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Research Article

## Evaluation and Comparative study of Lens Aldose Reductase Inhibitory activity of leaves Extracts of *Merremia emarginata*, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrata*: Potential for Diabetic Cataract treatment

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### ABSTRACT

**Introduction:** The present research attempts at discovering an effective anti-cataract agent, focusing on evaluation of Aldose reductase inhibition (ARI) capacities of weeds and lichen. The present study was aimed at finding out the in vitro ARI activity of extracts of weed plants and lichen. **Methods:** ARI activities of the ethanolic extract of weed plants and lichen were evaluated using goat lens aldose reductase using Hayman and Kinoshita method. Evaluation was done using UV-Visible spectroscopy at 340 nm. **Results:** The extracts showed AR inhibitory activity at different extent. **Conclusion:** The study concludes the ARI capacity of leaves of *Merremia emarginata*, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrata* which may be attributed to their flavonoid constituents and their extraction are solvent dependent. Thus *Merremia emarginata* leaves, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrata* weed plant's leaves and lichen may therefore work as a base for the development of anticataract agent. And out of all extract Triadax procumbens showed maximum activity.

**Keywords:** Aldose reductase, *Merremia emarginata* leaves, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrata* anti-cataract agent, weed plant, lichen, flavonoid.

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### Introduction

The term diabetes mellitus describes a metabolic disorder of multiple etiology characterizes by chronic hyperglycemia with disturbance of carbohydrate, fats and protein metabolism result from defects in insulin secretion, insulin action, or both.<sup>1</sup> The long-term effects of diabetes mellitus include progressive development of the specific complication of retinopathy with potential blindness, nephropathy that may lead to renal failure, and/or neuropathy with risk of foot ulcers, amputation, Charcot joints, and features of automatic dysfunction, including sexual dysfunction© 1998 WHO. Aldose reductase (AR) is an essential enzyme of the polyol pathway and plays a vital role in the development of diabetic complications.<sup>2-5</sup>

### Objective of work

The present study was aimed to Evaluation and Comparative study of Lens Aldose Reductase Inhibitory activity of leaves Extracts of *Merremia emarginata*, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrate*

### Material

DL-glyceraldehyde and Nicotinamide adenine dinucleotide phosphate (NADPH) used for AR activity determination were obtained from Merck KGaA (Darmstadt, Germany). Other reagents and solvents were of analytical grade, Double beam UV spectrophotometer (Shimadzu, Pharmaspec 1800) was used for determining the absorbance of the sample.

### Methods

#### Plant procurement

Plant was collected from the medicinal garden of Smriti college of Pharmaceutical Education, Indore and local market of Indore in the month of July-August 2018. The weeds and lichens were identified and voucher specimen of the plant has been deposited.

#### Extraction

The leaf petals were picked and washed with water to get rid of all unwanted debris, shade dried at a room temperature of

25 °C for 1 month, pulverised into powder using an electronic grinder and stored in an air-tight container for further use. Pulverised leaf petals were extracted by Maceration using 90% ethanol for seven days to produce a yield and phytochemical screening was performed.

### Isolation and Partial Purification of Goat Eye Lenses

Eye ball was obtained from slaughter house freshly and stored 0.9% NaCl solution. Lenses were removed by lateral incision of the eye, washed with ice-cold distilled water and kept cold. The lenses were homogenized in 10 volumes of ice-cold dist. water and centrifuged at 15,000 xg for 15 minutes at 4 °C. The resulting supernatant was used as the source of aldose reductase. Saturated ammonium sulphate (100%) was added to the supernatant from the homogenate to reach 40% saturation and then allowed to stand for 15 min with occasional stirring to ensure the completeness of precipitation. It was then centrifuged and the precipitate was discarded. The same procedure was repeated for the resulting supernatant using 50% and 75% ammonium sulphate saturations. The final supernatant was used as the partially purified aldose reductase.<sup>6</sup>

### Aldose reductase Assay

The method of Hayman and Kinoshita[6] was used to assay for aldose reductase (AR) activity. For determining the aldose reductase inhibitory activity a sample cuvette was taken containing mixture of 0.3mL of enzyme extract, 0.5 mL NADPH (0.104mM), 0.75 mL sodium phosphate buffer (pH 6.2, 0.1M), 0.1 ml extract and 0.7 mL of deionized water. The above mixture was incubated at 30°C for 10 min. and 0.75mL D, L-glyceraldehyde (10mM) was added to substrate and the absorbance was recorded at 340 nm for 3 minutes at 30 sec. interval. The assay was performed in triplicate. IC<sub>50</sub> value and Percentage inhibitions was calculated from a dose-response curve.(Table 3)(Graph 1).

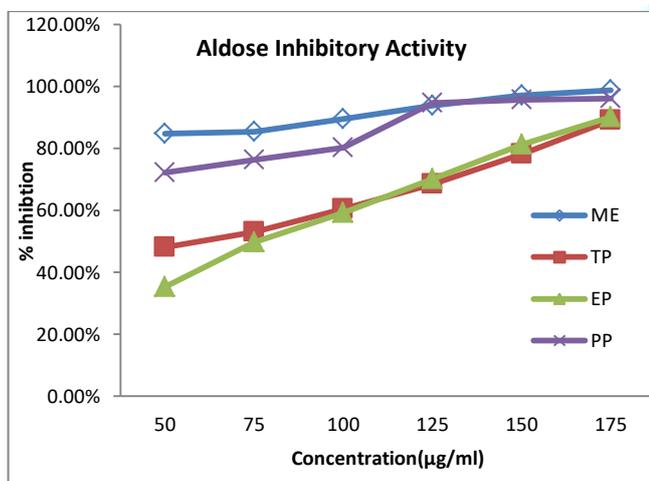
### Result and discussion

#### Aldose reductase assay

ARI activity was done for ethanolic extracts of *Merremia emarginata* (ME), *Permotrema perlatum*(PP), *Tridax procumbens*(TP) and *Euphorbia prostrata*(EP) leaves with IC<sub>50</sub> value 41.71±0.12, 63.3±0.29, 75±0.21, 21.27±0.67 respectively in the weeds and lichen extract inhibits aldose reductase.

Table 2:

Extract	Percentage Inhibition						IC <sub>50</sub>
	50 µg/ml	75 µg/ml	100 µg/ml	125µg/ml	150 µg/ml	175µg/ml	
ME	84.78±0.11	85.30±1.23	89.41±3.05	93.78±0.20	97.11±0.11	98.78±0.11	41.71±0.12
TP	48.1±0.14	53.1±0.22	60.4±0.50	68.4±0.30	78.2±0.72	89.1±0.32	63.3±0.29
EP	35.33±0.19	49.8±0.11	59.2±0.42	70.1±0.02	81.3±0.45	90.2±0.12	75±0.21
PP	72.18±0.23	76.22±0.45	80.30±1.89	94.64±0.67	95.63±0.21	96.15 ± 0.87	21.27±0.67



Graph 1

### 6. Summary and conclusion

The study concludes that the ARI capacity of leaves of *Merremia emarginata*, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrata* which may be attributed to their flavonoid constituents and their extraction are solvent dependent. Thus *Merremia emarginata* leaves, *Permotrema perlatum*, *Tridax procumbens* and *Euphorbia prostrata* weed plant's leaves and lichen may therefore work

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