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Investigating the possible mechanism for potency of latex of *Plumeria alba L.* in treating scabies

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ABSTRACT

The human body has multiple complex processes that enable the regular and effective functioning of all the systems. During the procedure, organs undergo wear and tear and heal themselves regularly. But due to physiological stress, they tend to produce some free radicals which are the sole reasons for few diseases like Alzheimer's, tissue damage, Parkinson's disease and some skin conditions like scabies, and ageing. Herbs are used as the best treatment of numerous illnesses which had an underlying mechanism of action as antioxidant activity. So it is confirmed that the oxidative free radicals are the reasons for the causing of most of the diseases. Ideally, the herbs that are rich in flavonoids and polyphenols that have excellent antioxidant activity will process potency against many of the diseases. The latex of the plant Plumeria alba L. was used as a treatment of scabies. Plant latex was potent and used to treat many diseases. The underlying mechanism was not yet known. It is assumed on the fact that antioxidant activity of drugs is responsible for many other activities. So, the present research focuses on establishing and investigating the antioxidant activity of the plant latex invitro. The latex had shown a productive antioxidant activity, and the mechanism of the above activities accurately correlate and support the anti scabies activity of the latex.

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INTRODUCTION

The human body has multiple complex processes that enable the regular and effective functioning of all the systems. During the procedure, organs undergo wear and tear and heal themselves regularly. But due to physiological stress, they tend to produce some free radicals which are the sole reasons for few diseases like Alzheimer's, tissue damage, Parkinson's disease and some skin conditions like scabies, and ageing [1]. They cause deterioration and damage to the body, which it cannot heal by itself and thereby eventually leading to the disability of permanent damage. The probability of the diseases due to oxidative free radicals depends on the alterations in the expressions of DNA, RNA in the body [2]. They lead to improper protein expression, which results in the lost function of the body. Yoga, change in lifestyle, diet and nutrition and some Vedic and spiritual practices [3]. The antioxidant drugs fight the generated free radicals and neutralize them to ensure the normal body functions are restored. It is assumed, investigated and published in numerous works to prove the antioxidant activity of the drugs [4]. There are various mechanisms of action of antioxidants one of them being free radical scavenging activity.

Numerous side effects are reported for synthetic drugs when used as antioxidants [5]. There is a need for the hour to discover alternative solutions for synthetic drugs as treatment of diseases

utilizing the antioxidant profile of the drugs [6]. Herbal drugs show themselves as possible solutions to overcome the side effects and without compromising the potency of the drugs. So the demand had been rising for those drugs which have antioxidant activities with an assumption that it treats most of the diseases using this mechanism [7].

Herbs are used as the best treatment for numerous diseases which had an underlying mechanism of action as antioxidant activity [8]. So it is confirmed that the oxidative free radicals are the reasons for the causing of most of the diseases. Ideally, the herbs that are rich in flavonoids and polyphenols that have excellent antioxidant activity will process potency against many of the diseases. These drugs can be used a dietary supplementation also. These can fight to combat the free radicals [9, 10].

The latex of the plant Plumeria alba L. was used as a treatment of scabies. Plant latex was potent and used to treat many diseases. The underlying mechanism was not yet known. It is assumed on the fact that antioxidant activity of drugs is responsible for many other activities. So, the present research focuses on establishing and investigating the antioxidant activity of the plant latex invitro.

METHODS

Herbal extraction

Plants of Plumeria alba L. were identified in a local area, and the herbarium sample was prepared and unidentified. The herbarium sample was preserved in the college library. An incision was made on the fresh stems and leaves of the plants. The latex was allowed to secrete, and it was collected and dried. It was then finely powdered and stored in a desiccator for future use. The dried latex powder was directly used for the experiments [11, 12].

Antioxidant screening

Nitric oxide free radical scavenging potency

The latex was weighed about 1gm and mixed with double distilled water. After complete dissolution, the mixture is centrifuged at 4000 rpm to sediment the solid matter. The supernatant liquid was collected and serially diluted to make a concentration of 50-250μg/ml. These solutions were then dissolved with 2.5ml of sodium nitroprusside and phosphate buffer. It was then incubated for about 30mins, and about 1.5ml of Greiss reagent was added and allowed to react for 5mins. These solutions were measured for absorbance in UV at 546nm. The absorbances were noted, and the activity was calculated using the below formula [13, 14].

%scavenging = (Absorbance of control - Absorbance of sample / Absorbance of control) X 10

Hydrogen Peroxide Free radical scavenging Potency

The latex was weighed about 1gm and mixed with double distilled water. After complete dissolution, the mixture is centrifuged at 4000 rpm to sediment the solid matter. The supernatant liquid was collected and serially diluted to make a concentration of 50-250μg/ml. The solutions were then added with equal volumes of hydrogen peroxide and left to react for 10 mins, and the absorbance was measured at 230 nm under UV spectroscopy. The procedure was repeated for the standard drug (Ascorbic acid) also, and the % of free radical scavenging was calculated using formula.

%scavenging = (Absorbance of control - Absorbance of sample / Absorbance of control) X 10

DPPH Method

Different concentrations of latex were prepared in the method in the above experiments, which lead to a final concentration of 50-250μg/ml. 03.M solution of DPPH was added to the solutions separately and are allowed to react for 30mins. The absorbance was measured at 517nm under UV spectrometry. The same formula as above was used to calculate the percentage inhibition of the DPPH oxidation.

RESULTS

Ascorbic acid is the standard drug in all most all the in-vitro antioxidant screenings. It is known to reduce tissue damage due to oxygen free radicals that are generated due to physiological stress. The results of the antioxidant activity of the latex of plant in all three methods were displayed in table 1-3. In NO generated free radical way, the latex shows inhibition similar to the activity when compared to the standard. Nitric oxide generates the free radicals that disturb the platelets aggregation process and induce toxicity to eh cell walls breaking them into lipids. They also inhibit the dilation of the blood vessels, thereby damaging the walls of the blood vessels. These blood vessels are essential n supplying the blood to the skin during the recovery of the skin from scabies. The latex was found effective in treating scabies.

In the H_2O_2 method, the latex might have inhibited lipid peroxidation, which was the standard mechanism of peroxide-free radicals that are generated due to H2O2. It might have successfully regenerated the phospholipid layer of the membrane in the skin cells, which might have been accompanied to the anti scabies activity. The highest activity was

Table 1: Comparison of Antioxidant Activities of *Plumeria alba* L in H2O2 methods

Sono.	Concentration (ug/ml)	Standard	Latex
1	50	54.24±1.01	53.52±1.13
2	100	61.05±1.24	59.71±1.45
3	150	70.42±1.56	68.43±2.07
4	200	76.83±2.02	74.80±2.41
5	250	85.17±2.47	79.03±2.68

Table 2: Comparison of Antioxidant Activities of *Plumeria alba* L in NO methods

Sono.	Concentration (ug/ml)	Standard	Latex
1	50	52.11±1.04	52.06±1.28
2	100	62.34±1.37	63.25±1.72
3	150	77.62±1.62	76.19±2.36
4	200	80.29±2.15	82.34±2.65
5	250	84.93±2.71	84.12±2.83

Table 3: Comparison of Antioxidant Activities of Plumeria alba L in DPPH methods

Sono.	Concentration (ug/ml)	Standard	Latex
1	50	47.32±1.25	58.29±1.61
2	100	53.61±1.19	66.48±1.59
3	150	58.45±1.40	73.65±2.24
4	200	62.14±2.08	80.71±2.92
5	250	69.78±2.52	87.43±2.75

achieved in the concentration of latex of 250. It showed a dose-dependent manner of the inhibition.

DPPH method estimates the reducing power of the extract and its chemical constituents. It was assumed that the antioxidant capacity was the causative mechanism behind the anti scabies activity of the latex and it is proven that the reducing chemical components in the latex are the ones that are responsible for the anti-scabies activity. The latex had effectively combatted the protons that are generated by DPPH reagent. There is an assertion that there are other chemicals constituents in latex that are responsible for the activity.

CONCLUSION

The plant latex of Plumeria alba L was investigated for the antioxidant activity in the process of correlating the antioxidant property on the anti scabies activity of the latex. The latex had shown a productive antioxidant activity, and the mechanism of the above activities accurately correlate and support the anti scabies activity of the latex. It is yet the confirm the chemical constituents of the latex that are responsible for treating scabies which might have an advantage of developing newer molecules and an advancement in treating the disease effectively.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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