Objective: The present research work deals with the establishment of a standardization parameter for the Pharmacognostical evaluation of the plant Embelia Ribes and Camellia sinensis. Embelia Ribes is widely used in parasitic intestinal infection, however; Camellia sinensis is mainly used in the beverage preparation, for their Antioxidant activity but their anthelmintic effect is unknown. The present study aims to find out the effect of Camellia sinensis against phermitama Posthuma and compare their anthelmintic effect with Embelia Ribes.

Methods: The study has been performed under the different parameters. 1) The physiochemical parameter includes total Ash value, acid insoluble ash value, water-soluble ash value, moisture content, and foreign organic matter. 2) The phytochemical investigation includes the Extraction of Embelia Ribes and Camellia sinensis in different solvents in the increasing order of their polarity with Petroleum ether, chloroform, ethanol, distilled respectively and showed the presence of Alkaloids, carbohydrates, glycosides, tannins, flavonoids, phenolic compounds. 3) The pharmacological studies include the In vitro anthelmintic effect of Embelia Ribes and Camellia sinensis (ethanolic extract) against Phermitama Posthuma. The paralysis time and death time were studied.

Results: Shows the phys-chemical parameters such as total Ash value, acid insoluble ash value, water-soluble ash value, moisture content and foreign organic matter, which was determined to be not more than 8.98%, 1.5%, 7.8%, 3.2% and 0.25% in Embelia ribes as well as 7.8%, 1.6%, 8%, 2.2% and 0.21% in Camellia sinensis. Anthelmintic effect of Embelia ribes and Camellia sinensis (ethanolic extract) were investigated by measuring the paralysis time (75+3.7, 60+4.30, 48+4.40 and 73.32+3.80, 53.34+2.50, 38.55+3.45 respectively) and death time (140±2.62, 135±9.95, 97.55±4.25 and 124.85±5.30, 110.82±5.80, 80.30±2.80) at three different concentration 25 mg, 50 mg, 100 mg, against Phermitama posthuma and compared with the standard drug (Albendazole).

Conclusion: Camellia sinensis (ethanolic extract) extract and affords protection against helminthes (Phermitama Posthuma) and results show that Camellia sinensis is as effective as embelia ribes.

Keywords: Embelia ribes, Camellia sinensis, Antioxidant, Anthelmenitic, Pheritima posthuma
Muzaffarnagar, and the herbarium was registered as BGT/CSIR/19. The fresh young leaves were dried in shades at room temperature for 10 d and powdered to obtain 2-3 mm particle sizes. Fifty grams of powdered plants were macerated in 1,500 ml hydro-alcoholic solution (50% water+50% absolute ethanol) for 72 h. The extracts were filtered and concentrated in a rotary evaporator to obtain solid extracts and then freeze-dried to remove the solvent completely [6].

Physico-chemical analysis: The coarse powder of Embelia Ribes seeds and Camellia sinensis leaves were subjected to various Physico-chemical studies for determination of ash value (total ash, acid insoluble, and water-soluble ash) extractive values (water-soluble, alcohol soluble and petroleum ether soluble, and chloroform-soluble) respectively.

Pharmacognostical Investigation

Preliminary Pharmacognostical study on the leaves of Camellia sinensis and seeds of Embelia Ribes was studied to determine various parameters of Pharmacognostical standards such as ash values, extractive values, phytochemical tests, and microscopically characters of leaf powder. The shade-dried powder and various solvent extracts (viz, 70% ethanol, chloroform, and petroleum ether) have been analyzed for their phytoconstituents. The petroleum ether and chloroform extract were found to contain the presence of terpenoids and steroids. The data generated for the evaluation on Camella sinensis leaves may be useful for establishing the standardization protocols [7].

Pharmacognostic and physico-chemical standardization of ethno pharmacologically important seeds of Embelia Ribes and leaves of Camellia sinensis were performed. The physico-chemical standards developed in this study will provide referential information for the identification of these crude drugs and standardization. Quality control standardizations of the various medicinal plants used in traditional medicine are becoming more important today given the commercialization of formulations based on these plants. E. ribes and Camella sinensis seeds and leaves evaluated as per WHO recommendation respectively, various physicochemical and phytochemical evaluation parameters for quality control of medicinal plants are performed. Because of their medicinal importance and taxonomic confusion, Physico-chemical parameters, preliminary phytochemical screening, and quantitative evaluation were performed to establish the salient diagnostic characters [8].

Pharmacological evaluation

Procedure

The anthelmintic activity was performed according to the method of Gosh et al. (2005) on the adult Indian earthworm Pheritima Posthuma. Albendazole, the standard drug, was diluted with normal saline to obtain 25, 50, and 100 mg/ml concentrations and was poured into Petri dishes. Ethanolic extracts of both plants were diluted with normal saline to obtain 2.5, 50, and 100 mg/ml concentrations respectively. Normal saline (0.9% NaCl) alone served as the negative control.

All these dilutions were poured into the Petri dishes accordingly. Six groups of earthworms (n = 6) were taken for the study. Earthworms, nearly equal sizes (about 8 cm), were placed in each Petri dish at room temperature. Time for paralysis was noted down when no movement of any sort could be observed, except when the worm was shaken vigorously. The time of death for worms was recorded after ascertaining that the worms neither moved when shaken vigorously nor when dipped in warm water (50 °C). The paralysis time and lethal time were recorded in terms of minutes [10].

RESULTS

Phytochemical studies

Embelia ribes seeds

The physicochemical parameters total Ash value, acid insoluble ash value, water-soluble ash value, moisture content, and foreign organic matter which was determined to be not more than 8.98%, 1.5%, 7.8%, 3.2%, and 0.25% respectively shows in table 1. The extractive values (petroleum ether, chloroform, ethanol, Alcohol, Distilled water) were determined to be not more than 2.4%, 2.8%, 3.2%, 11.62% and 7.5% respectively shows in table 2.

Camellia sinensis leaves powder

The physicochemical parameters total Ash value, acid insoluble ash value, water-soluble ash value, moisture content, and foreign organic matter which was determined to be not more than 7.78%, 1.6%, 8%, 2.2%, and 0.21% respectively (table 1). The extractive values (petroleum ether, chloroform, ethanol, Alcohol, Distilled water) which were determined to be not more than 2.5%, 2.7%, 3.5%, 11.98% and 7.9% respectively (table 2).

Pharmacological evaluation

Preliminary phytochemical investigation

Extractive values using successive extraction successive extraction was performed by Sodhet apparatus with different solvents in the increasing order of their polarity e.g. Petroleum ether, chloroform, ethanol, distilled water and percentage yield is calculated (table 3). The foaming index was less than 100; although the Swelling Index of Embelia ribes and Camella sinensis was found to be 1.44 and 1.10 respectively.

DISCUSSION

In the present study, varied Pharmacognostical and chemical science parameters like ash values, extractive values, and wetness content of Embelia ribes seeds and Camella sinensis were established. These parameters play a very important role within the determination of the identity, quality, and purity of the drug. Wetness in conjunction with an acceptable temperature result in the activation of enzymes and enhances for the expansion of micro-organisms that could be a major issue liable for the deterioration of the medicine and formulations. Swelling index is that the property of plant containing gums, mucilage, or hemicelluloses, which can be liable for specific therapeutic utility whereas foaming index determines the glucosidal content of the drug [14]. Total ash indicates the presence of inorganic salts like phosphates, carbonates, and silicates of metallic element, potassium, magnesium, calcium, etc. Acid insoluble ash obtained when boiling the ash with robust acid-like acid and igniting the insoluble portion. It offers a live of sand and alternative oxide matter. Water-soluble extractive worth shows the presence of water-soluble inorganic salts. Phytochemical standardization encompasses all potential data concerning the chemical constituent’s gift in associate flavorer drug. This study discovered the presence of vital phytochemical contents such Alkaloids, carbohydrates, glycosides, tannins, Flavonoids, phenolic resin from the tested plants and compare their antihermic activity. Tannins and Phenolics are familiar to interfere with the energy generation in parasitic parasites by uncoupling biological process [13]. The Petroleum ether and chloroform extract were found to contain the presence of terpenoids and steroids. The info generated for the analysis on shrub leaves is also helpful for establishing the standardization protocols. Shrub is wide used, for their antioxidant activity. Antioxidant molecules have the capability to manage or neutralize the free radicals [12]. The leaf extract of shrub has important inhibitor and anthelmintic activity. However any investigations on the isolation of active compounds gift within the extracts and in vivo studies are necessary to spot a possible chemical entity for clinical use.

CONCLUSION

The pharmacognostical characteristics were evaluated successfully by using the different solvent extract of E. ribes and camellia sinensis. The method of evaluation was simple and inexpensive to obtain the optimized form. Fig. 1 shows the comparison of E. Ribes and C. sinensis with the standard drug (Albendazole). It indicates the significant change in the death time of pHERITIMA POSTHUMA as we increase the concentration of both tested drugs. It also provides evidence, that C. sinensis as effective as Albendazne as and more effective than E. Ribes. Fig. 2 shows the plot between paralysis time and different concentrations of ABZ, E. Ribes and C. sinensis respectively. It shows that there is no significant change at low concentration (25 mg/ml) in...
paralysis time but it has been found as we increase the concentration of tested drug it shows the significant change and in paralysis time. Camellia sinensis (ethanolic extract) extract affords maximum protection against helminthes (Pheritima Posthuma) and results show that Camellia sinensis is more effective than Embelia ribes.

Table 1: Ash valve of Embelia ribes seeds and Camellia sinensis leaves

| Solvents         | %value (w/w) Embelia ribes | %value (w/w) Camellia sinensis |
|------------------|---------------------------|-------------------------------|
| Petroleum ether  | 2.4                       | 2.5                           |
| Chloroform       | 2.8                       | 2.7                           |
| Ethanol          | 3.2                       | 3.5                           |
| Distilled water  | 7.5                       | 7.9                           |

Table 2: Extractive values of embelia ribes and camellia sinensis

| Parameter                        | %value (w/w) Embelia ribes | %value (w/w) Camellia sinensis |
|----------------------------------|-----------------------------|-------------------------------|
| Total ash                        | 8.98                        | 7.78                          |
| Acid insoluble ash               | 1.5                         | 1.6                           |
| Water-soluble ash                | 7.8                         | 8                             |
| Moisture content                 | 3.2                         | 2.2                           |
| Foreign organic matter           | 0.25                        | 0.21                          |

Table 3: Swelling index and foaming index of Embelia ribes and Camellia sinensis

| Parameter                        | Value (Embelia ribes) | Value (Camellia sinensis) |
|----------------------------------|-----------------------|---------------------------|
| Swelling index                   | 1.44                  | 1.10                       |
| Foaming index                    | Less than 100         | Less than 100              |

Table 4: Phytochemical analysis showed the presence of Alkaloid, carbohydrate, glycosides tannins, flavonoids, and steroids in the extract

| Phyto-chemical          | PEL | CEL | ETH |
|-------------------------|-----|-----|-----|
| Alkaloids               | -   | -   | +   |
| Carbohydrates           | -   | -   | +   |
| Glycosides              | -   | -   | +   |
| Protein and amino acids | -   | -   | +   |
| Tannin                  | -   | -   | +   |
| Terpenoids              | +   | +   | -   |
| Saponin                 | -   | -   | +   |
| Flavonoids              | -   | -   | +   |
| Steroids                | -   | +   | +   |

Table 5: Phytochemical analysis showed the presence of Alkaloid, carbohydrate, glycosides tannins, flavonoids, and steroids in the extract

| Phyto-chemical          | PEL | CEL | ETH |
|-------------------------|-----|-----|-----|
| Alkaloids               | -   | -   | +   |
| Carbohydrates           | -   | -   | +   |
| Glycosides              | -   | -   | +   |
| Protein and amino acids | -   | -   | +   |
| Tannin                  | -   | -   | +   |
| Terpenoids              | +   | +   | -   |
| Saponin                 | -   | -   | +   |
| Flavonoids              | -   | -   | +   |
| Steroids                | -   | +   | +   |

PEL: pet ether extract of Camelia sinensis leaves; CEL: chloroform extract Camelia sinensis leaves; ETH: Ethanol extract of Camelia sinensis leaves

Anthelmintic activity

Table 6: In vitro anthelmintic effect of Embelia ribes and Camellia sinensis (ethanolic extract) against pheritima posthuma

| Drugs (treatment)          | Concentration (mg/ml) | Paralysis time (min) | Death time (min) |
|----------------------------|-----------------------|----------------------|------------------|
| Albendazole(standard)      | 25                    | 55.44±3.40           | 120.82±7.0       |
|                           | 50                    | 40.66±4.50           | 98.64±4.89       |
|                           | 100                   | 36.55±3.58           | 75.85±4.28       |
| Embelia ribes (ethanolic extract) | 25        | 75±3.76              | 140±2.82         |
|                           | 50                    | 60±4.30              | 135±9.95         |
|                           | 100                   | 48±4.40              | 97.55±4.25       |
| Camellia sinensis (ethanolic extract) | 25        | 73.32±3.80           | 124.85±5.30      |
|                           | 50                    | 53.34±2.50           | 110.82±5.80      |
|                           | 100                   | 38.55±3.45           | 80.30±2.80       |

Fig. 1: Death time (minute) verses concentration (25, 50, 100 mg/dl) of Albendazole (ABZ), Embelia ribes, Camellia sinensis

Fig. 2: Paralysis time (min) verses concentration (25, 50, 100 mg/dl) of Albendazole (ABZ), embelia ribes, camellia sinensis
ABBREVIATION

ABZ - Abibendazole

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

Declared none

REFERENCES

1. Uma Bhandari, Raman Kanojia, KK Pillai. Effect of ethanolic extract of embelia ribes on dyslipidemia in diabetic rats. Int J Exp Diab Res 2002;3:159–62.
2. A Sabitha Rani, K Saritha, V Nagamani, G Sulakshana. In vitro evaluation of antifungal activity of the seed extract of embelia ribes. Indian J Pharm Sci 2011;73:247–9.
3. Yuqiong Guo, Shanshan Zhao, Chen Zhu, Xiaojun Chang, Chuan Yue, Zhong Wang, et al. Identification of drought-responsive miRNAs and physiological characterization of tea plant (Camellia sinensis L) under drought stress. BMC Plant Biol 2017;17:211.
4. Lenu B Fakae, Carl W Stevenson, Xing Quan Zhu, Hany M Elsheikha. In vitro activity of camellia sinensis (green tea) against trophozoites and cysts of Acanthamoeba castellanii anjin from Pongamia pinnata (L) pierre and embelin from Embelia ribes Burm.f. Int J Parasitol: Drugs Drug Res 2017;38:76–81.
5. Maryam Esghaie. Evaluation of anticancer activity of camellia sinensis in the caco-2 colorectal cancer cell line. Asian Pac J Cancer Prev 2018;19:1697–701.
6. Rajani Srivastava. A review on phytochemical, pharmacological, and pharmacognostical profile of wrightia tinctoria: adulterant of kurchi. Pharmcogn Rev 2014;8:36–44.
7. Bigonyia P, Singh CS, Shukla A. Pharmacognostical and physicochemical standardization of ethnopharmaceutically important seeds of Lepidium sativum Linn. and Wrightia tinctoria R. Br. Indian J Nat Prod Resour 2011;2:464–71.
8. Ghosh T, Maity TK, Boseand A, Dash GK. Athelmintic activity of Bacopa monieri. Indian J Nat Prod 2005;21:16–9.
9. Rastogi T, Bhutda V, Moon K, Aswar PB, Khadabadi SS. Comparative studies on anthelmintic activity of Moringa oleifera and Vitex negundo. Asian J Res Chem 2009;2:181–2.
10. Shambadiya Goswami, Awanish Pandey, Poonam Tripathi, Asheesh Singh, Amrita Rai. An in vitro evaluation of the anthelmintic activity of Hedychium spicatum rhizomes and Zingiber zerumbet rhizomes on the Pheretima Posthuma model: a comparative study. Pharmcogn Res 2011;3:40–2.
11. Chandra Kala, Syed Salman, Sudhir Chaudhary. Comparative pharmacognostical evaluation of costus speciosus (Wild ginger) and zingiber officinale (ginger) rhizome. Int J Curr Pharm Res 2016;8:19–23.
12. Kumar S, Pandey AK. Chemistry and biological activities of flavonoids: an overview. Sci World J 2013. https://doi.org/10.1155/2013/162750
13. Ananta Swargiary, Abhijita Daimari, Manita Daimari, Noymi Basumatary, Ezekiel Narzary. Phytochemicals, antioxidant, and anthelmintic activity of selected traditional wild edible plants of lower Assam Indian J Pharmacol 2012;46:418–23.
14. M Sreesjith, N Kannappan, A Santhiagu, Ajith P Mathew. Phytochemical, anti-oxidant and anthelmintic activities of various leaf extracts of Flacourita sepiaaria Roxb. Asian Pac J Trop Biomed 2013;3:947–53.