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# A Review of *Acalypha Communis* and *Bergia Capensis*

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**Abstract:** ***The present assessment summarizes the Plant taxonomy, botanical distribution, ethno medicinal uses, Bergia capensis (B. capensis) and Acalypha communis (A. communis), pharmacology, and toxicity review of different extracts and compounds of Bergia capensis. Several phytochemical compounds including alkaloids, anthraquinones, coumarins, flavonoids, glycoflavonoids, glycosides, iridoids, limonoids, polyphenols, phytosteroids, pregnane, saponins, tannins, and withanoides have been identified from different plant parts of the species. In the past years, research on Bergia capensis &Acalypha communis focused on evaluating pharmacological activities of the different extracts, and compounds isolated from the species. As revealed by the present review, the vast majority of the documented ethnopharmacological studies reported are in vitro and some in vitro studies. This review covers the traditional uses, the phytochemical and pharmacological investigations of the bergia capensis and Acalypha communisit was valuable to elaborate the therapeutic value of Bergia capensis by conducting numerous preclinical and clinical evaluations for social benefit.***

**Keywords:** Bergia capensis, Review, Distribution, Phytochemistry, Pharmacology

## 1. Introduction

*Bergia capensis* is a small annual herb which grows in wet places and is native to Africa, southern China and tropical Asia. The Elatinaceae are a small family of plants, usually associated with seasonally inundated areas of tropical and subtropical regions. There are only two genera in the family, *Bergia*and *Elatine. Bergia* was named by Linnaeus after Petrus Jonas Bergius 1766-1790 and includes about 24 species worldwide with centres of diversity in Africa and Australia (1).

There were proposals to change the species name of *Bergia capensis* to *B. verticillata*, *B. aquatica* or *B. luxurians*, on the grounds that the epithet *capensis* was inappropriate as the species does not occur in the Cape of Good Hope, South Africa. However, the name *B. capensis* was reinstated in accordance with the International Code of Botanical Nomenclature (2,3).Acevedo-Rodríguez and Strong (4) cite *Bergia sessiliflora* as a synonym of *Bergia capensis*, but this species is reported as valid in the World Flora Online (5).

**Ethnobotanical Review of Bergia Capensis**

**Scientific Name**
- Bergia capensis

**Common Name**
- White water fire

**Synonyms**
- *Bergiaverticillata*Willd.
- *Bergia aquatic* Roxb.
- *Bergia sessiliflora* Griseb.
- *Bergiaverticillaris* Druce
- *Elatineluxurians* Delile
- *Elatineverticillata* Wight &Arn.

**Common Names**

- Bengali
- English
- Tamil
- Telugu
- malayalam
- White Keshuriya
- White Water Fire
- Nandu Kollupu Chedi
- NeeruPaavila
- Pola-tsjira

**Taxonomy**

- Root
- Kingdom
- Phylum
- Class
- Order
- Family
- Genus
- Species
- Root
- Plantae
- Tracheophyta
- Equisetopsida C. Agardh
- MalpighialesJuss. ex Bercht. & J. Presl
- Elatinaceae
- Bergia
- Bergia capensis L.

**Morphology**

Annual or perennial herbs, about 10-35 cm tall, stem ascending, erect, succulent, reddish, much branched, with ascending and creeping branches, constricted and rooting at nodes. Leaves simple, opposite-decussate, narrow elliptic-oblong to lanceolate, about 19-50 x 10-22 mm across, attenuate or decurrent at the base, margin entire, apex acute or subacute, glabrous, petiole stout, about 1-5 mm long, stipules, ovate-triangular, margins pectinate membranous, glandular, usually persistent, about 2-3 mm long. Inflorescence densely fascicled in axillary cymes. Flowers bisexual, actinomorphic, about 2-3 mm across, pedicel subsessile or about 1-4 mm long, bracteate, sepals 3-5, free, ovate-lanceolate, united at the base, membranous, apex subacute, keeled, green with reddish tips, about 1.5-2.5 mm long, petals 3-5, free, white or pink, longer than the sepals, obovate-oblong to spathulate, transparent, margin entire or membranous, apex with mucronate tip, about 2-2.5 mm long. Stamens 10, usually in 2 series, filaments filiform, about 1-1.5 mm long, dilated at the base, anthers 2-locular, oblong, dorsifixed, dehiscing longitudinally disk hypogynous. Ovary superior, 5 locular, syncarpus, ovoid-subglobose, about 2 mm long, ovules numerous, anatropus, axil placentation, styles 5, slightly curved, about 2 mm long, stigma capitate. Fruit capsule, obovoid-globose, about 2 mm across, 5 loculed, dehiscing septicidally or septifrugally. Seeds numerous, oblong-ellipsoid, minute, dark brown to black, scalariform or reticulate (6).

**Habit:** Perennial herb (7)

**Distribution**

*Bergia capensis* is native to tropical and subtropical areas in Africa and from China to tropical Asia (8). It is reported as introduced in Central America, the West Indies (Cuba, Haiti, Netherlands Antilles, southwestern Mexico, South America (Ecuador, Peru, Venezuela) and Europe (Greece, Portugal, Spain)(9-13).

*Bergia*species are not more widespread in suitable areas of Australia as they do not compete well with other wetland species. Nevertheless, the distribution of *B. capensis* might be under-reported, as small species associated with wetlands are usually under-collected and/or overlooked.

***Global Distribution***

Asia: China, India, Iran, Malaysia, Sri Lanka, Thailand; Africa; Europe; North America.

***Local Distribution***

Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Diu & Daman, Goa, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal (6).

***Indian distribution***

State - Kerala, District/s: Alappuzha, Kollam, Kottayam, Malappuram, Kozhikkode, Ernakulam, Thrissur (14)
Maharashtra: Kolhapur, Ratnagiri, Sangli, Satara, Sindhudurg Karnataka: N. Kanara Kerala: Alapuzha, Kollam, Kozhikode, Malappuram (7)

**Habitat**

*B. capensis* is reported as occurring in paddy fields, grasslands, rice fields, irrigation channels, ditch sides, rock pools, marshes, muddy places and along streams (15-17).

**Biology and Ecology**

**Genetics**

The chromosome number reported for *Bergia capensis* is 2n=18 (18).

**Reproductive Biology**

Very little information is available on the reproductive biology of *Bergia capensis.* According to East (1940), self-fertilization is common in *Bergia.* At the India Biodiversity Portal (2019), *B. capensis* is reported as being self-pollinated, cross pollinated and visited by insects. Seed dispersal is by autochory (self-dispersal), anemochory (wind dispersal) and zoochory (birds or animals).

**Physiology and Phenology**

The species flowers from January to February and in May in Africa. it flowers and fruits from August to November in India.
The presence of phenolic acids, including delphinidin, ellagic acid, quercetin, cyanidin and kaempferol, is reported from members of the genus *Bergia* (19). Saponins and alkaloids are absent from the genus.

**Longevity**

*B. capensis* is a small annual herb (6).

**Environmental Requirements**

Little information about the environmental requirements of *Bergia capensis* is available, other than that it grows in seasonally inundated areas (16, 17). Leach reports that *Bergia*can survive high salinity, high temperatures and droughts, but does not specify which species. (20)

**USES**

**Economic Value**

According to Tucker the Elatinaceae have little economic importance (1). Methanolic extract of *Bergia capensis* inhibit the growth of *Bipolarisoryzae* [or *Cochliobolusmiyabeanus*], which is a pathogenic fungus that causes brown spot disease in rice (20).

**Social Benefit**

No species of *Bergia* is recorded as used for food or condiments, and none are reported as poisonous. *Bergia capensis* is used in folk rituals and traditional medicine. Seeds of the species are also reported to have been collected for ritual purposes in Ghana in prehistoric times (19). In India, the leaves are given to animals to cure food poisoning. The leaves are also used to treat intestinal worms (20-21).

**Ethnobotanical Review of *Acalypha Communis***

***Acalypha communis Mull.Arg***

**Scientific classification**

| | | |
|---|---|---|
| Kingdom | : | plantae |
| Subkingdom | : | Viridaeplantae |
| Class | : | Spermatopsida |
| Subclass | : | Rosidae |
| Superorder | : | Euphorbianae |
| Order | : | Malpighiales |
| Family | : | *Euphorbiaceae* |
| Subfamily | : | Acalyphoideae |
| Tribe | : | Acalypheae |
| Genus | : | *Acalypha* |
| Subgenus | : | nom |
| Specific epithet | : | communis |
| Botanical name | : | *Acalypha communis Mull.Arg* |

**Description of *Acalypha communis* [21]**

*Acalypha communis* is a synonym of *Ricinocarpus communis* (Müll.Arg.) Kuntzebelongs to family *Euphorbiaceae.*It includes herbs, shrubs and small trees, Shrubs or suffrutex frequently with resinous bright droplets on leaves and inflorescences; indumentum of simple or glandular hairs. Inflorescences spicate, usually unisexual, sometimes androgynous; male inflorescences axillary; female or androgynous inflorescences terminal. Female bracts increasing and foliaceous in fruit, deeply divided into 6–12 linear teeth of 1/2 or more of the bract length. Female flowers sessile with deeply branched styles from base or nearly so. mainly from the tropics and subtropics, although some species are also found in temperate areas. About two-thirds of the species are distributed in America. They thrive in a wide variety of habitats, from tropical rain forests to subdesert areas, and from sea level up to 4000 meters in altitude.

**Taxonomic history (24)**

*Acalypha communis* was first described by J.MüllerArgoviensis in March of 1865, in volume 34, fascicle 1 of *Linnaea*, in a preliminary treatment of *Acalypha* for A.P. de Candolle's *Prodromus*. He divided the species into five varieties, designatedby Greek letters: α *tomentosa*, β *tomentella*, δ *puberula*, γ *hirta*and ε *brevipes*. When studying the *Acalypha* collections from Argentina, Paraguay, Uruguay and the southern regions of Bolivia and Brazil, we found that many of them had been identified as *Acalypha communis* Müll. Arg. A preliminary review of these collections was enough to note that this name was applied to very different plants. where he described three new varieties of *Acalypha communis*: var. *pallida*, var. *intermedia* and var. *Obscura*. *A. communis* has been used repeatedly as a "wildcard" to designate a group of taxa of complicated taxonomic assignment widely distributed mainly in the north of Southern Cone.

**Phytochemical Review of Bergia Capensis *Acalypha Communis***

**New Antimicrobial Cycloartane Triterpenes from *Acalypha communis***

Three new cycloartane-type triterpenes, 16α-hydroxymollic, 15α-hydroxymollic, and 7β, 16β-dihydroxy-1,23-dideoxyjessic acids, were isolated from the aerial parts of Acalypha communis. The structures of the novel triterpenes were determined by spectroscopic methods as well as chemical derivatization. These compounds were tested for their antimicrobial activity against Gram-positive

and -negative bacteria. Compoundsexhibited moderate antimicrobial activity (MIC 8, 32, 8 µg/mL, respectively) against vancomycin-resistant enterococci. In addition, compound was found to be active against methicillin-resistant staphylococci. In contrast, compounds were poorly active against Gram-negative bacteria.

**Revised taxonomy and nomenclature of *Acalypha* sect. *Communes* (*Euphorbiaceae*), a complex group of species widespread in the northof the Southern Cone**

The application of the species names included in the previously invalidly published "*Acalypha* sect. *Communes*", mostly around the widely cited *A. communis*, has been confusing almost since their publication. After a thorough study of the literature, from which we recorded 56 scientific names associated to this section, as well as the study of ca. 1500 herbarium specimens, including nomenclatural types, we propose a deep nomenclatural and taxonomic reorganization of this group. *Acalypha* sect. *Communes* is validly published and circumscribed to include five species: *Acalypha communis*, *A. variabilis*, *A. vellamea*, *A. senilis* and *A. hassleriana*. Regarding *A. communis*, we delimit its taxonomic status and propose five subspecies: *A. communis* subsp. *communis*, subsp. *apicalis*, subsp. *paraguariensis*, subsp. *saltensis*and subsp. *tracheliifolia*, four of them new combinations. Twenty-two lectotypes and three neotypes are designated, and 20 new synonyms are proposed. A key based on morphological characters to the species and subspecies of this section is also provided.

**Phytochemical Review of Bergia Capensis**

**Isolation and identification of phytoconstituents**
A new triterpenoid, 3-oxo-12β-hydroxy-oleanan,13β-olide, and six known triterpenoids were isolated from the root bark of *bergia capensis*, an Africanmedicinal plant. Alimonoid and two glycoflavonoids were found in its leaves. (22)

**Isolation and identification of Alkaloids and stilbenes**
Two alkaloids including one carbazole alkaloid berginineand its derivative N-methylberginine have been isolated and characterized from *B. senegalensis* (23).

**Isolation and identification of Phenolic compounds**
Two flavonoids called kaempferol-3-*O*-β- D-glucopyranoside and quercetin-3-*O*-β-D-glucopyranoside were isolated from the leaves from *E. capensis* (24). Atraric acid also called methyl 2,4-dihydroxy-3,6-dimethylbenzoate and 4-hydroxy-3,5-dimethylbenzoic acid were isolated from the stem bark of *E. senegalensis*, respectively (25,26). Recently, we reported for the first time, one phenylpropanoid named senegalin from the stem bark of *E. senegalensis* (27).

**Isolation and identification of Steroids**
The chemical examinations of the *bergia*plant species, a total of seven steroids have been isolated and consisted into five stigmastane-type steroids viz β-sitosterol, β-sitosterol acetate, β-sitosterol palmitate , β-sitosterol oleate and stigmasterol (25,26), as well as two pregnane-type steroids including (Z)-volkendousin and ekeberin B (28).

**Isolation and identification of Coumarins**
lactones of 2-hydroxy- Z-cinnamic acid. Twelve coumarins were isolated from *bergia*species, mostly from the stem bark as compared to the other parts of the plant. Ekersenin also called pereflorin or 4-methoxy-5-methylcoumarin is the first coumarin isolated from this genus B. *senegalensis* (29).

**Isolation and identification of limonoid**
The limonoid ekebergin was reported from the seeds of *B. capensis*. It belongs to the andirobin-class of limonoids identified by their rings B,D-seco (30). In order to confirm the structure its oxidation was performed using Jones reagent and gave the corresponding ketone , while its acetylation gave compound (31, 32)

**Pharmacological Review of Bergia Capensis**

**Anti-hypertensive studies**
David R Kamadyaapaetal, study was to examine the *in vivo* effects of *bergia capensis* leaf ethanolic extract (BCEE) on the blood pressure of anaesthetised normotensive male Wistar rats and conscious weanling Dahl salt-sensitive (DSS) rats, which develop hypertension as they age. To investigate possible mechanism(s) of the extract's hypotensive effects, the contractile or relaxant responses to EKE in the absence or presence of reference drugs were evaluated in Wistar rat isolated aortic rings precontracted with methoxamine hydrochloride.

Acute intravenous administration of BCEE elicited hypotensive responses in anaesthetised animals, while sub-chronic treatment with the extract averted the development of high blood pressure in weanling DSS rats. Isometric recordings of methoxamine hydrochloride (ME) pre-contracted, isolated, endothelium-intact and -denuded aortic rings revealed concentration-dependent relaxation responses to BCEE. The potency was significantly less in the endothelium-denuded rings. Inhibitors of endothelium-derived relaxing factor (EDRF), L-NAME, methylene blue and indomethacin significantly reduced BCEE-evoked vasorelaxations in endothelium-intact aortic rings.These results indicate that the vasorelaxant effect of BCEE was in part mediated via EDRF-dependent or -independent pathways. These observations suggest that the hypotensive effect of BCEE was in part mediated via modulation of total peripheral resistance of the vascular smooth muscles. (33)

**Analgesic activity**
William *et al*evaluated, the analgesic activities of aqueous stem bark extracts of *B. capensis* in albino rats using a hot plate and tail immersion tests. Rats were administered with doses of 100 mg/kg and 200 mg/kg intraperitoneally, and a standard drug pentazocine 10 mg/kg was used. The extract showed activities which were dose-dependent, and the activities were comparable to that of pentazocine in the hot plate method but higher than pentazocine in the tail immersion method. At the dosage of 200 mg/kg body weight, the latency period increased from 21.4 min at pre-treatment to 48.2 min and 59.4 min and 15 min and 30 min post-treatment, respectively. The result of extract on tail immersion test response showed that there were no significant changes in the time for tail withdrawal at all dosages of extract administered except at 100 mg/kg body

weight and 200 mg/kg body weight where the time for tail withdrawal was significantly shorter than that of the pre-treatment [34]. Comparing reaction times obtained for animals treated with the extracts and the control values, it was apparent that the extracts caused prolongation of latency times, which is indicative of centrally mediated activity.

**In-Vitro Anti-inflammatory activity**

Jager *et al*. evaluated aqueous and ethanolic root extracts of *B. capensis* in an *in vitro* assay for cyclooxygenase (COX) inhibitors with indomethacin (0.5 µg) as the control. The ethanolic extract of *E. capens is* showed inhibition of 82% which was >66.5% inhibition exhibited by the indomethacin control. Based on these results, the RE might be a rationale for the ethnopharmacological claim that *B. capensis* possess anti-inflammatory properties. [35]

**In-Vivo Anti-inflammatory activity**

Mulaudzi *et al*. [36] evaluated the anti-inflammatory activities of dichloromethane, ethanol, petroleum ether, and water bark, and leaf extracts of *B. capensis* against the COX (COX-1 and COX-2) enzymes. All the solvent extracts showed moderate to high (40–90%) inhibition activity toward COX-1, and insignificant to high (<20–85%) inhibition activity toward COX-2 at 250 µg/ml and three further concentrations were evaluated at 31.25 µg/ml, 62.5 µg/ml, and 125 µg/ml to determine inhibitory concentration (IC50) values. Water bark extracts bark showed half maximal IC50 value of 0.01 µg/ml and 0.05 µg/ml toward COX-1 and COX-2, respectively [36].

**Anthelmintic activity using nematode *Caenorhabditis elegans***

McGaw *et al*studied, anthelmintic activities of hexane, ethanol and waterleaf extracts of *E. capensis* on the mortality and reproductive ability of the free-living nematode *Caenorhabditis elegans* in two different assays. All extracts exhibited activities at a concentration of 2 mg/ml after the 7 day incubation period, with only water and ethanol extracts showing activities at a concentration of 1 mg/ml and after 2 h incubation period, respectively [37].

**Anthelmintic activity using *Haemonchuscontortus***

Egual*eet al*studied, anthelmintic activities of crude aqueous and hydroalcoholic extracts of the seeds of *E. capensis* on eggs and adult *Haemonchuscontortus*. Both aqueous and hydroalcoholic extracts induced significant egg hatching inhibition with aqueous extract requiring maximum concentration of 0.25mg/ml to induce 100% egg hatch inhibition while the hydroalcoholic extracts did not induce complete inhibition at the highest concentration tested of 2mg/ml. The aqueous extract induced 50% inhibition (ED50) at 0.06 mg/ml while the ED50 value of hydroalcoholic extract was 1.03mg/ml. After 24 h of exposure of adult *H. contortus*to different concentrations of plant extracts, hydroalcoholic extracts produced motility or mortality of adult *H. contortus*to the level of 60% at a concentration of 8mg/ml while aqueous extract produced only 43.3% at the same concentration. These findings are comparable to the standard, albendazole which killed the parasites in a dose-dependent manner, and all the worms were dead at a concentration of 0.5 mg/ml within 24 h [38].

**Antibacterial activity**

Rabe and Van Staden [39] studied, antibacterial activities of water and methanol bark extracts of *E. capensis* against *Staphylococcus aureus, Staphylococcus epidermis, Bacillus subtilis, Escherichia coli,* and *Klebsiella pneumoniae* using the agar diffusion and dilution methods with neomycin as the positive control. The extracts showed activities against *S. aureus, S. epidermis,* and *B. subtilis* with minimum inhibition concentration (MIC) values ranging from 2.0 mg/ml to 4.0 mg/ml [39].

Ndukwe *et al*. [40] evaluated the antibacterial activities of methanol leaf, root, and stem bark extracts of *E. capensis* against *B. subtilis, E. coli, Klebsiella, Pseudomonas, Salmonella typhi,* and *S. aureus* using disc diffusion assay. The extracts showed activities with a zone of inhibition ranging from 5 mm to 23 mm and MIC value of 6.25 µg/ml [40].

Mulaudzi *et al*. [41] investigated the antibacterial effects of aqueous, acetone, dichloromethane, ethanol, methanol, and petroleum ether bark and leaf extracts of *E. capensis* against *B. subtilis, E. coli, K. pneumoniae,* and *S. aureus* using microdilution bioassay with neomycin as the positive control. The minimal microbicidal concentration (MMC) of the tested bacteria ranged from 0.39 mg/mL to 3.13 mg/mL [41].

Similarly, York *et al*. [42] assessed the antibacterial properties of aqueous and dichloromethane-methanol (1:1) leaf extracts of *E. capensis* against *K. pneumoniae, Moraxella catarrhalis, Mycobacterium smegmatis,* and *S. aureus* using microdilution assay with ciprofloxacin as the positive control. The extract showed activities with MIC values ranging from 1.33 mg/ml to 16.0 mg/ml [42].

Mabona *et al*. [43] evaluated antibacterial activities of aqueous and dichlomethane-methanol (1:1) bark and leaf extracts of *E. capensis* using the microtiter plate dilution technique against dermatologically relevant pathogens such as *Brevibacillusagri, Propionibacterium acnes, Pseudomonas aeruginosa, S. aureus,* and *S. epidermidis* with ciprofloxacin as the positive control and acetone and dimethyl sulfoxide (DMSO) as negative controls. The extracts showed activities with MIC values ranging from 0.38 mg/mL to >16.00 mg/mL [43].

**Studies on *Neisseria gonorrhoeae***

Mulaudzi *et al*. [36] evaluated the antigonococcal activities of aqueous, acetone, dichloromethane, ethanol, methanol, and petroleum ether bark and leaf extracts of *E. capensis* against *Neisseria gonorrhoeae* through determination of clear zones of inhibition with ciprofloxacin and DMSO as positive and negative controls, respectively. *E. capensis* showed moderate to high activity with dichloromethane, ethanol, and petroleum ether extracts with percentage inhibition ranging from 45.0% to 96.0% [36].

**Sexual Transmitted Disease**

Vambe *et al*. [44] evaluated the antigonococcal activities of dichloromethane, methanol, and petroleum ether and waterleaf extracts of *E. capensis* against *N. gonorrhoeae* using microdilution and agar disk diffusion techniques with ciprofloxacin as the positive control. All extracts exhibited

activities with MIC value of >2.5 mg/ml. The good antigonococcal activities exhibited by *E. capensis* extracts tested in this study could lead to the isolation of lead antigonococcal compounds.

**Anti- *tuberculosis studies***

Lall and Meyer studied, antimycobacterial activities of acetone extract of *E. capensis* against a drug-sensitive strain of *Mycobacterium tuberculosis* (H37Rv) using the agar plate method. The activity of the extract was 0.5 mg/ml, and further evaluation was carried out using a rapid radiometric method to confirm the inhibitory activity. The extract exhibited MIC value of 0.1 mg/ml against the H37Rv strain. These antimycobacterial activities suggest that *E. capensis* extracts deserve further investigation as they may provide secondary metabolites which may lead to tuberculosis drug discovery.[45]

**Respiratory disorders**

Kama-Kama *et al*. evaluated,antimycoplasmal activities of methanol-dichloromethane (1:1) and methanol stem bark extracts of *E. capensis* against *Mycoplasma mycoides* subsp. capri, five strains of *M. mycoides* subsp. *mycoides* and one strain of *Mycoplasma capricolum* subsp. *Capricolum* using broth microdilution assays. All the extracts showed activities with MIC values ranging from 0.13 mg/ml to 0.15 mg/ml [46].

**Antifungal activity**

Ndukwe *et al* evaluated, the antifungal activities of methanol leaf, root, and stem bark extracts of *E. capensis* against *Aspergillus niger*and *Candida albicans* using disc diffusion assay. The extracts showed activities with a zone of inhibition ranging from 5 mm to 20 mm [47].

**Chickenpox and respiratory synticalAntiviral studies**

Bagla *et al* studied, antiviral activities of hexane, dichloromethane, and methanol root extracts of *E. capensis* against canine distemper virus, canine parainfluenza virus-2, feline herpesvirus-1, and lumpy skin disease virus using virucidal and attachment assays. Dichloromethane and hexane extracts inhibited all viruses by at least 50%, and the extracts showed weak activities with EC50 values ranging from 30.9 µg/ml to 78.2 µg/ml with selectivity index values of <1 [48].

**Anti HIV Studies**

Mulaudzi *et al*. [36] evaluated anti-HIV activities of aqueous and methanol bark and leaf extracts of *E. capensis* using a non-radioactive HIV-1 reverse transcriptase (RT) colorimetric ELISA kit. The aqueous bark and leaf extracts as well as methanol leaf extract showed good HIV-1 RT inhibition percentage (70%) at 1 mg/mL based on COX-assay, with bark and leaf water extracts exhibiting dose-dependent IC50 values of 0.01±0.00 mg/mL while leaf methanol extract exhibited IC50 values of 0.39±0.06 mg/mL [36].

**Uterin-stimulant studies**

Sewram *et al* evaluated, the uterotonic activities of aqueous wood extracts of *E. capensis* using both pregnant and non-pregnant guinea pig uterine smooth muscle *in vitro*. The extract exhibited positive uterotonic activities. Sewram *et al* evaluated, the uterotonic activities of compounds 25 and 42 isolated from *E. capensis* using both pregnant and non-pregnant guinea pig uterine smooth muscle *in vitro*. The results of this study show that compounds varying degrees of agonist activity on uterine smooth muscle with minor changes in the molecular structure affecting its intrinsic activity on uterine muscle. The compounds were observed to mediate its effect through the cholinergic receptor [49].

**Sub chronic toxicity studies**

Mulholland and Lourine evaluated, toxicity activities of hexane seed extract of *E. capensis* seeds using the brine shrimps lethality test. Extracts at a concentration of 10 µg/ml, 100 µg/ml, and 1000 µg/ml was studied. Extract demonstrated moderate activities at the lowest concentration and 61%–80% at the highest concentration [50].

## 2. Conclusion

Present studies reveal that there is no doubt that these ethnopharmacological studies demonstrated a remarkable potential of *Bergia capensis* in the treatment of different human health problems. There is no doubt that *B. capensis &A. communis*is a valuable medicinal plant characterized by several phytochemical compounds and pharmacological activities; however, there are not yet enough phytochemical and pharmacological data Anti-diabetic studies. Therefore, future studies on the species should focus on evaluations of Diabetic studies and mechanism of action of the extracts as well as compounds isolated from the species of *Bergia capensis&A. communis.*

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