

Folk Medicine, Pharmacological and Biological Activities

Acorus species are widely used in the Chinese and Ayurvedic traditional medicine systems (Vohora *et al.*, 1990). The ocular toxicity in humans occurs from the family of *Araceae*, including genera *Arisaema*, *Colocasia*, *Pinellia*, *Dieffenbachia* and *Philodendron*, leading to keratoconjunctivitis associated with crystal deposits in the cornea (Hsueh *et al.*, 2004).

1. *Acorus calamus* L. (Sweet flag): The root is used as a carminative, antispasmodic, emetic, stomachic, tonic, aphrodisiac, anthelmintic, appetite stimulant, anthelmintic, vermifuge, an antibacterial agent, sedative, analgesic and contraceptive, expectorant, insecticide and as a remedy of asthma and diarrhea. It is also used for ague and atonic dyspepsia (Watt and Breyer-Brandwijk, 1962; Barua *et al.*, 2014). The use of *A. calamus* has a long history in Lithuania, where for example, the leaves are still used in backing bread (Radusiene *et al.*, 2008). In South Africa, rhizome extracts were found to have anthelmintic and antibacterial activities. However, mammalian toxicity and carcinogenicity of asarones has been demonstrated by other researchers, supporting the discouragement of the medicinal use of *Acorus calamus* by traditional healers in South Africa (McGaw *et al.*, 2002). *A. calamus* is a traditional herbal plant used for centuries to treat various allergic symptoms including asthma and bronchitis (Kim *et al.*, 2012). The plant extracts exhibited CNS effect (Vohora *et al.*, 1990), anticonvulsant (Bhat *et al.*, 2012; Katyal *et al.*, 2012), antiveratrinic, antiarrhythmic (Madan *et al.*, 1960), anti-inflammatory (Saxena and Saxena, 2005; Kim *et al.*, 2009; Muthuraman *et al.*, 2011), antidiabetic effects (Wu *et al.*, 2007, 2009; Si *et al.*, 2010; Prisilla *et al.*, 2012), bronchodilatory (Shah and Gilani, 2010), neuroprotective effect (Muthuraman and Singh, 2012), antioxidant and DNA damage protection (Sandeep and Nair, 2010, 2012; Barua *et al.*, 2014; Srividya *et al.*, 2014), anticellular, immunomodulatory (Mehrotra *et al.*, 2003), antidepressant activity (Pawar *et al.*, 2011), antihypertensive activity (Patel *et al.*, 2012),

antimicrobial, antiviral, antiulcer and insecticidal (Nalamwar *et al.*, 2009; Barua *et al.*, 2014; Srividya *et al.*, 2014) activities. The essential oil exhibited antimicrobial activity (Radusiene *et al.*, 2008). β -Asarone exerts anti-adipogenic (Lee *et al.*, 2012), anthelmintic, antibacterial (McGaw *et al.*, 2002) and antifungal (Rajput and Karuppayil, 2013) activities. *cis*-Asarone which constituted 40% of the oil had fungicidal activity (Saxena *et al.*, 1990). The sesquiterpene, $1\beta,5\alpha$ -guaiane- $4\beta,10\alpha$ -diol-6-one, isolated from the plant possesses antidiabetic activity (Zhou *et al.*, 2012). The lectins, isolated from both *Acorus calamus* and *Acorus gramineus* showed mitogenic and cytotoxic activities (Bains *et al.*, 2005). The extract of the plant can be used to control several species of stored-grain insects. The ethanol extract of *A. calamus*, as well as (*Z*)-asarone and acorone (identified from the plant) had strong repellency and contact effect to maize weevil (Yao *et al.*, 2008, 2010). The essential oil of has been demonstrated to possess insecticidal activity. The plant extract, essential oil of the rhizomes and its constituent compounds (methyleugenol, (*E*)-methyloegenol and α -asarone) have potential for development into natural fumigants/insecticides; exhibiting strong repellency and contact effect to insects e.g. maize weevil and cockroaches (Liu *et al.*, 2013).

2. *Acorus gramineus* Soland: The rhizome is used in China to treat convulsions and epilepsy. It has been used as a Korean traditional medicine for learning and memory improvement, sedation and analgesia. Moreover, this herb has long been used for the treatment of stomach ache and swelling as well as for the extermination of insects (Park *et al.*, 2011). It has been used for the treatment of memory loss and its related symptoms (Rajagopal *et al.*, 2013). Pharmacological studies showed that *A. gramineus* exhibited antifungal (Lee, 2007), CNS depressant, neuroprotective activity (Chun *et al.*, 2008), anti-acetylcholinesterase, anti-inflammatory, antioxidant, antispasmodic, cardiovascular, hypolipidemic, immunosuppressive, cytoprotective, antidiarrheal, antimicrobial, anthelmintic (Rajagopal *et al.*, 2013), nematocidal, larvicidal (Perrett, 1994; Perrett and Whitfield, 1995). The essential oil of the rhizome exhibited CNS inhibition, sedative (Cho *et al.*, 2001; Koo *et al.*, 2003), neuroprotective (Cho *et al.*, 2001) and antifungal (Lee *et al.*, 2008) effects. β -Asarone is antimicrobial (Lee *et al.*, 2004). Phenylpropanes, isolated from the plant, were found to inhibit some green and blue-green algae (Della Gerca *et al.*, 1989).
3. *Acorus tatarinowii* Schott: The alkaloid acortatarin A, isolated from the rhizomes, significantly inhibit reactive oxygen species production in high-glucose-stimulated mesangial cells in a dose- and time-dependent manner (Tong *et al.*, 2010a). The compound 5-hydroxymethyl furfural, isolated from the plant exhibited a notable anti-fatigue activity (Zhu *et al.*, 2012b). The essential oil and asarones from the rhizomes displayed antidepressant-like effect (Han *et al.*, 2013). Both decoction and volatile oil extracted from the rhizome have anticonvulsive (antiepileptic) effects (Liao *et al.*, 2005).
4. *Alocasia cucullata* Schott: The lectin, isolated from the plant, is a potent mitogen (Kaur *et al.*, 2005a).
5. *Alocasia decipiens* Schott: The rhizome extracts showed antibacterial activity (Roy *et al.*, 2013).
6. *Alocasia fornicata* (Roxb.) Schott: Extracts of leaves and stolon of the plant showed antioxidant activity (Mandal *et al.*, 2010).
7. *Alocasia indica* Schott (Elephant ear taro, Gaint taro): The different parts of the plant are used as hepatoprotective, antioxidant, analgesic, antiarthritic, anti-inflammatory, antitumour, digestive, anthelmintic, laxative, diuretic, astringent, and antipyretic. It is also used in the treatment of piles (Hoque *et al.*, 2011; Patil *et al.*, 2012a,b; Islam *et al.*, 2013).

Extracts of the plant (leaves and/or tubers) exhibited several activities *viz.* antimicrobial (Mulla *et al.*, 2010c; Patil *et al.*, 2012a), hepatoprotective, free radical scavenging (Mulla *et al.*, 2009a,b), antioxidant (Mulla *et al.*, 2010a; Islam *et al.*, 2013), antinociceptive, anti-inflammatory (Mulla *et al.*, 2010a), anthelmintic (Mulla *et al.*, 2010b), antidiarrheal, antiprotozoal (against *Entamoeba histolytica* and *Giardia intestinalis*) (Mulla *et al.*, 2011; Islam *et al.*, 2013), antidiabetic, hypolipidemic (Patil *et al.*, 2012b) and cytotoxic (Islam *et al.*, 2013). The leaf and stem extracts possess antidiabetic activity (Karim *et al.*, 2014). The extracts of the roots exhibited significant free radical scavenging activity (Patil *et al.*, 2012c) and significant anthelmintic activities; and the seeds were reported to possess antifungal activity (Patil *et al.*, 2012a). The rhizome extracts exhibited hepatoprotective (Pal *et al.*, 2014), thrombolytic, antibacterial and cytotoxic activities and are toxic against *Artemia salina* (Hoque *et al.*, 2011).

8. *Alocasia macrorrhiza* (Linn.) G. Don (Giant taro): The plant (extensively distributed in tropic and subtropical regions of Asia) is widely used in treating joint disorders and flu complications, including headache, bleeding hemorrhoids, pulmonary tuberculosis, and so on. In China, it was also used against chronic bronchitis and appendicitis as an antiphlogistic medicine. Moreover, it has shown anticancer, antiinflammatory, antinociceptive, and antifebrile activities. Of the alkaloids, isolated from the rhizomes, five showed mild antiproliferative activity against human throat cancer (Hep-2), and Hep-G2 whereas, two of them showed gentle antiproliferative activity against human nasopharyngeal carcinoma epithelial (CNE) cell lines (Zhu *et al.*, 2012a). Alocasin (a protein isolated from the rhizomes) displayed antifungal activity against *Botrytis cinerea*. It reduced the activity of HIV-1 reverse transcriptase and exhibited weak hemagglutinating activity, only at a concentration of 1 mg/ml (Wang and Ng, 2003). Extracts of the different parts (roots, rhizome and leaves) of the plant showed antioxidant (Mandal *et al.*, 2010), laxative, diuretic (Mubeen *et al.*, 2012), antioxidant, antimicrobial, thrombolytic, cytotoxic and anthelmintic activities (Banik *et al.*, 2014) activities. The leaf juice possesses hepatoprotective and antioxidative efficacy when tested *in vitro* (Patil *et al.*, 2011).
9. *Amorphophallus bulbifer* (Roxb.) Blume: The plant is used in traditional Indian medicine for the treatment of piles, gonorrhea, hemorrhoids, diarrhea, rheumatic muscular and joint pain and as antidote to poisoning from animal bites. Extracts of the whole plant possess antiinflammatory and analgesic properties (Reddy *et al.*, 2012b). The tuber extracts exhibited antibacterial and antioxidant activities (Shete *et al.*, 2014).
10. *Amorphophallus campanulatus* (Roxb.) Blume ex. Decne (Elephant foot yam): The tuber is useful in piles, enlargement of spleen, abdominal tumors, asthma, abdominal pain, boils and much used in acute rheumatism. Herb is used in earache, pain, intercostals neuralgia, perpueral fever and swelling of throat. The tuber is reported to have antiprotease activity (Shilpi *et al.*, 2005; Ansil *et al.*, 2012). The corms are acrid, anstringent, thermogenic, irritant, anodyne, anti-inflammatory, antihaemorrhoidal, expectrorant, carminative digestive, appetizer, tonic, stomachic, anthelminthic, liver tonic, and aphrodisiac (Khan *et al.*, 2008b; Gajare, 2014). The plant is also used for treatment of arthralgia, elephantiasis, tumours, haemorrhages, vomiting, cough, bronchitis, anorexia, dyspepsia, flatulence, constipation, helminthiasis, hepatopathy, splenopathy, amenorrhoea, dysmenorrhoea, seminal weakness, fatigue, anaemia and general debility (Srivastava *et al.*, 2014). The plant extracts or the isolated compounds exhibited antimicrobial, cytotoxic (Khan *et al.*, 2007, 2008a,b, 2009), analgesic (Shilpi *et al.*, 2005), antioxidant (Sahu *et al.*, 2009; Bais and Mali, 2013; Ansil *et al.*, 2013), anthelmintic (Ramalingam *et al.*, 2010), immunomodulatory, antidiabetic, antinociceptive, and hepatoprotective (Jain *et al.*, 2009;

Ansil *et al.*, 2012; Gajare, 2014) activities. Tyrosinase and laccase activities (Paranjpe *et al.*, 2003), as well as inhibitory activities against amylase, trypsin and chymotrypsin have been reported (Khan *et al.*, 2008b).

11. *Amorphophallus commutatus* (Schott) Engl. var. *wynadensis*: The corms are used for treatment of piles, cysts and tumors and as cure for snake bite. The tuber is used for curing scabies, piles and mouth diseases. The tuber extracts exhibited antibacterial activity (Krishna *et al.*, 2011, 2013). The methanolic and aqueous extracts are relatively safe for long term oral administration fulfilling its use in traditional medicinal therapies (Raj *et al.*, 2014).
12. *Amorphophallus dubius*: The tubers are used as a carminative, expectorant, and in the treatment of piles, rheumatism, haemorrhoids, dysentery (Edison *et al.*, 2006).
13. *Amorphophallus konjac* K. Koch ex N. E. Br.: It has long been used as a food source and as a traditional medicine. In traditional Chinese medicine (TCM), a gel prepared from the flour has been used for detoxification, tumour-suppression and phlegm liquefaction; and has been consumed for the treatment of asthma, cough, hernia, breast pain, burns as well as haematological and skin disorders. Clinical studies have demonstrated that supplementing the diet with purified flour, commonly known as konjac glucomannan significantly lowers plasma cholesterol, improves carbohydrate metabolism, bowel movement and colonic ecology (Chua, *et al.*, 2010).
14. *Amorphophallus konkanensis* Hett., Yadav & Patil: The tuber extracts exhibited antibacterial and antioxidant activities (Shete *et al.*, 2014).
15. *Amorphophallus paeoniifolius* (Dennst.) Nicolson (Elephant foot yam, Whitespot giant arum, Sweet yam, Telinga potato): The tuber is edible. The tubers of wild plants are highly acrid and cause irritation in throat and mouth due to excessive amount of calcium oxalate present in the tubers. The tubers are anodyne, anti-inflammatory, antihemorrhoidal, haemostatic, expectorant, carminative, digestive, appetizer, stomachic, anthelmintic, liver tonic, aphrodisiac, emmenagogue, rejuvenating and tonic. They are traditionally used in arthralgia, elephantiasis, tumors, inflammations, hemorrhoids, hemorrhages, vomiting, cough, bronchitis, asthma, anorexia, dyspepsia, flatulence, colic, constipation, helminthiasis, hepatopathy, splenopathy, amenorrhea, dysmenorrhoea, seminal weakness, fatigue, anemia and general debility (Das *et al.*, 2009; De *et al.*, 2010; Dey and Ghosh, 2010; Reddy *et al.*, 2013; Singh and Wadhwa, 2014). Tender shoots, used as vegetables, are used to cure sinusitis. Boiled corm is used in the treatment of dysentery and rheumatism (Gogoi and Zaman, 2013). The tuber is reported to have antiprotease activity (Prathibha *et al.*, 1995). The plant extracts exhibited cytotoxic (Angayarkanni *et al.*, 2007), analgesic (Dey *et al.*, 2010), CNS depressant (Das *et al.*, 2009), antidiabetic (Reddy *et al.*, 2012a, 2013), gastroprotective (Nataraj *et al.*, 2011), anticonvulsant (De *et al.*, 2012), hepatoprotective, antioxidant, immunomodulatory, anthelmintic, antidiarrheal, antibacterial, anti-inflammatory, and insecticidal (Dey *et al.*, 2012; Singh and Wadhwa, 2014) activities. The flavonoid fraction of the plant showed hepatoprotective effect (Sharstry *et al.*, 2010).
16. *Amorphophallus rivieri* Durieu ex Carrière: The tuber, used in ethnomedicine of China, is reported to possess medium toxicity (Huai *et al.*, 2010).
17. *Amorphophallus sylvaticus* Roxb.: The fruits and seeds are used in the treatment of toothache, bruises, and glandular enlargements (Edison *et al.*, 2006). The plant is used in treatment of dental ailments. The seed extracts showed antibacterial activity (Revathi and Rani, 2014).
18. *Amydrium sinense* (Engl.) H. Li: The plant, used in ethnomedicine of China, is reported to possess medium toxicity (Huai *et al.*, 2010).

19. *Anchomanes difformis* (Blume) Engl.: The plant is purgative, used in for the treatment of various diseases such as diabetes, edeme, jaundice, ulcers, tuberculosis, malaria, kidney-pains, diuretic, dysentery, fevers, cough, respiratory diseases, pain of various aetiologies, eye inflammation, and as a poison antidote (Akah and Njike, 1990; Aliyu *et al.*, 2008; Okpo *et al.*, 2012, 2013; Olawale *et al.*, 2013). The rhizome extracts showed anti-inflammatory, analgesic, hypothermic (Akah and Njike, 1990), antimicrobial (Oyetayo, 2007; Enejojo *et al.*, 2011), anti-ulcer (Okpo *et al.*, 2012), gastroprotective (Okpo *et al.*, 2011), trypanocidal (Atawodi *et al.*, 2003) and cytotoxic (Doyinsola *et al.*, 2012) activities. The plant is considered safe as it did not cause lethality or any obvious toxic manifestations in the acute toxicity study (Okpo *et al.*, 2013).
20. *Anthurium schlechtendalii*: The plant is a traditional remedy for the treatment of arthritis, rheumatism, cough and severe skin conditions. A polar extract of the plant exhibits strong anticancer activity (Stark *et al.*, 2009).
21. *Arisaema amurense* Maxim.: The diacylglyceryl galactosides, isolated from the plant are cytotoxic (Jung *et al.*, 1996a). Four of the isolated cerebrosides displayed significant antihepatotoxic activity (Jung *et al.*, 1996b). The volatile oil from the tubers has antitumor activity (Yang *et al.*, 2014).
22. *Arisaema consanguineum* Schott: The corm is reported as a high toxic (Huai *et al.*, 2010).
23. *Arisaema cum*: The plant extracts showed anti-inflammatory (Ahn and Je, 2012), antioxidant (Ahn *et al.*, 2012) and neuroprotective (Ki *et al.*, 2012) activities.
24. *Arisaema curvatum* Kunth (Cobra lily): The lectin, from the tubers has anti-metabolic effect on the melon fruit fly (*Bactrocera cucurbitae* Coq. larvae (Singh *et al.*, 2008).
25. *Arisaema decipiens*: The plant is used as analgesic, antitumor, and pesticide agent (Gu *et al.*, 2014)
26. *Arisaema erubescens* (Wall.) Schott: It is used in traditional Chinese medicine remove damp-phlegm and as anticonvulsant. The plant extracts possess anticonvulsant, anti-cancer, insecticidal (Du *et al.*, 2011) and molluscicidal (Ke *et al.*, 2008; Zhang *et al.*, 2009) activities. The two flavonoids schaftoside and isoschaftoside, isolated from the tubers, showed nematocidal activity against the root-knot nematode (Du *et al.*, 2011).
27. *Arisaema flavum*: The rhizome is used in scorpion bite (Nasim *et al.*, 2013). A lectin, isolated from the tubers, exhibited mitogenic and anti-proliferative activities (Singh *et al.*, 2004). The plant extract exhibited antibacterial activity (Bibi *et al.*, 2011).
28. *Arisaema franchetianum* Engl.: The plant is used in traditional medicine as anti-inflammatory agent and for treatment of snake bite (Gu *et al.*, 2014). An alkaloid, isolated from the tubers, exhibited cytotoxic activity (Su *et al.*, 2013).
29. *Arisaema helleborifolium* Schott: The lectin isolated from the plant showed larvicidal and antiproliferative activities (Kaur *et al.*, 2006).
30. *Arisaema intermedium*: The lectin isolated from the plant was found to be mitogenic (Kaur *et al.*, 2005b) and insecticidal potential (Kaur *et al.*, 2009).
31. *Arisaema jacquemontii* Blume: The plant is used as anti-convulsant. Roots and fruits of the plant are used in psychic and nervous disorder. The juice from the tubers is applied to the skin for the treatment of ring worms and other skin diseases. The isolated lectin had potent insecticidal and antiproliferative activities. The plant extracts showed immunomodulatory, antileishmanial and phytotoxic activities (Tanveer *et al.*, 2014). The isolated triterpenoid, 2-hydroxydiplopterol exhibited cytotoxic activity (Tanveer *et al.*, 2013).
32. *Arisaema leschenaultii* Blume: The plant is used as purgative and for the treatment of urinary diseases, colitis, eczema, gonorrhoea, piles, haemorrhoids, syphilis, roundworm, fistula and sinus. The plant is used in veterinary medicine as antiseptic, abortifacient and

- contraceptive (Suruse *et al.*, 2011). The alcoholic extract of the plant exhibited wound healing (Suruse *et al.*, 2011) and antioxidant (Pandey *et al.*, 2012) activities.
33. *Arisaema rhizomatum* C. E. C. Fischer: In China, it is used to alleviate pain and inflammation. Extracts of the rhizomes showed anti-arthritic effect (Chunxia *et al.*, 2011).
 34. *Arisaema tortuosum* (Wall.) Schott: The plant is anthelmintic, contraceptive and is used to cure constipation, indigestion, abdominal pain, dysentery, rheumatism and stomachache, for boils, to cure piles, to treat bone fracture (Verma *et al.*, 2012) and for treatment of various diseases related to inflammation and stress (Nile and Park, 2014). A lectin, isolated from the tubers exhibited antiproliferative activity (Dhuna *et al.*, 2005).
 35. *Arisaema utile* Schott (Cobra lily): The plant extracts possess antimicrobial, cytotoxic and antioxidant activities (Mubashir and Shah, 2012). The lectin, isolated from the plant, showed antiproliferative and potent mitogenic effects (Dhuna *et al.*, 2010).
 36. *Arisaema wallichianum* Hook. f.: The lectin isolated from the tubers was found to be mitogenic towards human lymphocytes and showed antiproliferative effect (Kaur *et al.*, 2005b) and insecticidal potential (Kaur *et al.*, 2009).
 37. *Arum cyreanicum* Hruby. (Renish): The plant is used in Libya for dermatitis, psoriasis, corn and bone spur (El-Mokasabi, 2014).
 38. *Arum italicum* Miller: Tubers and ripe fruits are used in Turkey for treatment of rheumatism and hemorrhoids, while the leaves are consumed as a food (Saglick *et al.*, 2002a).
 39. *Arum palaestinum* Boiss.: The alkaloid piperazirum, isolated from the plant, showed a significant cytotoxic activity (El-Desouky *et al.*, 2007).
 40. *Arum* species: The aerial parts and fruits of *Arum indicum*, *Arum maculatum* (cuckoopint), *Arum palaestinum* and related species are reported in Europe as extremely hazardous (Wink, 2009).
 41. *Caladium bicolor* (Aiton) Vent. (syn. *Caladium picturatum*, *Caladium marmoratum*): An infusion of fresh leaf is used for the treatment of angina. The powdered dried leaf is used to treat infected sores. The plant extracts have antimicrobial (Biswas *et al.*, 2013), cytotoxic, antioxidant and thrombolytic activities (Mridha *et al.*, 2013).
 42. *Colocasia antiquorum* var. *esculenta* (Imperial taro): The methanolic extract of tuber-barks showed inhibitory effects on melanin production in melan-a cells. Some of the fatty acid derivatives (Kim *et al.*, 2010a), as well as some of the lignans (isolated from the tuber-bark) showed antimelanogenic activity (Kim *et al.*, 2010b).
 43. *Colocasia esculenta*: The herb has been known for its curative properties and has been utilized for treatment of various ailments such as asthma, arthritis, diarrhea, internal hemorrhage, neurological disorders, and skin disorders. The leaf juice is stimulant, expectorant, astringent, appetizer, and used for otalgia. The juice of the corm is used for treatment of body ache and baldness (Prajapati *et al.*, 2011) and as a laxative, demulcent and anodyne (Kubde *et al.*, 2010). It has been reported in folklore medicine in the management of *diabetes mellitus* (Eleazu *et al.*, 2013). The plant possesses various pharmacological and biological activities *viz.* analgesic (Prajapati *et al.*, 2011), anti-inflammatory (Biren *et al.*, 2007; Shah *et al.*, 2007), hypolipidemic (Sakano *et al.*, 2005; Boban *et al.*, 2006), antidiabetic (Grindley *et al.*, 2002; Kumawat *et al.*, 2010; Kasote *et al.*, 2011; Li *et al.*, 2014), antibacterial (Kubde *et al.*, 2010; Singh *et al.*, 2011), antifungal (Yang and Yeh, 2005; Kubde *et al.*, 2010; Singh *et al.*, 2011), anticancer (Brown *et al.*, 2005), antioxidant (Leong *et al.*, 2010; Kasote *et al.*, 2011), antihypertensive, diuretic (Vasant, 2012), various neuropharmacological activities (antidepressant, anxiolytic, sedative, and smooth muscle relaxant activity) (Kalariya *et al.*, 2010), antihepatotoxic and antilipid peroxidative (Patil and Ageely, 2011a,b) effects.

44. *Cyrtosperma johnstonii* N.E. Br.: The acetone extract of the rhizomes exhibited antioxidant and cytotoxic activities (Okonogi *et al.*, 2013).
45. *Cyrtosperma merkusii* (Giant swamp taro): The mucilage, from the tubers showed antioxidant activity (Nguimbou *et al.*, 2014).
46. *Cyrtosperma* sp.: The tubers are used in West Papua to treat chest pain (Lense, 2012).
47. *Dieffenbachia exotica* and *Dieffenbachia maculata* Schott: *Dieffenbachia* is reported as the most toxic genus in the Araceae. Calcium oxalate crystals, a protein and a nitrogen-free compound have been implicated in the toxicity, but the available evidence is unclear. The plants have also been used as food, medicine, stimulants, and to inflict punishment (Arditti and Rodriguez 1982). *Dieffenbachia* species are reported to be poisonous and to cause itchiubg, swelling, salivation and other allied symptoms when the juice of the plant comes in contact with the skin or mucous membrane (Walter and Khanna, 1972). The reaction of the albino Wistar rat to the instillation of the plant juice into the oral cavity was very similar to the reaction observed in the human upon accidental ingestion. An eye irritation study in albino rabbits showed principally conjunctival involvement and some reversible damage to the cornea (Fochtman *et al.*, 1969). The stem juice of *Dieffenbachia* plants produces prominent edema when injected into the paws of mice and rats (Kuballa *et al.*, 1981). *D. maculata* possesses cysteine protease activity (Chitre *et al.*, 1998).
48. *Dieffenbachia picta*: The plant is reported as a toxic one. Animals forced-fed with juice or extracts revealed several symptoms of acute poisoning ending in death. The cause of death being respiratory failure (Walter and Khanna, 1972). The toxicity results obtained from the brine shrimp lethality test revealed a higher level of toxicity in the leaf (LC₅₀ 324.8124 µg/ml) than the stem (LC₅₀ 549.2403 µg/ml) essential oil. The essential oil of the leaf and stem showed antioxidant and antimicrobial activities. (Abimbade *et al.*, 2011).
49. *Dieffenbachia sequine*: The plant tincture is mentioned in homeopathic medicine to treat frigidity and sexual impotence (Walter and Khanna, 1972). The milky latex caused ocular injuries and induced conjunctival chemosis and fine blue crystals in the stroma (Hsueh *et al.*, 2004).
50. *Draconitium lorentense*: The plant is reported in the Amazonian medicine to possess antiviral and immunomodulating activities (Williams, 2001).
51. *Dracunculus vulgaris* Schott: It is a poisonous plant. Furthermore, eating the stem induces abortion. The tubers and the fruits with the seeds are used for the treatment of rheumatism and hemorrhoids, respectively, although toxic properties of the plant are well known (Sağlık *et al.*, 2002b). The tuber extracts exhibited antioxidant, cytotoxic and apoptotic effects. Significant cytotoxic, DNA damaging and apoptotic activities shown by the extracts may have potential in the treatment and prevention of breast cancer (Aslantürk and Çelik, 2013).
52. *Epipremnum aureum* L. (*Scindapsus aureus*, *Pathos aurea*) (Silver vine, Devil's Ivy, Solomon Island's Ivy and Money plant): It is a popular house plant with numerous cultivars and efficient at removing indoor pollutants such as formaldehyde, xylene and benzene (Sonawane *et al.*, 2011). The leaf and root extracts showed antitermite, antimicrobial and antioxidant activities (Sonawane *et al.*, 2011; Srivasatava *et al.*, 2011; Mehta *et al.*, 2013).
53. *Epipremnum pinnatum* (L.) Engl. (syn. *Rhaphidophora pinnatifida* L.: The leaves are used to treat hepatitis and sexually transmitted diseases in men (Lense, 2012). The leaves are taken internally to treat chest pains. Juice extracted from a crushed inner part of stem mixed with water is drunk to treat joint problems, dislocation, and broken bones (WHO, 2009). The different parts of the plant have several traditional uses: analgesic, anti-

- rheumatic, sprains, bite wounds and tonic (Zumbroich, 2011). This plant had a reputation as a traditional anticancer preparation as well as a remedy for skin diseases (Tan *et al.*, 2007). The plant extracts showed cytotoxic (Tan *et al.*, 2007), anti-inflammatory and analgesic activities (Linnet *et al.*, 2010); and could inhibit the chicken pancreatic lipase activity (Hamzah *et al.*, 2015).
54. *Homalomena aromaticum* (Roxb.) Schott: The bulbs are used in West Papua to treat muscular pain and stomach-aches (Lense, 2012).
 55. *Lagenandera ovata* (L.) Thw. (syn. *Lagenandera toxicaria* Dalz.): The rhizome is used as carminative, tonic, diuretic and in bilious complaints, skin itch, quick wound healing, pain and inflammation. The rhizome oil exhibited antibacterial activity (Selvakumari and De Britto, 2007).
 56. *Lagenandera toxicaria* Dalz.: The rhizome possesses insecticidal properties and is used as a remedy for itch. The rhizome extracts showed weak to moderate antimicrobial activity (Kurdekar *et al.*, 2012).
 57. *Lasia spinosa* (L.) Thwaites: The tubers are used for treatment of rheumatoid arthritis, constipation, and to purify blood. The young tender leaves are used to treat intestinal worms' infections (Kumar *et al.*, 2013). The plant is recommended for a variety of disorders such as cholic, rheumatism, intestinal disorders. The rhizome is used for treatment of lung inflammation, bleeding cough and the whole plant in uterine cancer. The rhizome is most frequently used as a remedy for haemorrhoids in Sri Lanka (Shefana and Ekanayake, 2009). The stem is used as antitussive, expectorant, relieving itching from roseolar infantum, measles, rubella and other skin disorders (Goshwami *et al.*, 2012a). The leaves are used as anticestodal agent (Kumar *et al.*, 2013). The extracts of the different plant parts possessed antioxidant (Shefana and Ekanayake, 2009; Goshwami *et al.*, 2012a), antimicrobial, cytotoxic (Alam *et al.*, 2011; Goshwami *et al.*, 2012a) antinociceptive (Deb *et al.*, 2010; Goshwami *et al.*, 2012b), anti-inflammatory, antipyretic (Goshwami *et al.*, 2013a), anthelmintic (Yadav and Temjenmongla, 2012; Goshwami *et al.*, 2013b) and antidiabetic (Das *et al.*, 2014; Hasan *et al.*, 2014) activities and had potential for increasing reproductive function in male rats (Kaewamatawong *et al.*, 2013). The leaf extract possesses significant anticestodal efficacy against tapeworm *Hymenolepis diminuta* infections in rat (Temjenmongla and Yadav, 2006). The lipophilic extract of the rhizomes inhibited the seed germination and could slow down the growth of the seedling of *Mimosa diplotricha* C. Wright ex Sauvalle (Napiroon *et al.*, 2014).
 58. *Lysichitum americanum* Hultén and St. John: The stress metabolite lysichitalexin, isolated from the leaves, showed antifungal activity (Hanawa *et al.*, 2000).
 59. *Monstera deliciosa* Liebm.: Extracts of the leaves and branches exhibit cytotoxic activity (Lira *et al.*, 2014). The rhizome extracts showed moderate antioxidant, antihyperglycemic and antihyperlipidemic activities. Several compounds, isolated from the plant, were considered cytotoxic agents against Hep2 cell lines (Abo-Ellil, 2014).
 60. *Montrichardia linifera* (Arruda) Schott: The leaves are used to treat rheumatism and ulcers, and the roots are used as antidiuretic. The trunk sap is used against snake bites and rays stings and to treat deep cuts, however, excessive use of the sap can result in burns and even cause blindness if it comes in contact with eyes (Amarante *et al.*, 2011a; dos Santos *et al.*, 2014). The Mn content in the tea may exceed the tolerable daily intake and thus its use was not advised (Amarante *et al.*, 2011c). The plant extracts showed high toxicity (Amarante *et al.*, 2011b), antiplasmodial (Costa *et al.*, 2009; Amarante *et al.*, 2011b), antioxidant, insecticidal and cytotoxic activities (dos Santos *et al.*, 2014).
 61. *Philodendron* sp.: The stem is used to treat rheumatic and joint pains (Lense, 2012).

62. *Pinellia cordata* N. E. Brown.: Though it is a poisonous plant, it was traditionally used in China for treating all kinds of pain, stomachache, snake bite poisoning, injury, arthritis, rheumatism, cancerous tumors and skin diseases. Capsules containing this crude drug were clinically used as analgesic and anti-inflammatory agents in Zhejiang Province (Huang *et al.*, 2011).
63. *Pinellia ternata*: It is an edible herb native to China. The raw or semi-cooked roots and leaves have been consumed in ancient China as a medicinal plant for relieving cough and inflammation (Jin *et al.*, 2012). The tuber, reported toxic to humans, has been used as an antiemetic, sedative (Oshio *et al.*, 1978), expectorant and to suppress vomiting (Iwasa *et al.*, 2014). The plant extracts and/or the different plant constituents (polysaccharides, lectin, cerebrosides, etc.) exhibited anti-inflammatory, antioxidant (Zhang *et al.*, 1991), antimicrobial (Chen *et al.*, 2003; Feng *et al.*, 2012), antitumor (He *et al.*, 2005; Feng *et al.*, 2012; Zuo *et al.*, 2012; Li *et al.*, 2013), anti-arrhythmic, anti-ulcer, hypotensive, sedative-hypnotic, antitussive (Feng *et al.*, 2012) and insecticidal (Jin *et al.*, 2012) activities. A study revealed that drug interaction between *P. ternata* and the CYP3A-metabolizing drugs might be probable, suggesting that careful monitoring is essential for the concomitant use of the plant with other drugs so as to avoid the adverse interactions (Wu *et al.*, 2015).
64. *Pothos aurea* (*Epipremnum aureum* L.; *Rhaphidophora aurea*; *Scindapsus aureus*): Extracts of different plant parts exhibited antitermite, antimicrobial and antioxidant activities (Sonawane *et al.*, 2011; Srivasatava *et al.*, 2011; Mehta *et al.*, 2013).
65. *Pothos chinensis* (Raf.) Merr.: Extracts of the plant possess hypoglycemic effect (Qin *et al.*, 2011).
66. *Pothos scandens* L.: The leaves are used to treat diarrhoea (Lense, 2012).
67. *Remusatia vivipara* (Roxb.) Schott (Elephant ear): The whole plant and tuber were reported as high toxic (Huai *et al.*, 2010). The leaves and tubers are used in folk medicine for the treatment of inflammation, arthritis, analgesic, on the wound to dispel any worms and germs, for disinfecting genitourinary tract, whooping cough and for the treatment of reddish boils. The tubers are strongly poisonous but used externally to treat breast mastitis, abscesses and ascariasis (Bhurat *et al.*, 2011b; Asha *et al.*, 2013). Extracts of the different parts exhibited CNS depression (Bhurat, 2011), anti-inflammatory, cataleptic (Bhurat *et al.*, 2011b,c), antioxidant (Asha *et al.*, 2013) and antibacterial (Shaik *et al.*, 2014) activities. The *R. vivipara* mucilage was found to be useful for preparation of uncoated tablet dosage form (Shelke *et al.*, 2011).
68. *Rhaphidophora aurea* (*Pothos aureus* Linden & André; *Epipremnum mooreense* Nadeaud; *Scindapsus aureus* (Linden & André) Engl.; *Epipremnum aureum* (Linden & André) G. S. Bunting (Money plant): This plant is widely used as an indoor plant climbing from pots and hanging from baskets. The air roots have been fed to horses to rid them of intestinal worms (Arulpriya and Lalitha, 2011). The ethanol extract of *R. aurea* twined over *Lawsonia inermis* is toxicologically safe by oral administration (Arulpriya and Lalitha, 2012). The alcoholic extract of aerial roots showed antioxidant and anti-inflammatory activities (Arulpriya and Lalitha, 2014).
69. *Rhaphidophora decursiva*: Decursivine, an alkaloid isolated from the plant showed antimalarial activity (Zhang *et al.*, 2002).
70. *Rhaphidophora korthalsii* Schott: The plant has been traditionally used for cancer and skin diseases treatment (Yeap *et al.*, 2013). Various extracts of the plant exhibited cytotoxic, antioxidant, immunomodulatory (Wong and Tan, 1996; Yeap *et al.*, 2007, 2011a,b, 2012, 2013) (Wong and Tan, 1996; Yeap *et al.*, 2007, 2011a,b, 2012).

71. *Rhaphidophora pertusa* Schott: The plant extracts showed potent anti-inflammatory and analgesic activities (Linnet *et al.*, 2010). The ethanolic extract of the stem exhibited moderate antibacterial activity (Kalairasan and John, 2011).
72. *Sauromatum guttatum* Schott. (syn. *Sauromatum vencesum*): The plant extract possesses spasmolytic activity and can play a possible role as antidiarrheal (Shah *et al.*, 2014). It is also used as stimulating poultice in snake bite (Bin Asad *et al.*, 2011).
73. *Schismatoglottis calyptrata* Zoll. & Mor.: The leaves are used in West Papua to treat bone fracture (Lense, 2012).
74. *Scindapsus hederaceus* Schott.: The leaves are used in West Papua to treat cold of babies (Lense, 2012).
75. *Scindapsus officinalis* (Roxb.) Schott: The fruit is used in India as antidiabetic, anthelmintic, antidiarrhoeal, carminative, expectorant, tonic, antiprotozoal, anticancer, sharpening hearing, cardiogenic and regulating the bowel and appetite. It is also used in dysentery, asthma, troubles of the throat, bronchitis and for many other medical conditions. Extracts of the fruits and other parts exhibited antioxidant (Singh and Velraj, 2009; Shivhare *et al.*, 2011), anti-asthmatic (Hedayetullah *et al.*, 2010), analgesic, anti-inflammatory (Patel *et al.*, 2010; Mishra *et al.*, 2011), antibacterial (Rakshit *et al.*, 2011), anthelmintic (Singh *et al.*, 2014a), cytotoxic (Shivhare *et al.*, 2011), antinociceptive, hepatoprotective (Shrivastava *et al.*, 2013) hypoglycemic (Ferdous *et al.*, 2013a,b) and cytostatic (Dhirender *et al.*, 2012), activities.
76. *Syngonium podophyllum* Schott (Whitefly, Arrowhead Vine): The plant is a traditional remedy for the treatment of arthritis, rheumatism, cough and severe skin conditions (Stark *et al.*, 2009). The leaf and bark extracts exhibited anti-inflammatory activity (Sosa *et al.*, 2002). The leaf aqueous extract showed antioxidant, antibacterial, and cytotoxic activities (Kumar *et al.*, 2014). The volatile oil had a repellent effect on some aphids on aptera aphid, guard aphid and mustard aphid (*Lipaphis erysimi*) (Zhou *et al.*, 2004b).
77. *Typhonium divaricatum* (L.) Decne: The lectin from the tubers strongly agglutinated rabbit erythrocytes but was inactive with human erythrocytes irrespective of blood group. It showed antiviral and antiproliferative activities (Luo *et al.*, 2007).
78. *Typhonium flagelliforme* (Rodent tuber): The plant is used, in Malaysia, by the local communities to treat cancer (Lai *et al.*, 2010). The plant is often used as an essential ingredient of herbal remedies for alternative cancer therapies. The hexane extract exhibited cytotoxic activity (Choo *et al.*, 2001). The cerebroside, isolated from the tuber showed significant antihepatotoxic activity (Huang *et al.*, 2004b). Four pheophorbide related compounds, isolated from the plant, exhibited antiproliferative activity against cancer cells and the activity increased following photoactivation (Lai *et al.*, 2010).
79. *Typhonium roxburghii* Schott (corm): The plant is reported toxic, though its use in ethnomedicine in China (Huai *et al.*, 2010). The benzene extract of the corm showed insecticidal activity against the storage pest (Selvakumari and De Britto, 2012).
80. *Typhonium trilobatum* L. Schott: The rhizome is used for treating gastric ulcer, vomiting, cough, excessive expectoration, sore throat, headache, abscess and snake bite (Haldar *et al.*, 2011). The plant extracts exhibited antimicrobial (Kandhasamy and Arunachalam, 2008; Roy *et al.*, 2012), analgesic, anti-inflammatory, anti-diarrheal (Ali *et al.*, 2012) and larvicidal (against *Culex quinquefasciatus* Say) (Haldar *et al.*, 2011) activities
81. *Xanthosoma sagittifolium*: The spadix is reported to be rubbed on fresh wounds to aid blood clotting and rapid healing (Ukpong *et al.*, 2014). It is used as food and to prevent and treat bone diseases (de Oliveira *et al.*, 2012). The ethanolic extract of the corm possesses antidiabetic, hypolipidemic and antioxidant effects (Shajeela *et al.*, 2013).

82. *Xanthosoma violaceum*: The plant extracts showed antioxidant (Picerno *et al.*, 2003), antihyperglycemic and antinociceptive effects (Faisal *et al.*, 2014).
83. *Zantedeschia aethiopica*: Some of the isolated compounds possess antialgal activity (Della Greca *et al.*, 1998).

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