

## PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF *ELAEOCARPUS GENITRUS* (RUDRAKSHA) SEEDS

Jyoti Goldar and Rituraj Gupta\*

Department of Biotechnology, University Teaching Department, Sarguja University Ambikapur (C.G.)

Email: [riturajgupta21@gmail.com](mailto:riturajgupta21@gmail.com)

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**Abstract:** In the present investigation phytochemical and antibacterial activity of *Elaeocarpusganitrus* (Rudraksha) seeds were studied with the methanolic and acetonetic extract. The major phytochemical constituents screened were tannins, flavonoids, steroids, reducing compounds carbohydrates and alkaloids, alcohol and protein. It has been observed that maximum phytochemical compounds were present in methanolic and acetonetic extract of *E. ganitrus*. The phytochemical screening was done to ascertain the presence of bioactive components present in selected plant extract. Antibacterial activity in terms of minimum inhibitory concentration (MIC) of the extracts was studied with paper disc diffusion method and zone of inhibition was measured in mm. It has been observed that MIC was ranging from 11.25-21.25 mm for methanolic and 15.5-22mm for acetonetic extract respectively. It is concluded that Rudraksha seeds have many useful phytochemicals and possess significant antifungal/antibacterial activity.

**Keywords:** Phytochemical screening, Antibacterial activity, Rudraksha

### INTRODUCTION

*Elaeocarpusganitrus* commonly known as Rudraksha (Asolkar and Kakkar, 1992.). The word Rudraksha literally derived from two Sanskrit words 'rudra' a synonym for Lord Shiva and 'aksha' meaning eyes (Ramadurai, 2008). It is also called blueberry beads as beads are covered by an outer shell of blue color on fully ripening (Pandey and Das, 2004)). The seed is borne by several species of *Elaeocarpus*, with *Elaeocarpus ganitrus* being the principal species. Rudraksha was found in tropical and subtropical regions at the eminence ranging from seacoast to 2,000 meters above the sea level. Rudraksha cultivate in the area of the Gangetic plain in the foothills of the Himalayas to South-East Asia, Indonesia, New Guinea to Australia, Guam and Hawaii. Rudraksha tree flourish on mountains and hilly region of Nepal, Indonesia, Java, Sumatra and Burma. *Elaeocarpus* consists of about 12 genera and 350 species of tree (Gruissem and Jones, 2000). With the development of modern science, many scientists researched for evidences that support the ancient belief on the significance of Rudraksha (NISC,

2001). All the scientists came up with the findings that reassured and confirmed the divine power of Rudraksha beads. Individual from every walk of life irrespective of caste, creed, religion, nationality or gender can use Rudraksha to gain maximum spiritual, physical and materialistic benefits.

The presence of alkaloids, carbohydrates, phenol, tannin, flavonoids, and protein was tested by a standard qualitative analysis (Middleton and Kandaswami, 1994). In Indian scenario the phytochemical screening and antibacterial activity of Rudrakshaseeds are not known or little work has been done. Therefore, the present study was carried out to fill the knowledge gap in this regard.

### MATERIAL AND METHOD

Rudraksha seeds were collected from the Nitza Biological Research Lab Hyderabad, Andhra Pradesh, India. Epicarp and endocarp powder of seeds were used for phytochemical analysis and antibacterial activity as per the method reported by Sharma and Sharma (2010).



Fig. 1. Rudraksha seeds and powder

\*Corresponding Author

**Phytochemical screening****Test for alkaloids (Mayer's Test)**

Rudraksha endocarp (methanol and acetone extract) were treated with few drop of potassium mercuric iodide solution. Formation of a yellow colour precipitate indicates the presence of alkaloid. And Rudrasha epicarp (methanol and acetone extract) were treated with few drop of potassium mercuric iodide solution. Formation of a yellow colour precipitate indicates the presence of alkaloid.

**Test for flavonoid**

Rudraksha endocarp (methanol and acetone extract) were treated with sodium hydroxide solution. Formation of intense yellow colour indicate the absent of flavanoid. and Rudrasha epicarp (methanol and acetone extract) were treated with sodium hydroxide solution. Formation of intense yellow colour indicate the absent of flavonoid (Obasiet *al.*, 2010; Auduet *al.*, 2007).

**Test for carbohydrates (Molisch's Test)**

Rudraksha endocarp (methanol and acetone extract) were treated with few drop of alpha naphthanol solution. not formation of violet ring at the junction indicate the absence of carbohydrates. And Rudrasha epicarp (methanol and acetone extract) were treated with few drop of alpha naphthanol solution. Not formation of violet ring at the junction indicates the absence of carbohydrates.

**Test for tannin**

Rudraksha endocarp (methanol and acetone extract) were treated with 2% gelatin solution containing sodium chloride add the a few drops formation of white precipitation indicate the presence of tannin and rudrasha epicarp (methanol and acetone extract) were treated with 2% gelatin solution containing sodium chloride add the a few drops formation of white precipitation indicate the presence of tannin (Obasiet *al.*, 2010; Audu *et al.*, 2007).

**Test for steroid**

Rudraksha endocarp (methanol and acetone extract) were treated with acetic anhydride and 10 ml filtrate chloroform solution add the a few drops formation a ring of blue-green colour indicate the presence of steroid and Rudrasha epicarp (methanol and acetone extract) were treated with acetic anhydride and 10 ml filtrate chloroform solution add the a few drops

formation a ring of blue-green colour indicate the presence of steroid (Obasiet *al.*, 2010, Auduet *al.*, 2007).

**Test for protein**

Rudraksha endocarp (methanol and acetone extract) were treated with a few drops of concentrate nitric acid formation of yellow colour indicate the presence of protein .and Rudrasha epicarp (methanol and acetone extract) were treated with a few drops of concentrate nitric acid formation of yellow colour indicate the presence of protein (Obasi *et al.*, 2010; Audu *et al.*, 2007).

**Test for phenol**

Rudraksha endocarp (methanol and acetone extract) were treated with a few drops of ferric chloride solution formation of bluish black colour indicates the present of phenol. Rudraksha epicarp (methanol and acetone extract) were treated with a few drops of ferric chloride solution formation of bluish black colour indicates the present of phenol (Obasi *et al.*, 2010; Audu *et al.*, 2007).

**Antibacterial activity**

The agar well diffusion method was adopted to assess the antibacterial activity of the selected Rudraksha seeds (Baur *et al.*, 1966). Further 80 ml of nutrient agar media (NAM) was poured in four Petri plates. The Petri plates were labeled respectively and the media was allowed to solidified then 80µl of each of the bacterial suspension was inoculated on the surface of the solidified NAM. Then 80µl of extract was added to each well respectively. The plates were incubated at 37°C for 18 to 24 hours. After the incubation the diameters of the growth inhibition zone were measured as described by Singh and Nath (1999).

**RESULT AND DISCUSSION****Phytochemical screening**

The phytochemical screening of the rudrasha seeds (endocarp and epicarp) revealed that alkaloid is present in large amounts (Table no.1). And other classes present in small quantities: tannin, steroid, protein, phenol. However, the seed extracts tested negative for the presence of flavanoid and carbohydrates.

**Table 1.** Phytochemical constituents of Rudrasha seeds extracts

S. No.	Family of compound	Seed endocarp		Seed epicarp	
		Methanol	Acetone	Methanol	Acetone
1	Alkaloid	+ve	+ve	+ve	+ve
2	Flavanoid	-ve	-ve	-ve	-ve
3	Carbohydrates	-ve	-ve	-ve	-ve
4	Tannins	+ve	+ve	+ve	+ve

5	Steroid	+ve	+ve	+ve	+ve
6	Protein	+ve	+ve	+ve	+ve
7	Phenol	+ve	+ve	+ve	+ve



**Fig 2.** Phytochemical screening test

**Antibacterial Activity**

Out of Rudraksha seeds (endocarp and epicarp) tested for antibacterial activity, Rudraksha seeds (endocarp and epicarp) showed antibacterial activity by inhibiting more microorganisms. The results of the antibacterial activity of Rudraksha seeds extracts

tested agent microorganism by disk diffusion method are show in (table no-2) among the seeds extracts screened the methanol and acetone extracts. The Rudraksha seeds (endocarp and epicarp) showed in antibacterial activity but not antifungal activity.

**Table 2.** Antibacterial activity of Rudraksha seeds extract

Organisms	Rudraksha Seed Endocarp/ Epicarp	Extract	Size of zone of inhibition
(Bacteria) <i>Micrococcus</i>	Endocarp	Methanol	13.5mm
		Acetone	17.25mm
	Epicarp	Methanol	20.25mm
		Acetone	21.75mm
<i>E. Coli</i>	Endocarp	Methanol	12.75mm
		Acetone	15.5mm
	Epicarp	Methanol	20.75mm
		Acetone	21.5mm
Staphylococcus	Endocarp	Methanol	11.25mm
		Acetone	20.5mm
	Epicarp	Methanol	21.25mm
		Acetone	22mm



**Fig. 2.** Antibacterial activity endocarp (Staphylococcus)



**Fig. 3.** Measurement of zone (acetone epicarp)

## CONCLUSION

The selected Rudraksha seeds (endocarp and epicarp) showed the source of the secondary metabolite i.e. alkaloid, carbohydrates, phenol, tannin, flavanoid, protein and amino acid. Rudrasha seeds play a vital role in preventing various diseases, the Antioxidant activities, anticancer activities, Antidiabetic activities, Antifungal activities, Antibacterial activities of the seeds are due to the presence of the above mentioned secondary metabolite. Rudrasha seeds are used for discovering and phytochemical screening and antibacterial activity which are very helpful for the manufacturing of new drugs. The phytochemical screening and antibacterial activity of the rudrasha seeds are also important and have commercial. Interest in both research institutes and pharmaceuticals companies for the manufacturing of the new drugs for treatment of various diseases.

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