Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Spl Issue [5] 2022 : 561-564

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

Antioxidant and Anticoagulant Efficiency of Turmeric Oil Extract

Subasankari Kumaresan[1],Surya Chinnasamy[*2],Jayabharathi[3], Archana V. G.[4], Suriya M.[5] and Anshita Raghuvanshi[6]

*Department of Biochemistry Dhanalakshmi Srinivasan college of Arts and science for women (Autonomous) Perambalur 621212,Tamilnadu, India

[1]Department of Biotechnology, Dhanalakshmi Srinivasan college of Arts and science for women (Autonomous) Perambalur 621212, Tamilnadu, India

[2,3,4]Department of Biochemistry, Dhanalakshmi Srinivasan college of Arts and science for women (Autonomous) Perambalur 621212, Tamilnadu, India.

[6]Sr. Asst. Prof. Babu Banarasi Das University, Lucknow, U.P., INDIA

***E-mail:**ksshankari.suba@gmail.com

ABSTRACT

Turmeric plant (curcuma longa L) is the traditional plant and used as the Medicinal plant allovertheworld.Curcuminishighlypresentinturmericsolndianturmericisconsideredasoneofthe best turmeric in the world. Curcumin is the important compound present in the turmeric oil. We have selected Indian turmeric leaf to found whether the turmeric leaf oil has blood coagulation time and prothrombin time and also antioxidant activity while using turmeric extract. The methods like DPPH, Free fatty acid, PT and APTT, the results were found that Anti-oxidant was 56%, prothrombin time was 4.1 sec and Activated PT was 5.0 sec,ZnOantioxidant was 70.83% .

Keywords: *curcuma longa, Curcumin, DPPH, Anti-oxidant, Turmeric oil extract, Fatty acids.*

Received 24.10.2022 Revised 26.11.2022 Accepted 18.12.2022

INTRODUCTION

Curcuma longa (turmeric) has been used in Chinese traditional medicine and Ayurvedic medicine for many years. Zingiberaceae family comprises of many genera of aromatic and medicinal plants such as Curcuma, Alpinia, Zingiber and Kaempferia and one of the plants that commonly found in Malaysia is *Curcuma Longa* Linnaeus or turmeric. *Curcuma Longa* has been used for preparing traditional Indian curries for hundreds of years as a flavor, color, and preservative [8]. Turmeric has been reported to possess anti-inflammatory, hepatoprotective, antitumor, antiviral activities and anticancer activity and is used in gastrointestinal and respiratory disorders. Curcuminoids exhibit free-radical scavenging properties, antioxidant activity and act as inhibitors of human immune deficiency virus type 1(HIV-1) integrase. Traditionally, turmeric has been used as a medicinal plant with its various biological activities such as strengthening energy, antioxidant, antibacterial, anti-inflammatory, anticancer, and wound healing[9].These functional properties result from curcuminoids, the major components of turmeric, including desmethoxy curcumin, bisdemethoxy Curcumin,and Curcumin[11].Curcumin,a well-known yellow pigment, is a potential substance that may control oxidative stress-induced cellular damage owing to its radical scavenging activity[2]. Properties of zinc oxide nanoparticles played a significant role in the treatment of diabetes [4]. Synthesized green ZnONPs using the solid-state approach in the dry state capped by gum Arabic (GA) exhibit as an excellent Anti-diabetic agent with high cytocompatibility as a nano delivery system. Following this, hydrophobic docosahexaenoic Acid (DHA) was loaded onZnO NPs to investigate the antidiabetic efficacy of free DHA compared with loaded DHA NPs.The blood glucose, insulin resistance, oxidant and Antioxidants, cholesterol, triglycerides, fattyacid parameters and phosphoinositide 3-kinase (PI3K) levels are demonstrated in the preparation of diabetes in experimental rats. It confirms that the biocompatibility and physic chemical properties of zinc oxide nanoparticles played a significant role in the treatment of diabetes [4].

MATERIAL AND METHOD

Turmeric Leaf (*Curcuma Longa*) Collection and Processing

Turmeric leaf was finely cut into small pieces and dried under shadow for 5 days. The Soxhlet extractor was used to obtain extracts of dried and powdered leaves. Hexane used to extract soil from leaves. The

well dried leaves were finely powdered using an electric grinder. For conventional extraction 50 g of powdered plant material tightly packed into column and was extracted with 200ml of hexane in around bottom flask and refluxed for about that 60°C. Liquid extracts obtained were separated from the solid residue by vacuum filtration, concentrated using a rotary evaporator.

Determination of free fatty acid

The free fatty acids (FFA) analysis was carried out using the alkalimeter titration method. One gram of sample and 25ml of neutral alcohol were put into Erlenmeyer, and then heated for boiling. After the sample was cold, PP as the indicator was added as much as 1ml, then homogenized using vortex. The sample was titrated using 0.05NNaOHuntilthecolorwaspinkand did not disappear for 30 seconds. Free fatty acid levels can be calculated using formula. Organoleptic test that observed were color, odor, texture, and fungus. Five organoleptic panelists give the score. The CFLAB organoleptic score assessment questionnaire (1ml= 0.028palmiticacid).

Anti-Oxidant Activity of DPPH

The free radical scavenging activities of the target oil extract and nanoparticle were determined using the DPPH free radical scavenging assay. A fresh methanolic solution of DPPH (20 μg/mL) was prepared and stored at 10 °C in the dark. PHE were dissolved in water (v/v). The 0.5 Ml extract was added to freshly prepared methanolic DPPH solution (1.0 mL) and stirred. After reacting for 5 min, discoloration was recorded at 517 nm. The absorbance of the DPPH radicals without antioxidant was also measured as a control, and 95% methanol was used as blank. The absorbance was compared with those of the blank control.The reactions were performed in three replicates and averaged. Antioxidant activity was calculated as follows:

%Antioxidant activity = [(control absorbance − sample absorbance)/control absorbance] × 100%.

Anticoagulant Activity PT And APTT

Determination of APTT and PT were performed according to the manufacture's specifications using Thrombotimer (BehnkElektronik,Germany).In brief, citrated normal human plasma (90 μl) was mixed with 10 μl of samples (oil and nanoparticle) and incubated for 1 min at37°C. Then, APTT assay reagent (100 μl) was added to the mixture and incubated for 1 min at37°C. Thereafter, 20 mM $CaCl_2$ (100 μl) was added and the clotting time was recorded. For the PT assay, citrated normal human plasma (90 μl) was mixed with 10 μl of a sample and incubated for 1 min at 37° C. Then, PT assay reagent (200 μl), preincubated for 10 min at 37° C, was added and the clotting time was recorded.

RESULT AND DISCUSSION

Antioxidant Activity

In this study DPPH radical-scavenging activity was measured to identify the antioxidant activity of turmeric leaf extracts. DPPH radical-scavenging activity (%) of turmeric extracts and nanoparticle was compared and the result was noted (plate 3).91.6 % (standard), 56.25 % (oil extract), 19.58 % (Nanoparticle), 70.83 % (Nanoparticle oil) respectively shown in table 1. Significant increase was observed in nanoparticles extract as 89.58% when related to others. Antioxidant activities were also proportionally increased in the water extract. Comparing these results with the study developing turmeric leaves extraction conditions, turmeric leaf ethanol extract (1 mg/mL concentration) showed higher DPPH radical-scavenging activity (80.11%) than the water extract (74.65%). SOD radical-scavenging activity between ethanol extract and water extract in the same manner as the DPPH radical-scavenging activity [3]. According to the derived IC_{50} values, the Ethanolic extracts exhibited higher scavenging activities than did the corresponding aqueous extracts, indicating the influence of solvent on the measurement of antioxidant properties [5]. The antioxidant activities of aqueous extracts of turmeric support the activity shown by the corresponding ethanolic extracts. The free radical-scavenging activity may be attributed to the high contents of phenolics and flavonoids with a higher reducing capacity [10].

Table1.DPPH Antioxidant activity

SAMPLE	%
Standard	91.6
Oil	56.25

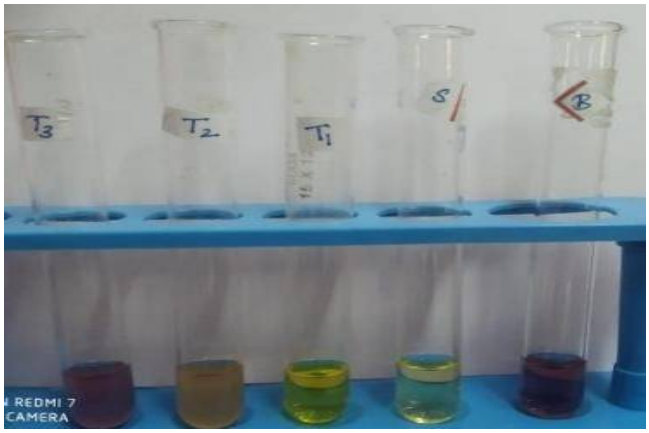

Fig.3DPPH Free Radical Scavenging

Anticoagulant Properties:

The anticoagulant properties of *curcumin longa* were tested using APTT and PT assays using plasma and are summarized in Table 2. The PT was used to estimate the total amount ofprothrombin in the blood (fig. 4). The prothrombin time of control is 14 s is reduced as 4.1, 6.2 and 5.0 sec respectively on oil,Zno(NaOH) and ZnO(oil). APTT was estimated at 31 for control where as for PT shows 14. A value range is declined in control for both APTT[5] and PT(4.1) both types of ZnONPs and oil reduced both APTT and PT in a dose-dependent manner. Anticoagulant activity was investigated using turmeric extracts, to monitor the effects on APTT shows 31 sec for control,30 sec of O- ZnO and 5.0 sec for Oil.

The effects of curcumin on the coagulant activity were better than NP, it suggests that the ortho-methoxy group in curcumin positively regulates anticoagulant functions of curcumin. In aprevious report, curcumin NP had different redox properties due to the presence of the [1]. Although oil differs in their chemical structures only with regard to the ortho-methoxy substitution, they exhibit significantly different antioxidant, antitumor, and anti-inflammatory activities. The hydrogen bonding interaction between the phenolic OH and the ortho-methoxygroups in curcumin markedly influences the O-H bond energy and H-atom abstraction by free radicals, thus making it a better freeradical scavenger [7].In another investigation, the ortho-methoxy substituted curcumin was a more potent suppressor of NF-kB activation [6].

Table2.Effectofcoagulantactivity

SAMPLE	PT	APTT
Control	14	31
Oil	4.1	5.0

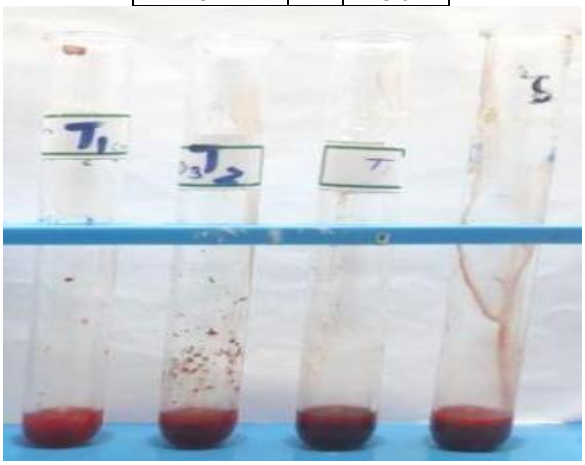

Fig.4 Anticoagulant assay

CONCLUSION

Turmeric oil is extracted from leaves and its medicinal values are studied. Results demonstrated that turmeric oil has potential Anti-oxidant (56%), Prothrombin time 4.1sec and Activated PT5.0 sec. Results show that turmeric oil has promising antioxidant (70.83%) is capable to modify blood coagulation time, and this effect is related to particle dimensions. The APTT and PT assays are used to evaluate the role of oil extrinsic coagulation times. The data involving coagulation times performed in this study showed that the turmeric oil fastening coagulation time with no functionalization- or size-specificity. Results indicate

the oil are non-hemolytic and interact with clotting factors. Application of turmeric oil may promise source for treatment of hemorrhage.

ACKNOWLEDGEMENT
The author's acknowledgement Chancellor Shri.A.Srinivasan, Dhanalakshmi Srinivasan College of Institutions for the financial support of this work.

CONFLICT OF INTEREST
The authors declare that they have no conflict of interest

REFERENCES
1. Anand, P., Thomas, SG., Kunnumakkara, AB., Sundaram, C., Harikumar, KB., Sung, B., Tharakan, S T., Misra, K., Priyadarsini, IK., Rajasekharan, KN., & Aggarwal, BB. (2008). Biological activities of curcumin and its analogues. Biochem. Pharmacol. 76: 1590-1611.
2. Bomdyal, RS., Shah, UM., Doshi, SY., Shah, AV., &Khirade, PS. (2017). Antibacterial activity of Curcumin (turmeric) against periopathogens An In vitro evaluation. *Journal Advanced Clinical and Research Insights*. (4)8:175-180.
3. Choi, WY., & Lee, HY. (2014). Enhancement of antioxidant activities of *curcuma longa* leaves byultra-high-pressure extraction. *Korean Journal of Medicinal Crop Science*.22(2):121–126.
4. Hussein, J., Attia Attia, MF., Edaly Mohamed, F.,Ekhayat, Z., &Enaggar. (2019). Solid state synthesis of docosahexaenoic acid-loaded zinc oxide nanoparticles as a potential antidiabetic agent in rats.*Int. J.Biol. Macromol*. (7)140:1305–1314.
5. Qader, SW., Abdulla, MA., Chua, LS., Najim, N., Zain, MM., & Hamdan, S. (2011). Antioxidant, totalphenolic content and cytotoxicity evaluation of selected Malaysian plants. *Molecules*. 16(4):3433–3443.
6. Sandur, SK., Pandey, MK., Sung, B., Ahn, KS., Murakami, A., Sethi, G., Limtrakul, P., Badmaev, V., & Aggarwal, BB. (2007). Curcumin, demethoxycurcumin, bisdemethoxy curcumin, tetrahydrocurcumin and turmerones differentially regulate anti-inflammatory and antiproliferative responses through a ROS-independent mechanism. *Carcinogenesis*. 28: 1765- 1773.
7. Somparn, P., Phisalaphong, C., Nakornchai, S., Unchern, S., & Morales, NP. (2007). Comparative antioxidant activities of curcumin and its demethoxy and hydrogenated derivatives. *Biol. Pharm. Bull.* 30: 74-78.
8. Tsai, SY., Huang, SJ., Chyau, CC., Tsai, CH., Weng, CC., & Mau., JL. (2011). Composition and antioxidant properties of essential oils from*Curcumarhizome.AsianJ.ArtSci*.2:57-66.
9. Uchio, R., Higashi, Y., Kohama, Y., Kawasaki, K., Hirao, T., Muroyama, K., & Murosaki, S. (2017). Ahot water extract of turmeric *(Curcuma longa*) suppresses acute ethanol-induced liver injury in mice by inhibiting hepatic oxidative stress and inflammatory cytokine production. *J. Nutr.Sci*.(6)2:5-9.
10. Widowati, W., Sardjono, CT., Wijaya, L., Laksmitawati, DR., & Darsono, L. (2011). Free radicals scavenging activities of spices and curcumin. *Medicine*(general). 6:29.
11. Zhou, XL., Sun ,DJ., Meng, M., Li, XX., & Sun, CH. (2013). Curcuminoids exert glucose-lowering effect in type 2 diabetes by decreasing serum free fatty acids: A double-blind, placebo-controlled trial.*Mol. Nutr. Food Res*. (8)57:1569–1577.

CITATION OF THIS ARTICLE
Subasankari Kumaresan, Surya Chinnasamy, Jayabharathi, Archana V. G., Suriya M. and Anshita Raghuvanshi: Antioxidant and Anticoagulant Efficiency of Turmeric Oil Extract. Bull. Env.Pharmacol. Life Sci., Spl Issue [5]: 2022: 561-564.