International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 2 Mar-Apr 2024, pp: 1297-1299 www.ijprajournal.com ISSN: 2249-7781

Comparative study of invitro anticoagulant activity of turmeric,ginger and cinchona

B.sandhya rani, A.amulya, N.shiny, B.krishnaveni, CH.jyothi SK.harshad mehata. Dr.D.dachinamoorthi
Assistant professor,QIS college of pharmacy

Submitted: 04-04-2024 Accepted: 14-04-2024

ABSTRACT:
The current work examines the anticoagulant properties of cinchona bark extract, curcumin, and ginger rhizome extracts in vitro. Worldwide, rhizomes of Zingiber officinale (ginger), cinnamon cassia (cinnamon), and curcuma longa (turmeric) are used as spices and in herbal medicine.The rhizomes and barks of Zingiber officinale and Curcuma longa were dried, ground into a powder, and then extracted in 70% ethanol to provide the complete crude extract. The extracts' phytochemical composition was ascertained.Prothrombin time (PT) was measured in vitro on blood samples from healthy individuals to evaluate their anticoagulant effect.In a dose-dependent manner (25, 50, and 75 µl), the extracts of ginger and turmeric inhibited coagulation and considerably delayed prothrombin time (PT) with approximately comparable efficacy, while cinnamon showed negligible anticoagulant effect.
Keywords:anticoagulants,prothrombin time,extraction,blood ,coagulation time

I. AIM AND OBJECTIVE:

In vitro study of **the** anticoagulant activity of zingiber **officinale (ginger),** curcuma **longa (turmeric), cassia cinnamon (cinnamon) when** measuring prothrombin time. **This** study compares the anticoagulant activity of curcumin **rhizome, ginger** rhizome **bark,** and cinnamon bark.
The **aim** of **in vitro** anticoagulant activity **studies** is to investigate and **analyze** the **possible effects** of **ginger, turmeric and cinnamon** on **blood. Anticoagulants** are **medications** that **help** prevent **bleeding. It is** given to people at high risk of **infection** to reduce **the risk** of serious **complications** such as **stroke** and heart **disease.**

Introduction:

Thrombin formation, which is **important in** the conversion of fibrinogen to fibrin, is key to blood **clotting.** Thrombin **exists** in **cells** in an inactive form known as prothrombin and is **activated** by the coagulation cascade through the **activation** of a complex known as **prothrombin.** Zingiber officinale and Curcuma longa are **perennial plants from the Zingiberaceae family** with rhizomes, fibrous **roots** and aerial **shoots.** The **aim** of this **study was** to evaluate the anticoagulant activity of Zingiber officinale and Curcuma longa Rhizomes and **Cinnamon officinale** in normal blood samples in vitro.

II. METHODOLOGY:

Research methodology:

The experimental crossover study took place at the Al-Gofran Medical Complex in Khartoum, Sudan. The participants in this study were comprised of healthy individuals who visited Al-.

Inclusion criteria

The study included a total of sixty individuals who are in good health and do not exhibit any indications of bleeding or thrombotic disease.

Exclusion criteria:

The study included individuals who have a background of bleeding, coagulation issues (either hereditary or acquired), thrombotic disorders, pregnancy, and have not utilized antithrombotic or thromboembolic medications like warfarin and aspirin in the recent past.

Plant material collection and preparation:

The rhizomes of Zingiber officinale and Curcuma longa were obtained from the local market. To extract the compounds, the rhizomes were fragmented, dried in the shade, and then finely powdered.

Phytochemical Screening:

The preparation of the extract :involved boiling the powdered plant material with 70% ethanol. The resulting macerate was then purified and used for the phytochemical screening process.

International Journal of Pharmaceutical Research and Applications
Volume 9, Issue 2 Mar-Apr 2024, pp: 1297-1299 www.ijprajournal.com ISSN: 2249-7781

Detection of phytochemical constitution:
To detect the phytochemical constituents (secondary metabolites) of the extracts, standard methods outlined in references 18 and 19 were followed.

In vitro anticoagulant test:

For the in vitro anticoagulant test, the activity of the extracts was determined by measuring prothrombin time and activated partial thromboplastin time. Each individual's plasma sample was separated into five groups. Group 1 consisted of the standard PT and APTT. The remaining four groups of plasma samples had curcumin and ginger extracts (25, 50, and 75µl) as well as distilled water (control) added to them separately. The anticoagulant effect was then assessed.

Extraction: To extract the desired components, the rhizomes of ginger, turmeric, and bark of cinnamon were dried and powdered. The powder was tightly packed without any leakage. The sample was placed in a thimble, which was then inserted into an extraction tube. The extraction tube was attached to a flask containing the solvent. A condenser unit was connected to the extraction tube, and water was run through it. The Soxhlet apparatus was fixed on a hot plate, and the flask containing the solvent was heated. The extraction solvent continuously cycled through the matrix, with the sample being collected in the hot solvent

Uses of anticoagulants:

Anti-coagulants play a crucial role in preventing blood clots from forming in the body. These medications are commonly used to treat conditions such as deep vein thrombosis, pulmonary embolism, myocardial infarction, unstable angina, rheumatic heart disease, vascular surgery, and cerebrovascular disease. Heparin is one of the most commonly prescribed anti-coagulants for the prevention and treatment of thrombosis

III. RESULTS AND DISCUSSION:

Results and findings: The current investigation delved into the impact of the aqueous ginger extract (Zingiber officinale) as an anticoagulant agent, utilizing the prothrombin time test principles on thirty healthy individuals. The prothrombin time results for all participants fell within the normal range (14.23±1.073 seconds). Upon the addition of aqueous extracts of Zingiber officinale (5%), curcuma, and cinchona in varying volumes (25, 50, 75, and 100 µL) to plasma samples from healthy individuals, a significant (P = 0.001) dose-dependent prolongation in prothrombin time was observed. Specifically, the prothrombin time values were 17.35±1.25, 20.39±1.60, and 24.75±2.40 seconds for ginger; 16.05±0.25, 19.09±1.20, and 20.85±1.90 seconds for cinchona; and 16.92±1.07, 19.49±1.48, and 23.68±2.17 seconds for curcumin, respectively.

Variable	Concentrations	PT Mean ±SD
Control		13.07±0.77
Curcumin	25 µml	16.92±1.07
	50 µml	19.49±1.48
	75 µml	23.68±2.17
Ginger	25 µml	17.35±1.25
	50 µml	20.39±1.60
	75 µml	24.75±2.40
cinnamon	25 µml	16.05±0.25
	50 µml	19.09±1.20

IV. CONCLUSION;

The results of the in-vitro study showed that both ginger and curcumin extracts exhibited similar anticoagulant effects. However, cinnamon had a minimal impact on anticoagulation, leading to a significant prolongation of PT.

REFERENCES:

[1]. Evans, W. C. Trease and evans' pharmacognosy E-book. Elsevier Health Sciences; 2009.
[2]. Ain QU, Khan H, Mubarak MS, PervaizA. Plant alkaloids as antiplatelet agent: drugs of the future in the light of recent developments. Front. Pharmaco. 2016; 7: 292.
[3]. Bojić M, Maleš Ž, Antolić A, Babić I, Tomičić M. Antithrombotic activity of flavonoids and polyphenols rich plant species. Acta Pharmaceutica. 2019; 69(4): 483-495.
[4]. Pouyfung P, Sukati S. Anticoagulant properties of Flavonoid compound: potential sturucture-functional relationship.Int. J. App. Pharmaceutics, 2021; 9-12.
[5]. Leite PM, Freitas A, Amorim J, Figueiredo RCD, Bertolucci S, Faraco A, et al. In vitro anticoagulant activity of

selected medicinal plants: potential interactions with warfarin and development of new anticoagulants. J. Basic Clin. Physiol. Pharmacol. 2021.

[6]. Keihanian F, Saeidinia A, Bagheri RK, Johnston TP, Sahebkar A. Curcumin, hemostasis, thrombosis, and coagulation. J. Cell. Physiol.2018; 233(6): 4497-4511.

[7]. Aggarwal BB, Harikumar KB. Potential therapeutic effects of curcumin, the anti-inflammatory agent, against neurodegenerative, cardiovascular, pulmonary, metabolic, autoimmune and neoplastic diseases. Inter. J. Biochem. Cell. Biol. 2009; 41(1): 40-59.

[8]. Ramırez-Tortosa MC, Mesa MD, Aguilera MC, Quiles JL, Baro L, Ramirez-Tortosa CL, et al. Oral administration of a turmeric extract inhibits LDL oxidation and has hypocholesterolemic effects in rabbits with experimental atherosclerosis.

[9]. Bae JS. Anticoagulant activities of curcumin and its derivative. BMB reports. 2012; 45(4): 221-226

[10]. Taj Eldin IM, ElmutalibTE, Hiba MA, Hiba F, Thowiba S, Elnazeer I. An in vitro anticoagulant effect of aqueous extract of ginger (Zingiber officinale) rhizomes in blood samples of normal individuals. Am. J. Res. Comm.2016; 4(1): 113-121

[11]. Singh G, Kapoor IPS, Singh P, de Heluani CS, de Lampasona MP, Catalan CA. Chemistry, antioxidant and antimicrobial investigations on essential oil and oleoresins of Zingiber officinale. Food. Chem. Tox. 2008; 46(10): 3295-3302.

[12]. Sanchez GM, Re L, Giuliani A, Nunez-Selles AJ, Davison GP, Leon-Fernandez OS. Protective effects of Mangifera indica L. extract, mangiferin and selected antioxidants against TPA-induced biomolecules oxidation and peritoneal macrophage activation in mice. Pharmacol Res. (2000);42:565–573. doi: 10.1006/phrs.2000.0727. - DOI - PubMed

[13]. Leiro JM, Alvarez E, Arranz JA, Siso IG, Orallo F. In vitro effects of mangiferin on superoxide concentrations and expression of the inducible nitric oxide synthase, tumour necrosis factor-alpha and transforming growth factor-beta genes. Biochem Pharmacol. (2003);65:1361–1371. doi: 10.1016/S0006-2952(03)00041-8. - DOI - PubMed

[14]. Li Y., Qian Z. J., Ryu B., Lee S. H., Kim M. M., Kim S. K. Chemical components and its antioxidant properties in vitro: an edible marine brown alga, Ecklonia cava. Bioorg. Med. Chem. (2009);17:1963–1973. doi: 10.1016/j.bmc.2009.01.031. - DOI - PubMed

[15]. Huang H., Morgan C. M., Asolkar R. N., Koivunen M. E., Marrone P. G. Phytotoxicity of sarmentine isolated from long pepper (Piper longum) fruit. J. Agric. Food Chem. (2010);58:9994–10000. doi: 10.1021/jf102087c. - DOI - PubMed

[16]. Prior RL, Cao G. Antioxidant capacity and polyphenolic components of teas: implications for altering in vivo antioxidant status. Proc Soc Exp Biol Med. (1999);220:255–261. doi: 10.3181/00379727-220-44376. -DOI - PubMed

[17]. Warren CP. Antioxidant effects of herbs. Lancet. (1999);353:676. doi: 10.1016/S0140-6736(05)75477-5. -DOI - PubMed

[18]. Joubert E, Joubert ME, Bester C, De Beer D, De Lange JH. Honeybush (Cyclopia spp.): From local cottage industry to global markets - The catalytic and supporting role of research. S A J Bot. (2011);77:889–907.

[19]. Dahlback B. Blood coagulation. Lancet. (2000);355:1627–1632. doi: 10.1016/S0140-6736(00)02225-X. -DOI - PubMed

[20]. Davie E. W., Fujikawa K., Kisiel W. The coagulation cascade: initiation, maintenance, and regulation. Biochemistry. (1991);30:10363–10370. doi: 10.1021/bi00107a001. - DOI - PubMed

[21]. Davie E. W. Biochemical and molecular aspects of the coagulation cascade. Thromb Haemost. (1995);74:1–6. - PubMed