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COMPARATIVE STUDY OF PHYSICO-CHEMICAL AND PHYTOCHEMICAL SCREENING OF SOME SELECTED ANTIDIABETIC MEDICINAL PLANT

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ABSTRACT: The present paper deals with the investigation of comparative physicochemical and phytochemical screening of five medicinal plants *viz*., leaves of *Gymnema sylvestre*, fruits of *Momordica charantia*, rhizomes of *Curcum alonga*, seeds of *Eugenia jambolana* and fruits of *Embilica officinalis* widely used in the treatment of diabetes. In the present communication, comparative results were shown. Various macroscopic, physicochemical, and phytochemical parameters were analyzed and presented.

INTRODUCTION: Medicinal plants are various plants used in herbalism and are thought by some to have medicinal properties. Few plants or their phytochemical constituents have been proven to have medicinal effects by rigorous science or have been approved by regulatory agencies such as the United States Food and Drug Administration or European Food Safety Authority. India is known for ancient scripts, the number system, the invention of zero and Vedas. Medicines in India are used by about 60 percent of the world's population. These are used for primary health care in rural areas such as developing countries and developed countries where modern medicines are predominantly used. While traditional medicines are derived from medicinal plants, minerals and organic matter, herbal drugs are prepared from medicinal plants only [1].

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The present paper deals with the comparative physicochemical and phytochemical screening of some medicinal herbs used to treat diabetes.

MATERIAL AND METHODS:

Selection, Collection and Authentication of Plant/ Plant Material: The different fresh plant parts *viz.*, leaves of *Gymnema sylvestre*, fruits of *Momordica charantia*, rhizomes of *Curcuma longa*, seeds of *Eugenia jambolana* and fruits of *Embilica officinalis* were collected in the months Jan 2021 to March 2021from the in and around local areas of Jaipur, Rajasthan.

Pharmacognostical Evaluation Morphological Features: The macroscopy /morphology of different parts of the selected plant, such as color, odor, size, shape, taste, surface characters, and fractures, were carried out [2].

Physicochemical Evaluation: The dried parts were subjected to the standard procedure to determine various physicochemical parameters [3-5].

Extraction of Plant Material: Samples were shattered and screened with 40 mesh. The shade-

dried coarsely powdered (250gms) were loaded in the Soxhlet apparatus and were extracted with ethanol until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using a rotator evaporator. The residue was then stored in a desiccator, and the percentage yield was determined [6-7].

Preliminary Phytochemical Screening of Extract: The ethanolic extract obtained after extraction was subjected to phytochemical screening to determine the presence of various phytochemicals in the extracts. The standard procedure was adopted to perform the study [8-9].

RESULTS AND DISCUSSION:

Morphological Features: The macroscopy/ morphological features of selected medicinal herbs viz., leaves of *Gymnema sylvestre*, fruits of *Momordica charantia*, rhizomes of *Curcuma longa*, seeds of *Eugenia jambolana* and fruits of *Embilica officinalis* were studied and were presented in **Table 1.** The photographs were given in **Fig. 1** to **5.**

TABLE 1: MORPHOLOGICAL FEATURES OF SELECTED MEDICINAL HERBS USED IN THE TREATMENT OF DIABETES

S. no.	Name of the Plant/drug	Plant Part	Size	Shape	Colour	Odour	Taste
1.	*Gymnea sylvestre*	Leaves	2-6 cm length 1-4 cm width	Simple, Petiolate, rounded to cordate base	Green	Characteristics	Slightly Bitter and Astringent
2.	*Mormodica charantia*	Fruits	2.5-25 cm long 2-7 cm diameter	Elongated, fusi form, longitudinally grooved, ridged	Green	Characteristics	Bitter
3.	*Curcuma longa*	Rhizome	3-6 cm long 3-8mm diameter	Curved, irregular, cylindrical	Greyish yellow	Slight	Very bitter
4.	*Eugenia jambolana*	Seed	1-2 cm diameter	Oval or round	Cream	Characteristics	Slightly bitter and astringent
5.	*Emblica officinalis*	Fruits	2-4 cm length 1-4 cm width	Rounded	Brown to black is h brown	Characteristics	Sour and astringent

TABLE 2: PHYSICO-CHEMICAL EVALUATION OF SOME SELECTED ANTIDIABETIC MEDICINAL PLANT

S. no.	Parameters	Values Obtained (%w/w)				
		GSL	MCF	CLR	EJS	EOF
1.	Total ash (TA)	8.44	7.0	7.98	8.40	8.78
2.	Water soluble ash (WSA)	1.06	3.78	1.36	3.20	1.025
3.	Acid in soluble ash(AIA)	3.78	0.30	1.12	1.20	0.59
4.	Moisture content (MC)	2.23	3.48	2.93	4.51	3.52
5.	Swelling index(SI)	2.90	3.21	1.56	4.28	4.68
6.	Foreign organic matters (FOM)	2.1	0.9	1.9	1.31	1.92
7.	Water soluble extractive value	25.12	35.23	8.65	22.20	33.10
8.	Alcohol soluble extractive value	18.92	20.41	22.49	14.94	24.56
9.	Pet. ether soluble extractive value	11.50	9.58	12.41	27.30	18.32

FIG. 1: LEAVES OF *GYMNEMA SYLVESTRE*

FIG. 2: FRUITS OF *MOMORDI CACHARANTIA*

FIG. 3: RHIZOMES OF *CURCUMA LONGA*

FIG. 4: SEEDS OF *EUGENIA JAMBOLANA*

FIG. 5: FRUITS OF *EMBILICA OFFICINALIS*

Physicochemical Evaluation: The physico-chemical evaluation of selected medicinal herbs *viz*., leaves of *Gymnema sylvestre*, fruits of *Momordi cacharantia*, rhizomes of *Curcuma longa*, seeds of *Eugenia jambolana* and fruits of *Embilica officinalis* were carried out.

Air-dried material was used for the quantitative determination of physiochemical values. This study determined ash values (total ash, acid insoluble ash, and water-soluble ash), moisture content, swelling index, and foreign organic matter **Table 3.**

TABLE 3: PHYSICO-CHEMICAL PROPERTIES OF SOME SELECTED ANTIDIABETIC MEDICINAL PLANT

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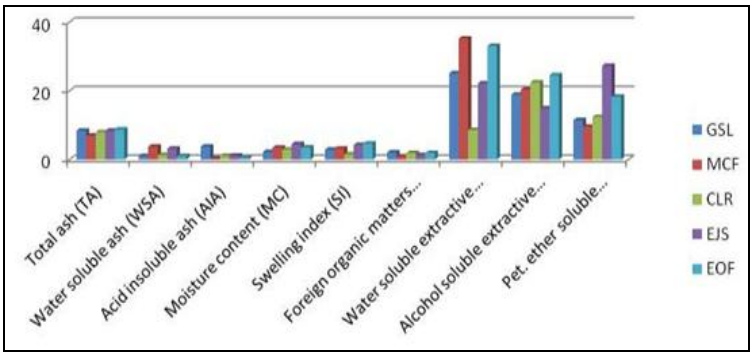

FIG. 6: PHYSICO-CHEMICAL EVALUATION OF SELECTED MEDICINAL HERB

Comparative studies were performed and were presented in the table. **Fig. 6** shows comparative physicochemicale valuation of leaves of *Gymnema sylvestre*, fruits of *Momordica charantia*, rhizomes of *Curcuma longa*, seeds of *Eugenia jambolana* and fruits of *Embilica officinalis* Pet. ether, alcohol and water soluble extractives were determined and were recorded. Alcohol and water extractive was determined as per WHO recommendations while petroleum ether soluble extractive was determined due to the medicinal attributes of the extract. Water soluble extractive was found to be very high in most of the extract when compared to other extractable matter in the drug. In some extracts alcohol soluble extractive value was recorded more, whereas pet. ether soluble extractive value was found to be the least.

Extraction of Plant Material: The shade-dried coarsely powder of selected medicinal herbs *viz*., leaves of *Gymnema sylvestre*, fruits of *Momordi cacharantia*, rhizomes of *Curcuma longa*, seeds of *Eugenia jambolana* and fruits of *Embilica officinalis* were extracted ethanol in a soxhlet apparatus. The solvents were removed by distillation under reduced pressure, and the resulting semisolid mass was vacuum-dried using a rotary flash evaporator. The percentage yields of ethanolic extract of selected medicinal herbs, their color, nature, and pH were presented in **Table 4.**

TABLE 4: PERCENTAGE YIELD OF ETHANOLIC EXTRACTS OF SOME SELECTED ANTIDIABETIC MEDICINAL PLANT

S. no.	Extract	Estimated percentage (%w/w)	Color of extract	Nature of extract	pH
1.	EEGS	12.92	Green	Semi Solid	7.03
2.	EEMC	15.39	Dark Green	Semi Solid	7.05
3.	EECL	18.25	Pale White	Solid Powder	7.00
4.	EEEJ	6.45	Dark Grey	Semisolid	7.02
5.	EEEO	10.28	Blackish Green	Stickysemi Solid	7.06

Abbr: EEGS Ethanolic extract of *Gymnema sylvestre* leaves EEMC: Ethanolic extract of *Momordica charantia* fruits EECL: Ethanolic extract of *Curcuma longa* rhizomes EEEJ: Ethanolic extract of *Eugenia jambolana* seeds EEEO: Ethanolic extract of *Embilica officinalis* fruits.

Fig. 7 shows the comparative percentage extractive value. The percentages EECL were found to be a maximum 18.25, followed by EEMC15.39, EEGS12.92, EEEO 10.28 and EEEJ 6.45. The color of extract ranges, which were reported in **Table 4**. The natures were solid to semisolid, where as the pH was neutral in all the extracts selected for the present investigation.

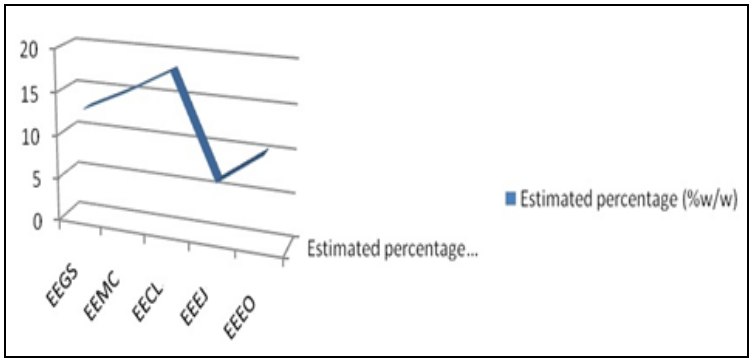

FIG. 7: PERCENTAGE YIELD OF ETHANOLIC EXTRACTS OF SOME SELECTED ANTIDIABETIC MEDICINAL PLANT

Preliminary Phytochemical Screening of Extract: The extract obtained after extraction of plant material was subject to phytochemical screening, which revealed the presence of various active phytoconstituents. The results were presented in **Table 5.**

TABLE 5: PRELIMINARY PHYTOCHEMICAL SCREENING OF SOME SELECTED ANTIDIABETIC MEDICINAL PLANT

S. no.	Constituents	Extracts of Medicinal Herbs				
		EEGS	EEMC	EECL	EEEJ	EEEO
1.	Carbohydrates	+	+	+	-	+
2.	Glycosides	+	+	+	+	+
3.	Alkaloids	+	+	+	+	+
4.	Protein & Amino acid	-	+	+	+	-
5.	Tannins & Phenolic compounds	-	-	+	+	+
6.	Flavonoids	-	+	+	+	-
7.	Fixed oil and Fats	-	+	+	-	-
8.	Steriods & Triterpenoids	+	+	+	+	-
9.	Waxes	-	-	-	-	-
10.	Mucilage & Gums	+	-	-	-	-

Abbr. - = Absent, + = Present

CONCLUSION: in the present study, compared results of some antidiabetic plants were shown various macroscopic, physicochemical, and phytochemicals parameters were analyzed.

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CONFLICTS OF INTEREST: Nil

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