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PHYTOCHEMICAL SCREENING AND ANTIOXIDANT PROPERTIES OF HERBS EXTRACTS IN THE IMMUNE RESPONSE

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ABSTRACT

An abstract for phytochemical screening and antioxidant characteristics of herb extracts in the immune response can address findings related to the phytochemical composition and antioxidant capacities of the extracts, particularly with regard to their impact on the immune system. Research should look into the antioxidant potential of plant extracts as well as the presence of phytochemicals such flavonoids, phenolics, alkaloids, and other bioactive compounds. It's crucial to look into whether and how these phytochemicals interact with the immune system to alter immunological responses. Any significant discoveries about the immunostimulatory properties of the herb extracts, their impact on immune function, and their potential for usage as alternative immunomodulatory medications should be highlighted in the abstract.

Keywords: *antioxidant, immune response, herb, phytochemicals, immunomodulatory.*

Introduction

The immunomodulatory capabilities of phytocompounds have generated significant attention because of their capacity to control immunological function. Specific phytochemicals known for their ability to modulate the immune system include: Curcumin, a substance known for its immunomodulatory properties, has been shown to alter the release of soluble molecules, such as cytokines, and affect the function of certain immune cells (Wen C C et al., 2012). Quercetin, a flavonoid, has demonstrated immunomodulatory properties that affect immune cell function and the synthesis of inflammatory compounds. It has been discovered that a class of polyphenols called flavonoids has immune-regulating properties, which means they may influence how one's immune system reacts to inflammation and its overall function. These phytochemicals show great potential as candidates for developing immunomodulatory medications. Further investigation into these substances may uncover novel therapeutic strategies for diseases and ailments related to the immune system. Phytocompounds with immunomodulatory characteristics have long been used to treat various illnesses and disorders. For example, scientific studies have shown that substances such as curcumin, quercetin, stilbenes, flavonoids, and lignans possess immunomodulatory properties that can be utilized for the treatment of immunological disorders, suppression of the immune system, and management of graft rejection reactions in tissues and cells. In addition, they have the ability to modify the release of soluble chemicals and transcription factors (Maheshwari S et al., 2022). There has been increased interest in the immune-modulating characteristics of medicinal plants and their extracts, as well as multi-component drugs that contain active components. The objective was to conduct phytochemical screening of the herb extracts in order to detect the existence of bioactive components and antioxidant characteristics. Additionally, the aim was to explore the possible immunomodulatory effects of different plant extracts.

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Materials and methods

The Soxhlet extraction process is frequently used to extract significant bioactive substances derived from different surroundings. It can be utilized to investigate several alternatives for retrieving novel information. The dehydrated and smashed object is added to the thimble in little amounts. The extraction flask contains the thimble containing a solvent combination consisting of 70% methanol and 30% water.

Phytochemical screening

We utilized several organic solvent extracts that had been previously prepared to examine the existence of different secondary metabolites for the analysis of plant phytoconstituents. The extracts were dissolved separately in high-quality DMSO for the purpose of qualitatively analyzing secondary metabolites, including alkaloids, flavonoids, phenols, coumarin, glycosides, carbohydrates, proteins, terpenoids, phytosterols, tannins, and saponins. This analysis was conducted by observing chemical reactions, precipitation, and color changes, following the established protocol described by Trease and Evans and Harborne.

"DPPH Free Radical Scavenging Activity"

The DPPH method for salvaging radicals that are unstable, also known as "2, 2-Diphenyl-1-picrylhydrazyl", has been applied to quantify the destruction of harmful free radicalsactivity of the extracts (Williams Brand et al., 1995). Oxidation of the DPPH molecule causes the methanol solution to change to a deep violet color. This mechanism functions by utilizing the concept of an antioxidant donating an electron to DPPH, which leads to the decrease of DPPH and a subsequent change in its color from a dark purple shade to yellow. The evaluation of free radical scavenging activity entails assessing the capacity to remove color from stable DPPH radicals. This methodology has been employed to assess the efficacy of antioxidants. Vitamin C and BHA were synthesized as guidelines, and extracts from the samples were generated at different quantities ranging from 200 to 1000 ppm. Subsequently, these were mixed with a solution of DPPH in ethanol, with a concentration of 0.04 mg/ml. After standing in darkness for 20 minutes, the combinations were evaluated at "a wavelength of 517 nm using a UV-Vis Spectrophotometer", with ethanol used as the reference.

"The percentage inhibition of DPPH by extracts was calculated by using the following formula".

$$\text{Scavenging Activity (\%)} = \frac{\text{"(Abs Control - Abs Sample)"}}{\text{"Abs Control "}} \text{ X } 100$$

Results and discussion

Extraction yield

The % yield was determined for the aqueous and ethanolic extracts of the selected species material. The findings indicated that the ethanolic extract of Turmeric tubers had the highest percentage yield (6.8%) in comparison to the aqueous extract. In comparison to the Aqueous extract, the ethanolic extract of lemon peel demonstrated the greatest percentage yield of 2.8% (Nfambi J et al., 2015) (Table 1).

Table 1: Percentage yield of extract of selected species

Extract	Percentage yield (in%)	
	Turmeric	Lemon peel
Aqueous extract	5.04	1.1
Ethanolic extract	6.8	2.8

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Phytochemical analysis

Table 2: Preliminary phytochemical analysis of Turmeric

S. No.	Phytoconstituents	Chemical Test	Turmeric extract		Lemon peel extract	
			Presence/ Absence	Inference	Presence/ Absence	Inference
1.	Alkaloids	"Dragendroff's test"	+	Reddish brown colour creamy-white to yellowish precipitate	-	No Reddish brown color
		"Mayer's test"	+		-	No creamy-white to yellowish precipitate
		"Wagner's test"	+	Reddish brown ppt	-	No Reddish brown ppt
		"Hager's test"	-	No Crystalline yellow precipitate		
2.	Flavonoids	Lead acetate test	-	No yellow precipitate	-	No Crystalline yellow precipitate
		Shinoda's test	-	No pink or red to purple colors		
		FeCl3 test	-	No blackish green color		
3.	Carbohydrates	Fehling's test	+	Brick red coloured ppt	+	yellow precipitate
		Molisch's test	+	Development of violet ring at the junction of two liquid	-	pink or red to purple colors
					+	blackish green color

4.	Phytosterol	Salkowski's test Liebermann–Burchard test	- -	No Formation of brown ring No Blue or orange color	+ -	Brick red colored ppt No Development of violet ring at the junction of two liquid
5.	Glycosides	Legals test Using NaOH reagent	+ -	Pink color No Yellow ppt	+ +	Formation of brown ring Blue or orange color
6.	Terpenoids/ Steroids	Briekorn and Brinar test	-	No Red color formation	- -	No Pink color No Yellow ppt
7.	Saponins Glycoside	Foam test	-	No foam is produced	+	Red color formation
8.	Tannins	Gelatin test Vanillin-HCl acid test FeCl3 test	+ - -	White buff colored ppt No Pink colored formed No Blue or green color produced	-	No foam is produced
9.	Proteins and Amino acids	Biuret's test	-	No Violet or pink color formed	- + -	No White buff coloured ppt Pink coloured formed No Blue or green colour produced
					-	No Violet or pink color

The analysis aims to determine the concentration of these bioactive chemicals, which may differ depending on variables such as the extraction technique, solvent employed, and plant species. Understanding the possible health advantages and applications of turmeric and lemon peel in numerous domains, including food,medicine, and cosmetics, is of utmost importance.

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DPPH Radical Scavenging Activity

Table 3: DPPH Assay of Lemon peel Extract

Concentration	Standard ascorbic acid	Lemon peel extract	Turmeric extract
0.1µg	1.031	0.113	0.045
0.2µg	1.072	0.177	0.075
0.3µg	1.073	0.208	0.096
0.4µg	0.865	0.428	0.105
0.5µg	0.966	0.62	0.103

The DPPH radical test of lemon peel exhibits an increasing trend. When the excerpt's content rises, the absorbance similarly increases, with values ranging from 0.113 at 0.1 µg to 0.62 at 0.5 µg. This indicates that lemon peel displays more antioxidant activity at higher doses compared to lesser amounts.

The absorbance of the turmeric leaves extract has a positive correlation with increasing concentration, surpassing that of the typical ascorbic acid. The absorbance of the sample is directly proportional to its concentration, especially increasing from 0.045 to 0.103. This observation demonstrates that turmeric leaves exhibit significant antioxidant capabilities.

Conclusion

The initial analysis of herb extracts showed the existence of different bioactive chemicals such as alkaloids, phenolics, flavonoids, tannins, saponins, and terpenoids. These phytochemicals are linked to antioxidant and immunomodulatory effects. The plant extracts' antioxidant activity was verified using the DPPH free radical scavenging method.

Reference

1. Wen CC, Chen HM, Yang NS. Developing Phytocompounds from Medicinal Plants as Immunomodulators. Adv Bot Res. 2012;62:197-272. doi: 10.1016/B978-0-12-394591-4.00004-0. Epub 2012 Jun 19. PMID: 32300254; PMCID: PMC7150268.

2. Maheshwari S, Kumar V, Bhadauria G, Mishra A. Immunomodulatory potential of phytochemicals and other bioactive compounds of fruits: A review. Food Frontiers. 2022 Jun;3(2):221-38.
3. Evans, William Charles., & Trease, G. E. (1989). Trease and Evans' pharmacognosy. Baillire Tindall.
4. Harborne, A. J. (1998). Phytochemical Methods A Guide to Modern Techniques of Plant Analysis. Springer Netherlands. https://books.google.co.in/books?id=vCWHUU6iobwC.
5. Nfambi J, Bbosa GS, Sembajwe LF, Gakunga J, Kasolo JN. Immunomodulatory activity of methanolic leaf extract of Moringa oleifera in Wistar albino rats. Journal of basic and clinical physiology and pharmacology. 2015 Nov 1;26(6):603-11.
6. Williams Brand, Cuvelier ME, Berset CLWT. Use of a free radical method to evaluate antioxidant activity. LWT-Food Science and Technology 1995; 28(1):25-30.