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IN VITRO ANTIOXIDANT POTENTIAL OF AQUEOUS EXTRACT OF SEEDS OF RICINUS COMMUNIS L

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Abstract:

Plants and plant-based medicaments are the basis of many of the modern pharmaceuticals we use today for our various diseases. The in vitro antioxidant activity of aqueous extract of seeds of Ricinus communis Lwas assessed against DPPH assay method using standard protocols. Phytochemical analysis revealed the presence of alkaloids, flavonoids, phenol, diterpenes and carbohydrates. These studies provided information for standardization and correct identification of this plant material. The diverse array of phytochemicals present in the plant thus suggests its therapeutic potentials which may be explored in drug manufacturing industry as well as in traditional medicine.The aqueous extract showed high antioxidant capacity as proved by their low IC50 concentration. Finally, the results in this study indicate that theexamined plant contain certain amounts of polyphenols and flavonoids, proving them to beperfect sources of antioxidants.

Key words:*Ricinus communis, Phytochemical, Antioxidant, DPPH*

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INTRODUCTION:

Plant-based drugs have been used globally for human healthcare. In numerous zone of total population of world's remains relies upon(grown plants) herbal plants medicinal for their essential/primary health care needs especially, where present day medicines are not available in this area.A thousands of years the raditional knowledge of herb drugs has been spread from the old generation to the new generation. The newer generation across the world are study plants as a future source of drugs because herbal plant medicines have a strong traditional or conceptual base. It is possible leads to treat the different diseases with least adverse effects. Natural products from medicinal plants sources have been the source of the management of human disease. Plants full fill the needs of not an only human being but also the entire animal kingdom, particularly because of the nearness of different bioactive compounds. Ethnopharmacology is the culturally diverse study of how individuals get medicines from fungi, plants, animals or remaining different naturally occurring resources. At present, the field mainly has persistent on developing new drugs on the basis of the medicinal plants use by native peoples. The revelation that indigenous information about remedial plants may hold clues for relieving diseases has ended up being a good among the most extensively usedconflicts for preserving society and an organic decent variety (Farnsworth, 1988). The conventional utilization of restorative plants by indigenous networks that reflectsthe social perspectives just as biodynamic components that have the enormous pharmacological potential to fix numerous illnesses (1-2).

The different indigenous frameworks, for example, Allopathy, Ayurveda, Unani, and Siddha utilize a few plant animal types to treat distinctive diseases(3). Ayurveda is referred as the oldest medicine system in India. "Ayurveda" the word has been derived from the Sanskrit, "Ayur" meaning as *life* and "Veda" meaning as *science or knowledge*. The combination of these two words means the life knowledge or "*science of life and longevity*". Its underlying foundations can be followed back to classical India, around 5,000 years back in history. Different Ayurvedic classics like *Susruthasamhita*, *Charakasamhita*and *Ashtanga samgraha*etc. have described the *Dravyaguna*properties of medicinal plants. Ayurveda idea depends on the tridosha that are a lot of parameters, which are physicochemical in nature, which is thought to result in different afflictions (4).

A cell support is a particle that reprsented the oxidation of different atoms. The response of oxidation includes the exchange of electrons or hydrogen from a substance to an oxidizing agent. Oxidation responses can deliver free radicals. Thus, these radicals can begin chain responses. This point when the chain response occures in a cell, it can be make harm or demise the cell. Cell reinforcements stop these chain responses by restrain other oxidation responses and evacuating free extreme intermediates (5). These free radicals may be oxidize proteins, lipids or DNA, nucleic acids, and can start degenerative sickness. Cancer prevention agent mixes like polyphenols, phenolic acids, and flavonoids search free radicals, for example, hydroperoxide, peroxide, or lipid peroxyl and in this way repress the oxidative systems that lead to degenerative infections. Oxygen is fundamental for the alive of all on this earth planet (6). Amid the procedure of oxygen usage in ordinary physiological and metabolic procedures around 5% of oxygen gets univalently decreased to oxygen-inferred free radicals like hydrogen peroxide, superoxide, hydroxyl and nitric oxide radicals. Every one of these radicals known as receptive oxygen species (ROS) apply oxidative worry towards the phones of human body rendering every phone to look around 10000 oxidative hits for every second (7). In this regards the age of ROS surpasses the cancer prevention agent protection of the cells, the free radicals begin assaulting the cell proteins, lipids and starches and this prompts some physiological issue (8). Free radicals are engaged with the improvement of degenerative ailments. They have additionally been embroiled in the pathogenesis of diabetes, liver harm, nephrotoxicity, irritation, during the time spent maturing, malignant growth, cardiovascular clutters, and neurological disarranges. Numerous plants regularly contain significant measures of cancer prevention agents including, carotenoids, nutrient C and E, tannins and flavonoids and so forth., and in this manner can be used to search the abundance free radicals from the human body (9). Among free radical searching strategies, DPPH technique is moreover quick, straightforward (for example not included with numerous means and reagents) and reasonable in contrast with other test models. Then again ABTS decolorization measure is material for both hydrophilic and lipophilic cell reinforcements (10). *Ricinus communis* Linn (Euphorbiaceae) (*R. comolunis*) is a soft-wooded small tree widespread throughout tropics and warm temperature regions of the world. In the Indian system of medicine, the leaf, root and seed oil of this plant have been used for the treatment of inflammation and liver disorders (11). It is reported that this plant possesses hepatoprotective (12, 13) antidiabetic (14), laxativeand antifertilityactivities (15). The aim of this work was to determine the quality (types) of bioactive compounds and in vitro antioxidant activity of seeds of *R. comolunis*.

MATERIAL AND METHODS:

Material:

All the chemicals used in this study were obtained from Hi Media Laboratories Pvt. Ltd. (Mumbai, India), Sigma-Aldrich Chemical Co. (Milwaukee, WI, USA), SD Fine-Chem. Ltd. (Mumbai, India) and SRL Pvt. Ltd. (Mumbai, India).All the chemicals and solvent used in this study were of analytical grade.

Methods:

Extraction of plant material

50 gram dried powdered of seeds of *Ricinus communis* Lhave been extracted with waterusing maceration process for 48 hrs, filtered and dried using vaccum evaporator at 40^0C.

Determination of percentage yield

The percentage yield of each extract was calculated by using following formula:

$$\text{Percentage yield} = \frac{\text{Weight of Extract}}{\text{Weight of powder drug Taken}} \times 100$$

Phytochemical Screening:

The chemical tests were performed for testing different chemical groups present in extracts.

1. Detection of alkaloids: Extracts were dissolved individually in dilute Hydrochloric acid and filtered.

a) Wagner's Test: Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

b) Hager's Test: Filtrates were treated with Hager's reagent (saturated picric acid solution). Presence of alkaloids confirmed by the formation of yellow coloured precipitate.

2. Detection of carbohydrates: Extracts were dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

a) Fehling's Test: Filtrates were hydrolysed with dil. HCl, neutralized with alkali and heated with Fehling's A & B solutions. Formation of red precipitate indicates the presence of reducing sugars.

3. Detection of glycosides: Extracts were hydrolysed with dil. HCl, and then subjected to test for glycosides.

a) Legal's Test: Extracts were treated with sodium nitropruside in pyridine and sodium hydroxide. Formation of pink to blood red colour indicates the presence of cardiac glycosides.

5. Detection of saponins

a) Froth Test: Extracts were diluted with distilled water to 20ml and this was shaken in a graduated cylinder for 15 minutes. Formation of 1 cm layer of foam indicates the presence of saponins.

6. Detection of phenols

a) Ferric Chloride Test: Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenols.

7. Detection of flavonoids

a) Alkaline Reagent Test: Extracts were treated with few drops of sodium hydroxide solution. Formation of intense yellow colour, which becomes colourless on addition of dilute acid, indicates the presence of flavonoids.

b) Lead acetate Test: Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoids.

8. Detection of proteins

a) Xanthoproteic Test: The extracts were treated with few drops of conc. Nitric acid. Formation of yellow colour indicates the presence of proteins.

9. Detection of diterpenes

a) Copper acetate Test: Extracts were dissolved in water and treated with 3-4 drops of copper acetate solution. Formation of emerald green colour indicates the presence of diterpenes.

Antioxidant activity of extract using DPPH method

DPPH scavenging activity was measured by the spectrophotometer. Stock solution (6 mg in 100ml methanol) was prepared such that 1.5 ml of it in 1.5 ml of methanol gave an initial absorbance. Decrease in the absorbance in presence of sample extract at different concentration (10-100µg/ml) was noted after 15 minutes. 1.5 ml of DPPH and 1.5 ml of the test sample of different concentration were put in a series of volumetric flasks. Three test samples were taken and each processed similarly. Finally the mean was taken. Absorbance at zero time was taken for each concentration. Final decrease in absorbance was noted of DPPH with the sample at different concentration after 15 minutes at 517 nm.

$$\textit{Calculation of \% Reduction} \frac{\text{Control Absorbance} - \text{Test absorbance}}{\text{Control Absorbance}} \text{X } 100$$

RESULTS AND DISCUSSION:

The crude extract obtained after the maceration process, extract were further concentrated on water bath evaporation the solvents completely to obtain the actual yield of extraction. The yields of extract obtained from sample using aqueous solvent are depicted in the table 1. A small portion of the dried extracts were subjected to the phytochemical test using Kokate (1994) methods to test for alkaloids, glycosides, phenol, saponins, flavonoids and carbohydrate separately for extracts of all samples. Small amount of each extract is suitably resuspended into the sterile distilled water to make the concentration of 1 mg per ml. The outcomes of the results are discussed separately in the table 2. The antioxidant capacity was measured by the free radicalscavenging methods DPPH. The aqueous extract showed high antioxidant capacity as proved by their low IC50 concentration. Finally, the results in this study indicate that theexamined plant contain certain amounts of polyphenols and flavonoids, proving them to beperfect sources of antioxidants Table 3.

Table 1: % Yield of extract of seeds of *Ricinus communis* L

S. No.	Aqueous extract	% Yield (w/w)
1	Seeds of *Ricinus communis* L	17.21

Table 2: Result of Phytochemical screening of seeds of *Ricinus communis* Lextract

S. No.	Constituents	Aqueous extract
1.	**Alkaloids** Wagner's test Hager's test	 +ve +ve
2.	**Glycosides** Legal's test	 -ve
3.	**Flavonoids** Lead acetate Alkaline test	 +ve +ve
4.	**Phenol** $fecl_3$ test	 +ve
5.	**Diterpenes** Copper acetate Test:	 +ve
6.	**Carbohydrates** Fehling's test	 +ve
7.	**Proteins** Xanthoproteic Test	 -ve
8.	**Saponins** Foam test	 -ve

Table 3: % Inhibition of ascorbic acid and aqueous extract of seeds of *Ricinus communis* Lusing DPPH method

S. No.	Concentration (µg/ml)	% Inhibition	
		Ascorbic acid	Aqueous extract
1	10	44.65	26.99
2	20	48.62	45.33
3	40	65.34	61.9
4	60	69.65	71.4
5	80	77.41	71.81
6	100	84.13	124.4
IC 50		17.68	25.66

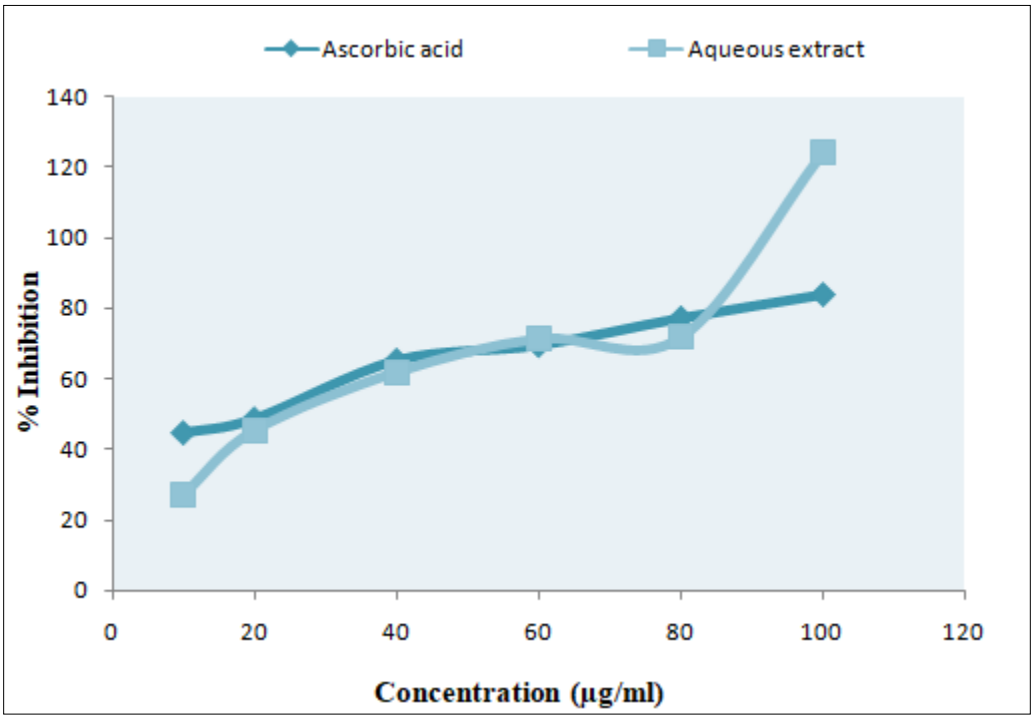

Figure 1: % Inhibition of ascorbic acid and aqueous extract of *Ricinus communis* Lusing DPPH method

CONCLUSION:

Polyphenols are antioxidants with redox properties, which allow them to act as reducing agents, hydrogen donators, and singlet oxygen quenchers. Some show metal chelation properties. In the present study, *Ricinus communis* L was tested with respect to their antioxidant capacity. Extractions were performed using the maceration method and aqueous as solvent. The antioxidant capacity was measured by the free radical scavenging methods DPPH. The aqueous extract showed high antioxidant capacity as proved by their low IC50 concentration. Finally, the results in this study indicate that theexamined plant contain certain amounts of polyphenols and flavonoids, proving them to be perfect sources of antioxidants.

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