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## Research Article

### *In Vitro* Studies on Anti-Cataract Activity of *Phoenix dactylifera* L., Seed

Shaik Khathija\*, E. Rajani, C. Madhavi Latha, Y. Prapurna Chandra

Department of Pharmacology, Ratnam Institute of Pharmacy, Pidathapolur (V&P), Muthukur (M), SPSR Nellore-524 346

#### Abstract

Cataract can be considered a paradigmatic protein conformation or amyloid disease because aggregation and precipitation of proteins from the normally clear soluble lens result in opacification and cataract. Cataract is painless clouding appearance on the internal lens of our eye. It blocks the light entering on lens of eye. This mostly happens to the older people, also those affected with metabolic disorder. Nowadays a children and young people are also affected because of the digital lifestyle. Early childhood cataract is a big challenge to overcome the visual eye. Opacity of the lens causes some chemical changes in the cellular and membrane constituents. The toxic effects of reactive oxygen species (ROS) or free radicals are neutralized in the lens by both enzymatic and non-enzymatic antioxidants. Several studies suggest the use of medicinal plants having antioxidant potential is beneficial against cataract. The most of the scientist selected the selenite induced cataract for oxidative damage induced cataract .we taken the naphthalene induced cataract model estimating the antioxidant level and compared with different groups of rats.  $\beta$  sitosterol is the active phytoconstitutes in the *Phoenix dactylifera* L., possess the antioxidant activity may be responsible for the anticataract activity.

Keywords: cataract, reactive oxygen species, *Phoenix dactylifera*

#### Article Info

##### \*Corresponding Author

Shaik Khathija

Department of Pharmacology,  
Ratnam Institute of Pharmacy,  
Pidathapolur (V&P), Muthukur (M),  
SPSR Nellore District-524346



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#### 1. Introduction

Cataracts in Asia like China, India, Taiwan and Singapore averagely has prevalence of 14% to 49%, where in the future the trend of cataract associated visual impairment is

increasing [1]. Visual impairment is a serious problem in the whole world, in fact blindness, as one of visual impairments, has become global issue with the percentage

of more than 1% of the total world population. World Health Organization (WHO) reported that the distribution of world population blindness has reached 45 people, especially in developing country such as Indonesia [2, 3]. A survey in 39 countries around the world reported that out of 285 people who have visual impairment, 50% of which is attributable to cataract affected by the age, diabetes complications and 13.7% blindness [4]. In some cases, free radicals trigger to induce lens opacification. The modification of protein by free radicals has been linked to severe oxidative stress, and Some studies shows that natural products from plants could be prevented protein insolubilization thereby delaying lens opacity [5]. Natural compounds consisting of antioxidant or anti-inflammatory secondary metabolites can serve as potential leads for anticataract agents. In this review, we tried to gather information form evidence plant- based natural products used for cataract treatment. This literature review is aimed at the evaluation of the potential natural products for anti-cataract.

## 2. Methodology

### Collection and Authentication of Plant

*phoenix dactylifera L.*, seeds was procured from Tirumala Hills and was authenticated by Dr. K. Madhava Chetty,

## 3. Results and Discussion

Asst. Professor, Department of Botany, S V University, Tirupati.

### Extraction Procedure

#### Preparation of *phoenix dactylifera L.*, seed extract.

The seeds were initially collected from the soil body and rinsed with distilled water and shade dried and then homogenized into fine powder and stored in air tight bottles. A total of 10 g of air dried powder was weighed and was placed in 100 mL of organic solvents (methanol and ethanol) in a conical flask and then kept in a rotary shaker at 190-220 rpm for 24 h. And then it was filtered with the help of muslin cloth and the solvent was evaporated by solvent distillation apparatus to make the final volume of one-fourth of the original volume, giving a concentration of 40 mg/mL. It was stored at 40 °C in air tight bottles for further studies.

#### *In-vitro* glucose induced bovine eye lens[6,7]

Fresh bovine eyeballs were obtained from slaughterhouse immediately after slaughter and transported to the laboratory at 0-4°C. The lenses were removed by extra capsular extraction and incubated in artificial aqueous humor (NaCl 140 mM, KCl 5 mM, MgCl 2 2 mM, NaHCO<sub>3</sub> 0.5 mM, NaH (PO<sub>4</sub>) 2 0.5 mM, CaCl<sub>2</sub> 0.4 mM and Glucose 5.5 mM) at room temperature and pH 7.8 for 72 h. Penicillin 32mg % and streptomycin 250 mg % were added to the culture media to prevent bacterial contamination.

Table: 1 Percentage yield of extract

Extraction of solvent	Ethanol	Ethyl acetate	Water
Percentage yield	2.1%w/v	1.4%w/v	1.0%w/v

Table: 2 Qualitative preliminary phytochemical analysis

S.No.	Chemical Test	Ethanol	Ethyl acetate	Water
<b>Test for carbohydrates</b>				
1.	Molisch's test	+	+	+
2.	Fehling's test	+	+	+
3.	Benedict's test	+	+	+
<b>Test for alkaloids</b>				
1.	Dragendroff's test	+	-	+
2.	Mayer's test	+	+	+
3.	Wager's test	+	+	+
4.	Hager' s test	+	-	-
<b>Test for triterpenoids</b>				
1.	Liebermann Burchard test	-	+	+
2	Salkowski test	+	+	+
<b>Test for Glycosides</b>				
1.	Legal test	+	+	-
2.	Keller kiliani test	+	-	-
3.	Baljet test	+	-	-
<b>Test for steroids</b>				
1.	Liebermann Burchard test	-	+	+
<b>Test for tannins and saponins</b>				
1.	Foam test	+	+	+

2	Froth test	+	+	+
3.	Tannins	+	+	-
<b>Test for phenols</b>				
1.	Ferric chloride test	+	+	+

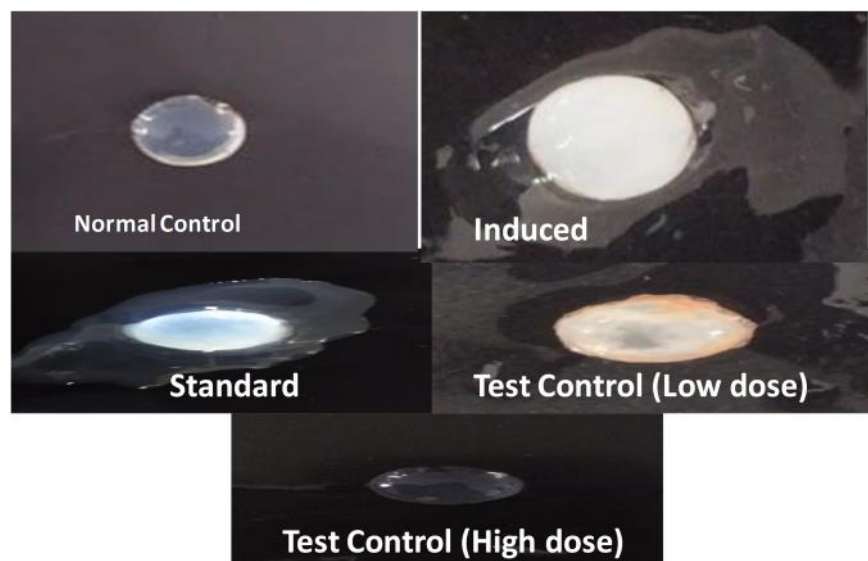


Fig: 1: Bovine eye lens incubated with KRB buffer (PH 7.5) with different groups.

Table 3: Absorbance of bovine serum albumin at different concentration

S.No	Concentration( $\mu\text{g}$ )	Absorbance (nm)
1	20	0.096
2	40	0.156
3	60	0.272
4	80	0.362
5	100	0.425

Table: 4 Total protein content at different concentration of extracts

S. No	Concentration( $\mu\text{g}$ )	Ethanol	Ethyl acetate	Water
1	20	1460.66	1307.66	494.35
2	40	2002.67	1763.33	567.98
3	60	2148.45	1887.51	675.98
4	80	2613.33	2218.67	904.27
5	100	3885.67	2434.16	1002.90

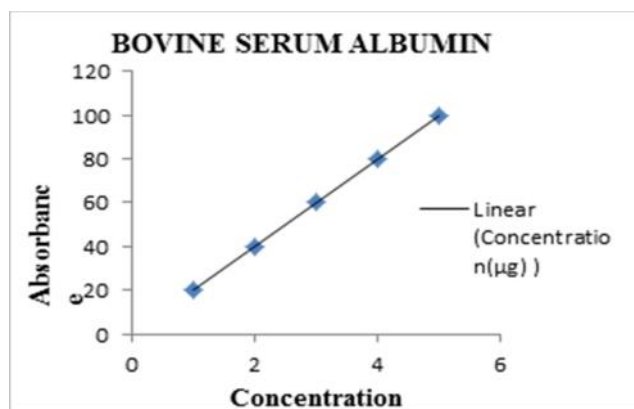


Fig: 2 Standard curve of Bovine Serum

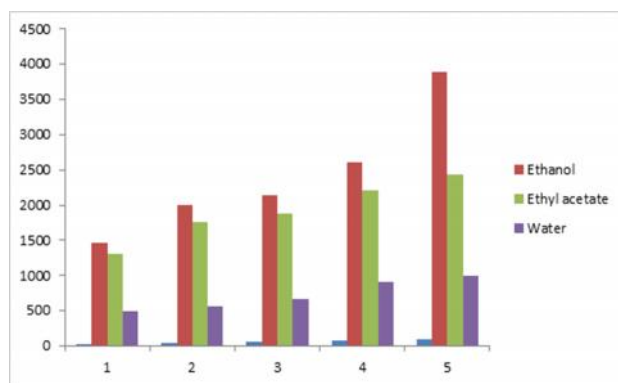


Fig.: 3 Comparison of Total Protein Content of Plant Extracts

#### 4. Conclusion

From the result it was concluded that ethanolic extract of the *Phoenix dactylifera L.*, seed possess anticataract activity using invitro bovine lens. It was confirmed by the histopathology and antioxidant determination in eye lens.  $\beta$  sitosterol is the active phytoconstitutes in the *Phoenix dactylifera L.*, possess the antioxidant activity may be responsible for the anticataract activity. In future future isolation of active constitutes, screnning the mechanism of action of the compound.

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