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In vivo pharmacological activities of medicinal plants of *Khalishpur upazila*, Khulna District, Bangladesh: a mini review

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Abstract

Since primitive time, human has always an attempt to mitigate sufferings and diseases by using natural flora. Medicinal plants are being used to treat various ailments as well providing new leads to discover new potential drugs. Moreover, two third of our commercial drugs is natural origin. Their traditional uses have attracted the attention of researchers, and as a result, reports on biological activity studies of medicinal plants are increasing day by day. This review has been designed to compile and appraise the reports on antinociceptive, anti-inflammatory, antipyretic, and anti-diabetic activities of medicinal plants of Khalishpur Upazila, Khulna District, Bangladesh. In order to gather web based information, Google Scholar, PubMed, Scopus, Scirus, and other pertinent literature were utilized. To report such activities, a total number of 32 reports on 27 plant species have been found so far.

Key words: Khalishpur; Khulna; Antinociceptive; Anti-inflammatory; Antipyretic; Antidiabetic

Introduction

Medicinal plants are being used in the treatment of various ailments from ancient time in all over the world (1-3). Since the progress of allopathic medicine system, the use of traditional medicine has gone to decline phage in considerable extent, and it was more prominent in few years ago. However, in recent years, the situation is being changed, because of side-effects and toxicity of the commercial synthetic drugs, predominance of multi-drug resistance microorganisms, and failure in the treatment of a number of diseases. Moreover, two-third people of the developing country directly or indirectly depend on complementary or alternative medicine for the treatment of health hazards (4).

Scientists all over the world are trying to find out scientific basis of the traditional uses of medicinal plants. Ultimate target is to find out potential lead compounds as well as possible mechanism of action responsible for each bioactivity. It is well known that more than 60% commercial drugs are from natural origin, or modified synthetic form of natural compounds (5).

It is already reported that several pharmacological active compounds are present in plants, as for example, homoharringtonine, and cantharidin are being used in the cancer therapy (6). Other potential drugs from natural origin include the anticancer drugs like vincristine, vinblastine, and taxol, as well as the anti-malarial drug like artemisinin (7).

In the present review, some pharmacological activities, namely, antinociceptive, anti-inflammatory, antipyretic, and anti-diabetic activities of locally available medicinal plants of Khalishpur Upazila, Khulna District, Bangladesh are complied and presented in organized manner.

This review aims to appraise these selective pharmacological activities of the plants of the study area, so that advanced studies can be designed to identify new lead compounds as well as molecular basis of bioactivity.

Study Area

Khalishpur is an Upazila of Khulna District in the Division of Khulna, Bangladesh. It is located at 22.8500°N 89.5361°E and total area is 11.47 km^2. Though this area possesses rich plant diversity only few plants have been screened for their pharmacological activities. That is why this area was selected to appraise some selective bioactivity studies so far conducted on locally available medicinal plants.

Methodology

Google Scholar, PubMed, Scopus, and Scirus were used to search published literature since 1950. Other additional publications, namely, books and journal articles, were also investigated. Locally available medicinal plants of the study area were searched for the bioactivities. The results are presented in Table 1. This table represents a general outline of the published works that have been done so far on locally available medicinal plants for antinociceptive, anti-inflammatory, antipyretic and anti-diabetic activity. It also delineates full botanical name of the plants species, plant parts used for the studies, screened activity, and the screening method with test animal.

Antinociceptive, anti-inflammatory, antipyretic and anti-diabetic activity

From the literature search, A total of 32 hits was found with local medicinal plants of the study area reporting one or more of these activities: antinociceptive, anti-inlfammatory, antipyretic, and anti-diabetic activity (Table 1) (8-39). Some of the literatures correspond for the same given species, and, therefore, a total of 27 plants were reported to have these pharmacological activities. However, 17 reports for antinociceptive activity, 13 reports for anti-inflammatory activity, only 4 reports for antipyretic activity and 10 reports for anti-diabetic activities were found so far since 1950 for locally available 27 medicinal plants.

For antinociceptive activity studies, acetic acid-

induced writhing, hot-plate, tail-immersion, and formalin-induced paw licking tests were utilized. Acetic acid-induced writhing test was most popular screening method. For anti-inflammatory activity studies, carrageenan and formalin-induced paw edema, ethyl phenylpropiolate-induced ear edema, cotton pellet granuloma, and acetic acid-induced increased vascular permeability technique were utilized. For antipyretic activity studies, Brewer's yeast-induced pyrexia, and TAB vaccine-induced pyrexia methods were used. For anti-diabetic activity studies, streptozotocin-induced diabetes, alloxan-induced diabetes, retro-orbital plexus puncture in normal and alloxan-induced diabetes, and glucose-induced diabetes methods were utilized. Streptozotocin and alloxan-induced diabetes were most common screening technique.

see Table 1.

Conclusion

This review has revealed that only a few studies have been done so far on the medicinal plants of Khalishpur Upazila. There is no report on bioactive compound isolation and identification of mechanism of action. So, advanced studies like LC-MS, GC-MS are required for identifying new lead compounds.

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Si. No.	Plant name	Family	Plant part tested	Observed activity	Test method	Refs.
1.	*Alocasia indica* Schott.	Araceae	EtOH extract of dried rhizome	Antinociceptive, anti-inflammatory	Acetic acid-induced writhing, carrageenan, and formalin-induced paw edema in rat	(8)
2.	*Aloe vera* L.	Aloaceae	Aqueous extract of leaves	Antinociceptive, anti-inflammatory	Acetic acid-induced writhing, hot-plate, tail-immersion test, cotton pellet granuloma, carrageenan, and formaldehyde-induced paw edema in rat	(9)
3.	*Amaranthus spinosus* L.	Amaranthaceae	50% EtOH extract of whole plant	Antinociceptive	Acetic acid-induced writhing, formalin, tail-immersion, and hot-plate test in mice	(10)
4.	*Amaranthus spinosus* L.		MeOH extract of leaves	Antipyretic	Yeast-induced pyrexia in mice	(11)
5.	*Amaranthus spinosus* L.		MeOH extract of leaves	Anti-inflammatory	Carrageenan-induced paw edema, cotton pellet granuloma, and acetic acid-induced increased vascular permeability in mice	(12)
6.	*Barleria lupulina* Lindl.	Acanthaceae	CH_3OH extract of leaves and twigs	Anti-inflammatory	Carrageenan-induced paw edema, and ethyl phenylpropiolate-induced ear edema in mice	(13)
7.	*Barleria lupulina* Lindl.		CH_3OH extract of aerial parts	Anti-diabetic	Streptozotocin-induced diabetes in rat	(14)
8.	*Bougainvillea spectabilis* Willd.	Nyctaginaceae	EtOH extract of stem bark	Anti-diabetic	Alloxan-induced diabetes in rat	(15)
9.	*Brassica oleracea* L. var. gongylodes L.	Brassicaceae	PE extract of stem	Anti-diabetic	Streptozotocin-induced diabetes in rat	(16)
10.	*Carica papaya* L	Caricaceae	MeOH extract of seed	Antinociceptive, anti-inflammatory	Formalin-induced paw licking nociception, carrageenin-induced paw edema in mice	(17)
11.	*Cassia fistula* L.f.	Fabaceae	EtOH extract of leaves	Anti-inflammatory, antipyretic	Carragenan-induced paw edema, cotton pellet granuloma, and TAB vaccine-induced pyrexia in rat	(18)
12.	*Cassia occidentalis* L.	Caesalpiniaceae	PE, $CHCl_3$, and aqueous extract of whole plant	Anti-diabetic	Retro-orbital plexus puncture in normal, and alloxan-induced diabetes in rat	(19)
13.	*Cedrus deodara* Loudon	Pinaceae	Volatile wood oil	Antinociceptic, anti-inflammatory	Acetic acid-induced writhing, hot-plate test and carrageenan-induced pedal edema in rat.	(20)
14.	*Centella asiatica* (L.) Urb.	Apiaceae	Water extract of whole plant	Antinociceptive, anti-inflammatory	Acetic acid-induced writhing, hot-plate test, and prostaglandin E_2-induced paw edema in mice	(21)
15.	*Clerodendrum inerme* (L.) Gaertn.	Verbenaceae	MeOH extract of leaves	Antinociceptive, anti-inflammatory	Acetic acid-induced writhing, and cotton pellet granuloma in rat	(22)
16.	*Clitoria ternatea* L.	Fabaceae	Aqueous extract of leaves, and	Anti-diabetic	Alloxan-induced diabetes in rat	(23)

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17.	*Cuscuta reflexa* Roxb.	Convolvulaceae	MeOH, and $CHCl_3$ extract of whole plants	Anti-diabetic	Glucose-induced diabetes in rat, and mice	(24)
18.	*Euphorbia royleana* Boiss.	Euphorbiaceae	Hydrosoluble fraction of latex	Anti-inflammatory	Carrageenan, and dextran-induced edema, formaldehyde-induced arthritis, and cotton-pellet granuloma test in rat	(25)
19.	*Excoecaria agallocha* L.	Euphorbiaceae	EtOH extract of stem berks	Antinociceptive	Acetic acid-induced writhing, hot-plate, and tail-immersion test in mice	(26)
20.	*Ficus hispida* L.f.	Moraceae	EtOH extract of bark	Anti-diabetic	Glucose oxidase method in both normal, and alloxan-induced diabetes in rat	(27)
21.	*Hygrophila auriculata* (Schumach.) Heine.	Acanthaceae	Aqueous extract of aerial parts, and root	Antinociceptive	Acetic acid writhing, hot-plate, and tail-flick test in mice	(28)
22.	*Murraya paniculata* (L.) Jack	Rutaceae	CH_3OH, PE, and ethyl acetate extract of bark	Antinociceptive	Acetic acid-induced writhing in mice	(29)
23.	*Murraya paniculata* (L.) Jack	Rutaceae	EtOH extract of leaves	Antinociceptive	Acetic acid-induced writhing in mice	(30)
24.	*Olea europaea* L.	Oleaceae	Leaf extract	Antinociceptive	Tail-flick, hot-plate, and formalin test in rat	(31)
25.	*Piper chaba* Hunter	Piperaceae	EtOH extract of fruit	Antinociceptic, anti-inflammatory, antipyretic	Formalin test, ethyl phenylpropiolate -induced ear edema, carrageenan-induced hind paw edema, and yeast-induced hyperthermia in rat	(32)
26.	*Psidium guajava* L.	Myrtaceae	EtOH extract of the stem bark	Anti-diabetic	Alloxan-induced hyperglycemia in rat	(33)
27.	*Sansevieria trifasciata* Prain.	Dracaenaceae	EtOH, and water extract of leaves	Antinociceptive, antipyretic	Tail-immersion, formalin test, and Brewer's yeast-induced pyrexia in mice	(34)
28.	*Saraca asoca* (Roxb.) W.J.de Wilde.	Caesalpiniaceae	Ethyl acetate extract of leaves	Antinociceptive, antipyretic	Tail-flick test, and Brewer's yeast-induced pyrexia in rat	(35)
29.	*Saraca asoca* (Roxb.) W.J.de Wilde.		PE, $CHCl_3$, and MeOH extract of leaves	Anti-diabetic	Streptozotocin-induced diabetes in mice	(36)
30.	*Trichosanthes kirilowii* Maxim.	Cucurbitaceae	Water extract of the roots	Anti-diabetic	Alloxan-induced diabetes in mice	(37)
31.	*Tridax procumbens* Linn.	Asteraceae	Aqueous, and EtOH extract of leaves	Antinociceptive, anti-inflammatory	Formalin, acetic acid, and CFA induced pain model in rat	(38)
32.	*Zea mays* L.	Poaceae	Aqueous extract of husk	Antinociceptive, anti-inflammatory	Hot-plate test, formalin-induced paw licking, carrageenan induced paw edema, and cotton pellet granuloma model in rat	(39)

Table 1: Antinociceptive, anti-inflammatory, antipyretic, and anti-diabetic activity of medicinal plants of Khalishpur Upazila, Khulna district, Bangladesh

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