited and have shown different medicinal potentials. The literature study has reported different pharmacological studies of the extracts and isolated compounds. The biological activities include anticonvulsant, antimicrobial, antityrosinase, antioxidant, cytotoxicity, hepatic and hematological, laxative, and hypoglycemic effects. Table 2 summarizes the bioactivities of extracts reported from *Globimetula and Scurrula*, while Table 3 reviews the biological bioactivities of the isolated compounds from *Globimetula and Scurrula* respectively.

Table 2. Bioactivities of genus *Globimetula* and *Scurrula* plants

Bioactivities	Extracts	Species/Host Plant	Description
Anticonvulsant	Ethyl acetate leaf extract	*G. braunii*/ *P. thonningii*	The fraction at 150 mg/kg protected 83.33% of the mice against pentylenetetrazole-induced seizure. (Musa et al., 2014)
Antioxidant	Methanol and ethyl acetate extracts	*G. braunii*/NR	Increase of lipid peroxidation in normal albino rats due to induced antioxidative enzymes (Okpuzor et al., 2009)
	Methanol, ethyl acetate, dichloromethane, and h-hexane extracts	*G. braunii*/ *P. thonningii*, *G. braunii*/ *P.biglobosa*	The MEOH extract of *G. braunii* parasitizing on *P. thonningii* displayed the highest DPPH activity of SC50 2.82 µg/mL. In ABTS, the ethyl acetate of *G. braunii* from *P. biglobosa* showed the highest activity of 138.9 µg/mL. MEOH extract of *G. braunii* parasite on *P. biglobosa* showed the highest FRAP equivalent value of 9.68 mM (Ja'afar et al., 2017)
	n-hexane, EtOAc, n-BuOH, and aqueous	*G. braunii*/ *L. leucocephala*	The EtOAc fraction exhibited the best activity among the partition fractions with significant ($p<0.05$) IC_{50} values of 8.58 and 154.87 µM in the DPPH and FIC assays, respectively (Oriola et al., 2021)
	Methanol and dichloromethane extracts	*G. oreophila*/NR	The extract exhibited strong free radical scavenging activity and reducing power. The antioxidative effectiveness of the extracts was evidenced in all the methods used for the antioxidant assays through their percentage inhibition and their IC_{50} values (Faboro et al., 2020)
Antibacterial	Ethanolic leaves extracts	*G. braunii*/NR	MIC value of 500 mg/mL against *S. aureus* and *E. coli*; MBC value of 500 mg/mL against *S. aureus* (Adewumi et al., 2011)
	Aqueous leaves extract	*G. braunii*/ *T. catappa*, *C. grandis*, *T. mantaly*, *K. sengalensis*	Minimum activity against *B. subtilis* (MIC 50 mg/mL; MBC 50 mg/mL) and MIC value of 100 mg/mL against *S. aureus*, *S. typhi*, and *E. coli* (Tizhe et al., 2015)
	Methanol/ Aqueous leaves extract	*G. braunii*/ *Eucalyptus*	The extracts produced good activity against *P. aeriginosa* which has shown resistance to both standards used (Inuwa et al., 2012)
	n-hexane, EtOAc, n-BuOH and aqueous	*G. braunii*/ *L. leucocephala*	The EtOAc fraction exhibited the best activity among the fractions, based on its lowest MIC range (0.63-5.00 mg/mL) and broad-spectrum activity against the test organisms. The power (FRAP) and capacity

			(TAC) of the EtOAc fraction were one sixth and halved more active respectively when compared with AA (Oriola et al., 2021)
	Methanol leaves extract	*G. oreophila*/NR	MIC value of 19.9, 3.5, 12.1, 14.1, 14.1, 10.0, and 8.9 mg/mL for *E. coli*, *K. pneumoniae*, *P. mirabilis*, *Shigella* spp., *S. typhi*, *P. aeruginosa* and *S. aureus* respectively (Osungunna et al., 2013)
Oxytocic	Aqueous leaves extract	*G. braunii*/ *C. sinensis*	The extract exhibited potent oxytocic effect on the uterine smooth muscle (Oboh et al., 2008)
Laxative	Ethanol leaves extract	*G. braunii*/ *C. acuminata*	Significant production of wet faeces (Fred-Jaiyesimi et al., 2008)
Antilipemic and hypocholesteremic	Methanol leaves extract	*G. braunii*/NR	Significant drop in the levels of total cholesterol, LDL-cholesterol, triglyceride and lipid peroxidation against induced hypercholesteremia in rats and restored the high levels of serum lipids to normal (Erukainure et al., 2011)
Lipid lowering	Methanol leaves extract, *n*-Hexane, $CHCl_3$, EtOAc, *n*-butanol and water fractions	*G. braunii*/NR	All the fractions produced significant drop of serum total cholesterol, triaglycerol and malonyldialdehyde levels in the tested rats (Okpuzor and Kareem, 2009)
Biochemical and toxicological	Ethanol leaves extract	*G. braunii*/ *C. acuminata*	Significant reduction in the triglyceride and blood chole sterol levels in the tested rats (Fred-Jaiyesimi et al., 2008)
Antiplasmodial	Methanol, ethyl acetate, dichloromethane and h-hexane extracts	*G. braunii*/ *C. acuminata*	*G. braunii* possess excellent and moderate antiplasmodial activity against susceptible and resistant *P. berghei*, respectively (Olanlokun et al., 2022)
Biochemical changes	Aqueous leaves extract	*G. cupulata*/NR	No antagonistic biochemical changes, renal damage or absence of hepatocellular with the use of the extract at the tested concentrations (David, 2009)
Hypoglycemic and hypotensive	Aqueous leaves extract	*G. cupulata*/NR	Significant dose dependent reduction in the levels of both streptozotocin induced diabetes and hypertensive Dahl salt-sensitive rats (Ojewole and Adewale, 2007)
Hepatic and hematologic	Methanol leaves extract, *n*-Hexane, $CHCl_3$, EtOAc, *n*-butanol and water fractions	*G. braunii*/NR	$CHCl_3$ fraction influenced the hematologic function and liver enzymes levels in the tested rats (Okpuzor et al., 2009)
Antihyperglycaemic	EtOH extract, dichloromethane, EtOAc, n-BuOH, Aqueous fractions	*G. braunii*/ *L. leucocephala*	Ethanol leaf extract exhibited greater than 5,000 mg/kg while its 100 mg/kg was the most active dose with comparable activity to the standard drug, glibenclamide (Ayoola et al., 2020)
Mitochondria-mediated apoptosis	Methanol, ethyl acetate, dichloromethane and h-hexane extracts	*G. braunii*/NR	The *n*-hexane fraction induced mitochondrial-mediated apoptosis through the opening of the mitochondrial pore, fragmentation of genomic DNA, increase in the levels of P53, bax, caspase 3 and 9 activation and cytochrome c release with concomitant decrease in the level of Bcl2 (Olanlokun et al., 2022)

Central nervous System Depressant	Ethanol	*G. braunii*/ *T. catappa*	The ethanol leaf extract significantly ($p<0.05$) prolonged the duration of sleep in mice at the dose of 800 mg/kg. The extract prolonged the time to complete the beam walk and exhibited significant decrease in number of head dips (Danladi et al., 2019)
	Ethanol	*G. braunii*/ *T. catappa*	Hexane fraction significantly ($p<0.05$) reduced latency to sleep and prolonged the sleeping time. Both chloroform and ethyl acetate fractions at highest and median doses showed significant increase in the duration of sleep compared to normal saline (Danladi et al., 2021)
Analgesic and Anti-inflammatory	Methanol stem extract	*G. braunii*/ *T. catappa*	The extract exhibited highest percentage inhibition of writhing (99.24%) at a dose of 1000 mg/kg. Also, the extract at lowest and highest dose (250 mg/kg and 1000 mg/kg) significantly ($p<0.05$) reduced paw size when compared to control group. The extract however, showed no central analgesic activity (Alhassan et al., 2023)
	Methanol and dichloromethane extracts	*G. oreophila*/NR	The extracts were potent as compared with the standard drugs used. The study revealed that the methanol extract of the plant in the in vivo studies was potent compared to the standard used (Faboro et al., 2022)
	Methanol and dichloromethane extracts	*G. oreophila*/NR	The MeOH extracts protected the stressed bovine erythrocyte membrane at some of the concentrations used and compare favourably with Diclofenac (standard drug) (Faboro et al., 2020)
Physicochemical	Ethanol extract, petroleum ether fraction and n-butanol fraction	*G. braunii*/ *A.indica*	The results indicated low levels of inorganic matter, silica and low levels of contamination by earth and heavy metals (Okpanaci et al., 2020)
Antioxidant	Ethanol, ethyl acetate and h-hexane extracts	*S. parasitica*/ *P. pinnata*	Ethyl acetate and methanol extracts exhibited effective antioxidant activities against DPPH, ABTS and FRAP assays, while n-hexane was inactive (Muhammad et al., 2020)
	Methanol leaves extract; petroleum ether, $CHCl_3$, EtOAc fractions	*S. paracitica*/ *H. integrifolia*	All the extracts displayed dose dependent antioxidant activity which increase with increased concentration of the extracts (Puneetha and Amruthesh, 2016)
	Acetone/water leaves, stem and flowers extracts	*S. ferruginea*/NR	All the extracts showed antioxidant activity in a dose dependent approach. (Mohsen et al., 2014)
	water, methanol, ethyl acetate, hexane extracts	*S. ferruginea*/NR	The stem methanol extract showed strong DPPH radical scavenging (IC_{50} value 27.81 µg/mL) and metal chelation activity (IC_{50} value 80.20 µg/mL). The stem aqueous extract showed the highest ABTS scavenging ability (Marvibaigi et al., 2016)
	Methanol, acetone, benzene, deionized water solvents	*S. ferruginea*/NR	Oven drying (60°C) using 80% acetone gave the optimum extract yield, content of phenolic compounds (TPC and TFC) and antioxidant activities (DPPH and FRAP) (Justine et al., 2019)
	Ethanol extract, water, ethyl	*S. atropurpurea*/ NR	The best antioxidant activity contained in ethyl acetate fraction with IC_{50} value was

	acetate, n-hexane fraction		14.08 ppm (very strong), followed by the ethanol extract of IC_{50} value of 21.92 ppm (very strong), the fraction of water with IC_{50} value of 89.57 ppm (very strong), and the fraction of n-hexane with IC_{50} value of 162.09 ppm (average), while the IC_{50} value of vitamin C was 4.41 ppm (very strong) (Mustarichie et al., 2017)
	Ethanol extract	*S. atropurpurea*/ NR	DPPH IC_{50} value of the extract is 0.35 ppm which can e categorized as very strong activity (Aditiyarini et al., 2022)
	Methanol, ethyl acetate and n-hexane extracts	*S. fusca*/ NR	Methanol, ethyl acetate and n-hexane extracts showed strong activity of IC_{50} vlalues 32.96, 27.35, and 40.31 µg/mL respectively (Sembiring et al., 2015)
Antityrosinase	Methanol, ethyl acetate and h-hexane extracts	*S. parasitica*/ *P. pinnata*	The ethyl acetate extract gave the highest tyrosinase percent inhibition value of 66.02% (Muhammad et al., 2018)
Anti-inflammatory	Stem aqueous extract	*S. ferruginea*/ *T. stans*	The extracts exerted anti-inflammatory capability attributed to inhibition of i-NOS and IL-1β mRNA expression (Hong et al., 2021)
	Methanol, ethyl acetate and h-hexane extracts	*S. ferruginea*/ *V. negundo* *M. minutum* *T. stans*,	*S. ferruginea* stems parasitising on *T. stans* and *V. negundo* which were freeze dried exhibited higher activity with IC_{50} values of 114.47 and 118.87 µg/mL, respectively (Hong et al., 2019)
Antioxidative and blood pressure lowering effect	Methanol leaves extract	*S. atropurpurea*/ NR	The extract decreased the oxidative stress and systolic blood pressure in deoxycorticosterone acetate-salt hypertensive rats (Nour et al., 2014)
Oxidative Stress	Methanol extract	*S. atropurpurea*/ NR	The administration of extract tends to increase f superoxide dismutase activity and decrease malondialdehyde concentration in this study, thus might be able to reduce oxidative stress in mice (Athiroh and Wahyuningshi et al., 2017)
Antimicrobial	Methanol, ethyl acetate and h-hexane extracts	*S. parasitica*/ *P. pinnata*	All extracts showed weak activity on antimicrobial inhibition assay (Muhammad et al., 2018)
Antibacterial	Acetone/water leaves, stem and flowers extracts	*S. ferruginea*/ NR	Significant activity against *P. putida* (MIC 225 µg/mL; MBC 225 mg/mL) recorded with the stem extract (Mohsen et al., 2014)
	Methanol, ethyl acetate and n-hexane extracts	*S. fusca*/NR	Methanol extract at concentration of 550 mg/ml is equal with activity of chloramphenicol at concentration of 1.5 mg/ml against gram positive bacteria (Sembiring et al., 2015)
Anti-nociceptive	Methanol of whole plant extract	*S. paracitica*/ *M. indica*	The extract at 400 mg/kg produced significant activity against acetic-acid induced pains in mice (Nilesh et al., 2013)
Antidiabetic	Ethanol extract	*S. paracitica*/NR	The extract shows significant results in lowering of blood glucose, triglyceride, cholesterol, LDL, ALP, SGOT and SGPT and increases the body weight and level of HDL after the 21 day (Laldingngheta et al., 2019)
Effect of extract on nitric oxide,	Methanol leaves extract	*S. atropurpurea*/ NR	The extract raised the total plasma nitrate/nitrite levels, raised the endothelial

endothelial damage and endothelial progenitor in hypertensive rats			pro-genitor number and reduced the circulating endothelial cells number compared to hypertensive groups (Nour et al., 2014)
Detoxification of Cadmium	Ethanol	*S. atropurpurea*/ NR	The extract reduces urea and blood creatinine levels on rat induced Cd with mean urea and creatinine levels of 38.46 and 1.74 mg/dL, respectively (Haernayanti et al., 2019)
Cytotoxicity	Methanol/ Aqueous stem extract	*S. ferruginea*/ NR	The methanol and aqueous extracts showed dose dependent cytotoxicity against MDA-MB-231 cells with IC_{50} of 19.27 and 50.35 µg/mL, respectively (Mohsen et al., 2016)
	water, methanol, ethyl acetate, hexane extracts	*S. ferruginea*/ NR	The stem methanol and aqueous extracts exhibited dose-dependent cytotoxic activity against MDA-MB-231 cells with IC_{50} of 19.27 and 50.35 µg/mL, respectively. Also, the extracts inhibited the migration and colony formation of MDA-MB-231 cells in a concentration-dependent manner (Marvibaigi et al., 2016)
	Ethanol extracts	*S. paracitica*/ *N. indicum*	The extract showed relatively improved anticancer activity among the host plants studied (Xiao et al., 2008)
	Ethanol extracts	*S. paracitica*/ *N. indicum* *M. alba* *O. fragrans*, *S. mulorossi*	Extract of parasitizing on *N. indicum* was the most sensitive to HL-60 cells. NISPEX induced HL-60 cell apoptosis and inhibited the cell proliferation in dose and time-dependent manner (Xiao et al., 2008)
	Ethanolic, chloroform and n-hexane extracts	*S. atropurpurea*/ NR	Chloroform and ethanolic extract showed best result for increasing expression of p53 protein that have crucial role in induction of apoptosis and inhibit the cell proliferation (Sudiwati et al., 2015)
Toxicity	Methanol and ethyl acetate extract, n-hexane fraction	*S. ferruginea*/ NR	The result showed the extract had cyctotoxic potential on shrimp larvae with LC_{50} of 84.01 ppm (Hardiyanti and Marpaung, 2018)

*NR = Not reported

Table 3. Bioactivities of chemical constituents of genus *Globimetula* and *Scurrula* species

Bioactivities	**Compounds**	**Species/Host Plant**; **Description**
Anticonvulsant	Quercetin, Quercitrin, Kaempferol 3-*O*-α-L-rhamnoside, (+)-Catechin, Lupeol, Lupeol palmitate, β -Sitosterol, Squalene	*S. parasitica*/*P. pinnata*; Quercetin significantly increased the mean onset of spasm in the unprotected animals. The compounds also differentially protected the mice against mortality (Muhammad et al., 2019)
Antioxidant	Globrauneine A, Globrauneine B, Globrauneine C, Globrauneine D, Globrauneine E, Globrauneine F, Lupeol, Lupeol palmitate, lup-20(29)-en-3β,15α-diol, Friedelin, Sitosterol, Octacosanoic acid, (1R,5S,7S)-[2-(4-hydroxyphenyl) ethyl]-2,6 dioxabicyclo [3.3.1]-nonan-3-one, Dodoneine, Quercetin, (+)-Catechin, Quercitrin, Rutin, Avicularin	*G. braunii*/*P. thonningii*: Quercetin exhibited the highest DPPH and ABTS scavenging capacity and also showed the highest ferric reducing antioxidant potential FRAP equivalent value (Muhammad et al., 2022)

	13,27-Cycloursane, Phyllanthone, Globraunone, Methyl 3,5-dihydroxy-4-methoxybenzoate, Methyl 3-methyl-4-hydroxybenzoate, Guaiacol, 4-Formaldehyde phenome, 6-Methoxy-2H-inden-5-ol	*G. braunii*/*L. leucocephala*; Guaiacol exhibited the best activity among the isolated compounds. Its activity was12 times better as a hydrogen-atom-donor than AA in the DPPH assay, while, in the FRAP assay, it was 0.76-times as good as a single-electron-donor when compared with AA. The FRAP assay, it was 0.76-times as good as a single-electron-donor (SET) when compared with AA (Oriola et al., 2021)
	Quercetin, Quercitrin, Kaempferol 3-O-α-L-rhamnoside, (+)-Catechin, Lupeol, Lupeol palmitate, β-Sitosterol, Squalene, Octacosane, Octadecane and Eicosane	*S. parasitica*/*P. pinnata*; Quercetin, quercitrin, kaempferol 3-O-α-L-rhamnoside, (+)-catechin exhibited effective antioxidant activities against DPPH, ABTS and FRAP assays (Muhammad et al., 2018)
Antityrosinase	Globrauneine A, Globrauneine B, Globrauneine C, Globrauneine D, Globrauneine E, Globrauneine F, Lupeol, Lupeol palmitate, Lup-20(29)-en-3β,15α-diol, Friedelin, Sitosterol, Octacosanoic acid, (1R,5S,7S)-[2-(4-hydroxyphenyl) ethyl]-2,6 dioxabicyclo [3.3.1]-nonan-3-one, Dodoneine, Quercetin, (+)-Catechin, Quercitrin, Rutin, Avicularin	*G. braunii*/*P. thonningii*: Quercetin and dodoneine displayed the highest tyrosinase inhibition activity with IC_{50} value of 0.12 and 0.19 mM, respectively (Muhammad et al., 2022)
	Quercetin, Quercitrin, Kaempferol 3-O-α-L-rhamnoside, (+)-Catechin, Lupeol, Lupeol palmitate, β-Sitosterol, Squalene, Octacosane, Octadecane and Eicosane	*S. parasitica*/*P. pinnata*; Quercetin gave the best result with tyrosinase percent inhibition value of 79.09% (Muhammad et al., 2018)
Antimicrobial	Globrauneine A, Globrauneine B, Globrauneine C, Globrauneine D, Globrauneine E, Globrauneine F, Lupeol, Lupeol palmitate, lup-20(29)-en-3β,15α-diol, Friedelin, Sitosterol, Octacosanoic acid, (1R,5S,7S)-[2-(4-hydroxyphenyl) ethyl]-2,6 dioxabicyclo [3.3.1]-nonan-3-one, Dodoneine, Quercetin, (+)-Catechin, Quercitrin, Rutin, Avicularin	*G. braunii*/*P. thonningii*: All the isolated compounds showed weak to not active in the antimicrobial inhibition assay (Muhammad et al., 2022)
	13,27-Cycloursane, Phyllanthone, Globraunone, Methyl 3,5-dihydroxy-4-methoxybenzoate, Methyl 3-methyl-4-hydroxybenzoate, Guaiacol, 4-Formaldehyde phenome, 6-Methoxy-2H-inden-5-ol	*G. braunii*/*L.leucocephala*; Globraunone was only inhibitory against *B. subtilis* at 2.50 mg/mL and fairly against *C. albicans* at 5.00 mg/mL (Oriola et al., 2021)
	Quercetin, Quercitrin, Kaempferol 3-O-α-L-rhamnoside, (+)-Catechin, Lupeol, Lupeol palmitate, β-Sitosterol, Squalene, Octacosane, Octadecane and Eicosane	*S. parasitica*/*P. pinnata*; All the compounds showed weak activity on antimicrobial inhibition assay with the exception of quercetin which exhibited moderate activity against *P. aeruginosa* with MIC and MBC value of 250 µg/mL (Muhammad et al., 2018)
Anti-hyperglycaemic	Phyllanthone, Methyl 2,6-dihydroxy-4-methoxybenzoate	*G. braunii*/*L. leucocephala*; Phyllanthone, and methyl 2,6-dihydroxy-4-methoxybenzoate elicited comparable activity to glibenclamide (5 mg/kg) at 10 and 20 mg/kg at all time-points (Ayoola et al., 2020)

Antibacterial	Globimetulin A, Globimetulin B	*G. dinklagei*/*M. esculenta*; Not sensitive to inhibition at 1500 μg/mL (Mkounga et al., 2016)
Cytotoxicity	Globimetulin A, Globimetulin B, Globimetulin C, 3-O-β-d-lucopyranosyl-α-amyrin	*G. dinklagei*/*M. esculenta*; Globimetulin B was significantly cytotoxic on cancerous cells with 50% inhibitory concentrations (IC_{50}) ranging from 12.75 to 37.65 μM and the selectivity index (SI) values varying between 1.13 and 3.48 against both normal cells (Njoya et al., 2020)
	Quercitrin, Quercetin, (+)-Catechin, Quercetin 3-*O*-α-L-arabinoside, (3β,7β)-7-Hydroxylup-20(29)-en-3-yl hexadecanoate, 7β,15α-Dihydroxylup-20(29)-ene-3β-*O*-palmitate, Lupeol, Lupeol palmitate, 3-Oxolup-20(29)-ene, Ursolic acid, Cycloeucalenol, Gitoxigenin 3-*O*-α-L-rhamnoside, Digitoxigenin 3-*O*-α-L-rhamnoside, Gitoxigenin 3-*O*-α-D-gluco-side.	*S. paracitica*/*N. indicum*; Quercetin, lupeol, ursolic acid, gitoxigenin-3-*O*-α-L-rham noside, digitoxigenin 3-*O*-α-L-rhamnoside and gitoxigenin 3-*O*-α-D-glucoside exhibited cytotoxic activi ty against cancer cell lines, PANC-1, HL-60 and SGC-7901 (Quan-Yu et al., 2015)
	Quercitrin, 4″-*O*-acetylquercitrin, Quercetin	*S. ferruginea*/NR; Quercetin, exhibited the most potent cytotoxic activity against four human cancer cell lines with IC_{50} μM on U251 (Francoise et al., 2002)
	Theobromine, Caffeine, Quercitrin Rutin, (+)-Catechin, (-)-Epicatechin, (-)-Epicatechin-3-*O*-gallate, (-)-Epigallocatechin-3-*O*-gallate, Aviculin, Oleic acid, Linoleic acid, Linolenic acid, Octadeca-8,10-diynoic acid, Octadec-12Z-ene-8,10-diynoic acid, Octadeca-8,10,12-triynoic acid, Icariside	*S. atropurpurea*/*T. sinensis*; quercitrin, rutin, (+)-catechin, compounds, icariside, (-)-epicatechin-3-*O*-gallate, (-)-epigallo-catechin-3-*O*-gallate and aviculin, exhibited inhibitory activity against cancer cell invasion. Octadeca-8,10,12-triynoic acid showed most potent inhibitory activity with IC_{50} of 5 mg/mL respectively (Kazuyoshi et al., 2003)

*NR = Not reported

5. CONCLUSION

The pharmacological studies carried out on *Globimetula* and *Scurrula* species show the vast potential in the treatment of many ailments. However, the varied pharmacological activities of the extracts and isolated compounds have only been evaluated in vivo and in vitro tests using laboratory animals, and the results obtained may not essentially be those noticed in humans. The studies carried out thus far needs to be linked in order to attain the full therapeutic potential of *Globimetula* and *Scurrula* species. Additional exploration, clinical trials and product development can reinforce the *Globimetula* and *Scurrula* species as a significant portion of our biodiversity to admiration and sustainable usage for the future.

Declaration of Interest
I declare that there is no conflict of interest.

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REFERENCES

Adesina SK, Illoh CH, Imoh IJ, Jacobs EI. (2013). African mistletoes (Loranthaceae); ethnopharmacology, chemistry and medicinal values: an update. *African Journal of Traditional, Complementary and Alternative Medicines*, 10(4), 161-170.

Adewumi AAJ, Aina VO, Alhassan S, Adebayo FI. (2011). Antibacterial activity of *Globimetulla browni* (Mistletoe) leaf extract against four clinical bacterial isolates. *Journal of Pharmaceuticals Allied Sciences*, 8(3), 1355-1361.

Aditiyarini D, Restiani R, Evieyana E. (2022). Profiling secondary metabolites and antioxidant activity of tea mistletoe leaves (*Scurrula artopurpurea* (Bl.) Danser in Nglinggo, Kulon Progo, Yogyakarta. *Jurnal Ilmiah Biologi*, 10(2), 196-205.

Afolabi CA, Jonhson AO, Kayode K, Joan O, Mary TO. (2016). Antioxidant activity and protective effects of cocoa and kola nut mistletoe (*Globimetula cupulata*) against ischemia/reperfusion injury in langendoff-perfused rat hearts. *Journal of Food and Drug Analysis*, 24, 417-426.

Alhassan AM, Lawal NB, Danladi S. (2023). Analgesic and anti-inflammatory studies of the methanol extract of *Globimetula braunii* (Loranthaceae) growing on *Terminalia catappa* Linn (Combretaceae). *Journal of Pharmacy and Bioresources*, 20(2), 1-13.

Athiroh N, Wahyuningsih D. (2017). Study of superoxide dismutase and malondialdehyde concentrations in mice after administration of methanolic extract of *Scurrula atropurpurea* (Bl.). *Jurnal Kedokteran Hewan*, 11(1), 19-22.

Ayoola MD, Oriola AO, Faloye KO, Aladesanmi AJ. (2020). Two antihyperglycaemic compounds from Globimetula braunii (Engl.) Van Tiegh (Loranthaceae). *GSC Biological and Pharmaceutical Sciences*, 11(1), 46-54

Barlow BA. (1991). Conspectus of the genera *Scurrula* L. and *Taxillus* Tieghem (Loranthaceae) in the Malesian region. *Blumea*, 36, 63-85.

Bruno NL, Joel TA, Jean RC, Makoah NA, Flora N, Gabriele P, Beate N, Hans GS, Catherin V, Silvere N, Norbert S. (2015). Two 2,6-dioxabicyclo[3.3.1]nonan-3-ones from *Phragmanthera capitata* (Spreng.) Balle (Loranthaceae). *Helvetica Chimica Acta*, 98, 945-952.

Danladi S, Musa AM, Yaro AH. (2019). Central nervous system depressant activity of ethanol leaf extract of *Globimetula braunii* (Engler) (Loranthaceae) growing on *Terminalia capatta* L. (Combretaceae). *Bayero Journal of Pure and Applied Sciences*, 12(1), 321-327.

Danladi S, Sule MI, Musa AM, Yaro AH. (2021). Central nervous system depressant activity of fractions of *Globimetula braunii* Engl. (Loranthaceae) growing on *Terminalia catappa* L. (Combretaceae) and isolation of lupeol. *Journal of Pharmacy and Bioresources*, 18(3), 196-206.

Danladi S, Alhassan AM, Sule MI, Mushamma MA, Yaro AH. (2022). Phytochemical Constituents and Pharmacological Activities of *Globimetula braunii* (Loranthaceae): A Review. *Tropical Journal of Natural Product Research*, 6(9), 1372-1377.

David OE. (2009). Biochemical changes in wistar rats on oral doses of aqueous extracts of the leaves of *Globimetula cupulata* (DC) van Tieghem. *Pharmacologyonline*, 3, 275-282.

Ebadi M. (2007). Pharmacodynamic basis of herbal medicine, 2nd Ed., Taylor and Francis Group: New York.

Erukainure LO, Joseph AA, Adeniyi SA, Rabiat UE, Michael AF. (2011). Antilipemic and hypocholesteremic activities of *Globimetula braunii* in rats. *Experimental of Toxicologic Pathology*, 63, 657-661.

Faboro EO, Olawuni IJ, Bolajoko A, Akinpelu BA, Oyedapo OO, Iwalewa EO, Obafem CA. (2020). Investigation on in vitro evaluation of antioxidant and anti-inflammatory properties of methanol and dichloromethane extracts of leaf of *Globimetula oreophila*. *Current Research and Development in Chemistry*, 4, 143-161.

Faboro EO, Omisore NO, Alabi BA, Iwalewa EO, Obafemi CA. (2022). In vivo assessment of analgesic and anti-inflammatory activities of methanol extract of the leaves of *Globimetula Oreophila*. *Adeleke University Journal of Science*, 1(2), 555-566.

Francoise LD, Sophie T, Didier F, Joel B. (2002). Flavonols from *Scurrula ferruginea* Danser (Loranthaceae). *Verlag der Zeitschrift für Naturforschung Tübingen*, 7, 1092-1095.

Fred-Jaiyesimi A, Onabanjo T, Ademuyiwa O. (2008). Phytochemical and laxative studies of *Globimetula braunii* (Engle) van Tiegh growing on *Cola acuminata* (Schott & Endl). *African Journal of Traditional, Complementary and Alternative Medicine*, 5(4), 419-420.

Fred-Jaiyesimi A, Onabanjo T, Jaiyesimi A. (2008). Biochemical and toxicological effects of Globimetula braunii (Loranthaceae) leaf. *African Journal of Traditional, Complementary and Alternative Medicine*, 10, 83-89.

Hardiyanti R, Marpaung L. (2018). Phytochemical and toxicity test of n-hexan extracts of *Dukus mistletoe* leaf (*Dendrophtoe pentandra*) and (*Scurrula ferruginea*) collected from Medan, Indonesia. AIP Conference Proceedings, 030015.

Hasan SM, Ahmed IM, Mondal S, Uddin SJ, Masud MM, Sadhu SK, Ishibashi M. (2006). Antioxidant, antinociceptive activity and general toxicity study of *Dendrophthoe falcata* and isolation of quercitrin as

the major component. *Oriental Pharmacy and Experimental Medicine*, 6(4), 355-360.

Hernayanti LS, Taufiq HKK. (2019). Detoxification of Cadmium on the levels of urea and creatinine on rattus Norvegicus with Tea Mistletoe (*Scurrula Atropurpurea*). AIP Conference Proceedings 2094, 020026.

Hong X, Ajat M, Fakurazi S, Noor AM, Ismail IS. (2021). Anti-inflammatory evaluation of *Scurrula ferruginea* (jack) danser parasitizing on *Tecoma stans* (L.) H.B.K. in LPS/IFN-γ-induced RAW 264.7 macrophages. *Journal of Ethnopharmacology*, 265, 113647.

Hong X, Isa NM, Fakurazi S, Ismail IS. (2019). Phytochemical and anti-inflammatory properties of *Scurrula ferruginea* (Jack) Danser parasitising on three different host plants elucidated by NMR-based metabolomics. *Phytochemical Analysis*, 31(1), 15-27.

Inuwa HM, Aina VO, Ibrahim S, Ameh DA. (2012). Phytochemical screening and antibacterial activity of *Globimetulla browni* extracts during dry season. *British Journal of Pharmacology and Toxicology*, 3(1), 4-6.

Justine VT, Musatafa M, Kankara SS, Go R. (2019). Effect of drying methods and extraction solvents on phenolic antioxidants and antioxidant activity of *Scurrula ferruginea* (Jack) Danser (Loranthaceae) leaf extracts. *Sains Malaysiana*, 48(7), 1383-1393.

Ja'afar KM, Shajarahtunnur J, Norazah B. (2017). Antioxidant activity of leaf extracts of *Globimetula braunii* (Engler) van tiegh parasitizing on *Piliostigma thonningii* and *Parkia biglobosa*. *Jurnal Teknologi*, 79, 43-47.

Ja'afar KM, Shajarahtunnur J, Norazah B, Mohd BB, Satyajit DS, Keith JF, Mathias OS. (2017). Lactones and flavonoids from the leaves of *Globimetula braunii*. *Natural Product Communication*, 12, 1455-1458.

Kazuyoshi O, Hendig W, Mutsuko M, Masahiro I, Made SP, Partomuan S, Hirotaka S. (2003). Indonesian Medicinal Plants. XXV. Cancer cell invasion inhibitory effects of chemical constituents in the parasitic plant *Scurrula atropurpurea* (Loranthaceae). *Chemical Pharmaceutical Bulletin*, 51(3), 343-345.

Kumar S, Shukla YN, Lavania UC, Sharma A, Singh AK. (1997). Medicinal and aromatic plants: prospects for India. *Journal of Medicinal Aromatic Plant Science*, 19, 361-36.

Laldingngheta J, Malsawmzuala L, Lalhlenmawia H. (2019). Evaluation of the anti-diabetic activity of ethanol extract of leaves of Scurrula parasitica in streptozotocin-induced diabetic rats. *Journal of Pharmacognosy and Phytochemistry*, 8(3), 2206-2212.

Lim YC, Rajabalaya R, Shirley HFL, Tennakoon KU, Quang-Vuong L, Idris A, Zulkipli IN, Keasberry N, David SR. (2016). Parasitic mistletoes of the genera *Scurrula* and *Viscum*: from bench to bedside. *Molecules*, 21, 1048.

Lin J, Lin Y. (1999). Flavonoids from the leaves of *Loranthus kaoi* (Chao). Kiu. *Journal of Food Drug Analysis*, 7(3), 185-190.

Mallavadhani UV, Narasimhan K, Sudhakar AVS, Mahapatra A, Li W, van Breemen RB. (2006). Three new pentacyclic triterpenes and some flavonoids from the fruits of an Indian Ayurvedic plant *Dendrophthoe falcata* and their estrogen receptor binding activity. *Chemical and Pharmaceutical bulletin*, 54(5), 740-744.

Marvibaigi M, Amini N, Supriyanto E, Abdul Majid FA, Jaganathan SK, Jamil S. (2016). Antioxidant activity and ros-dependent apoptotic effect of *Scurrula ferruginea* (Jack) Danser methanol extract in human breast cancer cell MDA-MB-231. *PlosOne*, 11(7), 0158942.

Mkounga P, Maza DHL, Ouahouo WBM, Tyon NL, Hayato I, Hiroshi N, Nkengfack AE. (2016). New lupan-type triterpenoids. *Zeitschrift fur Naturforschung*, 10, 0215-0235.

Mohsen M, Neda A, Eko S, Shajarahtunnur J, Fadzilah AA, Shahpour K. (2014). Total phenolic content, antioxidant and antibacterial properties of *Scurrula ferruginea* extracts. *Jurnal Teknologi*, 70(5), 65-72.

Mohsen, M., Neda, A., Eko, S., Fadzilah, A.A., Saravana, K.J., Shajarahtunnur, J., Javad, H. A. (2016). Rozita, N. Antioxidant activity and ROS-dependent apoptotic effect of *Scurrula ferruginea* (Jack) Danser methanol extract in human breast cancer Cell MDA-MB-231. *PlosOne*, 11(7), 1-5.

Muhammad KJ, Jamil S, Basar N, Magaji MG. (2019). Anticonvulsant studies on the isolated compounds from the leaves of *Scurrula parasitica* L (Loranthaceae). *Malaysian Journal of Fundamental and Applied Sciences*, 15, 806-810.

Muhammad KJ, Jamil S, Basar N. (2019). Phytochemical study and biological activities of *Scurrula parasitica* L. (Loranthaceae) leaves. *Journal of Research in Pharmacy*, 23, 522-531.

Muhammad KJ, Jamil S, Basar N, Sarker SD, Mohammed MG. (2020). Globrauneine A-F: six new triterpenoid esters from the leaves of *Globimetula braunii*. *Natural Product Research*, 34, 2746-2753.

Muhammad KJ, Jamil S, Basar N, Arriffin NM, Idris MT, Jibril S, Akanji FT. (2022). Antioxidant, antimicrobial, and antityrosinase activities of phytochemicals from the leaves of *Globimetula braunii* (Engler) van Tiegh (Loranthaceae). *Bulletin of the Chemical Society of Ethiopia*, 36, 387-397.

Musa MA, Abdullahi IM, Kamal MJ, Magaji GM. (2014). Phytochemical screening and anticonvulsant studies of ethyl acetate fraction of *Globimetula braunii* on laboratory animals. *Asian Pacific Journal of Tropical Biomedicine*, 4(4), 285-289.

Mustarichie R, Runadi D, Ramdhani D. (2017). The antioxidant activity and phytochemical screening of ethanol

extract, fractions of water, ethyl acetate, and n-hexane from mistletoe tea (*Scurrula atropurpurea* Bl. Dans). *Asian Journal of Pharmaceutical and Clinical Research*, 10(2), 343-347.

Newman DJ, Cragg GM, Snader KM. (2000). The influence of natural products upon drug discovery. *Natural Products Reports*, 17, 215-234.

Newman DJ, Cragg GM, Snader KM. (2003). Natural products as sources of new drugs over the period 1981-2002. *Journal of Natural Products*, 66, 1022-1037.

Nilesh M, Parag J, Manish K, Senthil KKL, Vaidhyalingam V. (2013). Anti-nociceptive potential of *Scurrula parasitica*: An unexploited parasitic plant. *Journal of Pharmacology*, 3(1), 4-8.

Njoya EM, Maza HLD, Mkounga P, Koert U, Nkengfack AE, McGaw LJ. (2020). Selective cytotoxic activity of isolated compounds from Globimetula dinklagei and Phragmanthera capitata (Loranthaceae). *Zeitschrift fur Naturforschung*, 75(5-6), 135-144.

Nour A, Nur P, Djanggan S, Aris MW. (2014). Antioxidative and blood pressure-lowering effects of *Scurrula atropurpurea* on deoxycorticosterone acetateesalt hypertensive rats. *Biomarkers Genome Medicine*, 6, 32-36.

Nour A, Nur P, Djanggan S, Aris MW. (2014). Effect of *Scurrula atropurpurea* on nitric oxide, endothelial damage, and endothelial progenitor cells of DOCA-salt hypertensive rats. *Iranian journal of Basic Medical Sciences*, 17, 622-625.

Oboh IE, Nworgu ZAM. (2008). Oxytocic properties of the aqueous extract of *Globimetulla braunii* (Loranthaceae). *Pakistan Journal of Pharmaceutical Science*, 21(4), 356-360.

Ogbulie JN, Ogueke CC, Okorondu S. (2004). Antibacterial properties of *A. cordifola*, *M. flurum*, *U. chaeme*, *B. pinnatum*, *C. albidem* and *A cilata* on some hospital isolates. *Nigerian Journal Microbiology*, 18(2), 249-255.

Ojewole JAO, Adewole SO. (2007). Hypoglycemic and hypotensive effects of *Globimetula cupulata* (DC) Van Tieghem (Loranthaceae) aqueous leaf extract. Cardiovasc. *South African Journal Botany*, 18, 1, 9-15.

Okpuzor J, Kareem G. (2009). Lipid lowering Activity of *Globimetula braunii*. *Research Journal of Medicinal Plant*, 3(2), 45-51.

Okpuzor J, Ogbunugafor HA, Kareem GK. (2009). Hepatic and hematologic effects of fractions of *Globimetula braunii* in normal albino rats. *Excli Journal*. 8, 182-189.

Okpuzor J, Ogbunugafor HA, Kareem GK. (2009). Antioxidative properties of ethyl acetate fraction of *Globimetula braunii* in normal albino rats. *Journal Biological Sciences*, 9(5), 470-475.

Olanlokun JO, Ekundayo MT, Ebenezer O, Koorba NA, Olorunsogo OO. (2021). Antimalarial and erythrocyte membrane stability properties of *Globimetula braunii* (Engle Van Tiegh) growing on Cocoa in *Plasmodium berghei*-Infected Mice. *Infection and Drug Resistance*, 14, 3795-3808.

Olanlokun JO, Ekundayo MT, Koorbanally NA, Olorunsogo OO. (2022). Hexane fraction of *Globimetula braunii* induces mitochondria-mediated apoptosis in *Plasmodium berghei*-infected mice. *Toxicology Reports*, 9, 769-777.

Okpanachi GO, Oyi AR, Musa H, Abdulsamad A, Emenike AV, Sule YZ. (2020). Assessment of physicochemical properties of Globimetula braunii (Loranthaceae) leaf extracts. *Journal of Science and Practice of Pharmacy*, 7(1), 344-354.

Oriola AO, Aladesanmi AJ, Idowu TO, Akinwumi FO, Obuotor EM, Idowu T, Oyedeji AO. (2021). Ursane-type triterpenes, phenolics and phenolic derivatives from *Globimetula braunii* leaf. *Molecules*, 26, 6528.

Osungunna O, Osungunna MO, Abimbola Y. (2013). Phytochemical and antimicrobial screening of *Globimetulla oreophila* (olive) van Tiege and *Phragmenthera capitate* (Spreng) Balle. *International Journal of Green Pharmacy*, 7, 127-130.

Phillipson JD. (2001). Phytochemistry and medicinal plants. *Phytochemistry*, 56, 237-243.

Pieroni A, Price LL, Vandebroek I. (2005). Welcome to journal of ethnobiology and ethnomedicine. *Journal of Ethnobiology and Ethnomedicine*, 1, 1.

Puneetha GK, Amruthesh .N. (2016). Phytochemical screening and in vitro evaluation of antioxidant activity of various extracts of *Scurrula parasitica*. *International Journal of Pharmaceutical and Biological Sciences*, 6(1), 77-86.

Quan-Yu L, Fei W, Lei Z, Jie-Ming X, Li AP, Yong-Hong ZA. (2015). Hydroxylated lupeol-based triterpenoid ester isolated from the *Scurrula parasitica* Parasitic on *Nerium indicum*. *Helvetica Chimica Acta*, 98, 627-632.

Quan-Yu L, Fei W, Yong-Hong Z, Feng NI. (2016). Chemical constituents of *Scurrula paracitica*. *China Journal of Chinese Material Medica*, 41(21), 3956-3561.

Ramawat KG. (2004). Biotechnology of medicinal plants: vitalizer and therapeutic. Science Publishers Inc., New Hampshire.

Sembiring HB, Barus T, Marpaung L, Simanjuntak P. (2015). Antioxidant and Antibacterial Activity of Some Leaves Extracts (Methanol, Ethyl Acetate and N-Hexane) of *Scurrula fusca* G.Don. *International Journal of PharmTech Research*, 8(9), 24-30.

Sudiwati N, Nurseta T, Aulannia AMA, Ali M. (2015). In-vitro and in-silico anticancer activity of parasitic tea plant *Scurrula atropurpurea* (Blume) against cervical cancer. *Sphinx Knowledge House*, 8(7), 12-18.

Takashi I, Etsuji T, Hendig W, Kazuyoshi O, Hirotaka S. (2001). A complex of perseitol and K^+ ion from *Scurrula fusca* (Loranthaceae). *Tetrahedron Letters*, 42, 6887-6889.

The Plant List, a working list of all known plant species. (2015). Version 1, released in January 1, 2010.

Tilney P, Lubke R. (1974). A chemotaxonomic study of twelve species of the family Loranthaceae. *South African Journal Botany*, 40, 315-322.

Tizhe TD, Alonge SO, Aliyu RE. (2015). Antibacterial activity of *Globimetula braunii* sourced from five different host trees in Samaru, Zaria, Nigeria. *International Journal of Current Science*, 18, 117-123.

Xiao YJ, Chen YZ, Chen BH, Chen JH, Lin ZX, Fan YL. (2008). Study on cytotoxic activities on human leukemia cell line HL-60 by flavonoids extracts of *Scurrula parasitica* from four different host trees. *China Journal of Chinese Material Medica*, 33(4), 427-432.

Yang L, Yan-Li Z, Yong-Ping Y, Xiao-Li L. (2011). Chemical constituents of *Viscum album* var. meridianum. *Biochemical Systematic and Ecology*, 39, 849-852.

Young-Kyoon K, Young SK, Sang UC, Shi YR. (2004). Isolation of flavonol rhamnosides from *Loranthus tanakae* and cytotoxic effect of them on human tumor cell lines. *Archives of Pharmacal Research*, 27(1), 44-47.