



## Review on Natural Blood Thinner

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### Introduction:-

Anticoagulants, commonly known as blood thinners, are pharmaceuticals employed for the treatment and prevention of blood clots. Contrary to the misconception that they physically "thin" the blood, these medications facilitate smooth blood flow within the blood vessels, significantly reducing the likelihood of clot formation. Blood clots, composed of red blood cells, platelets, fibrin (a protein type), and other proteins, pose a substantial risk when they develop in arteries, veins, or the heart. They can lead to severe complications such as heart attacks, strokes, and blockages that contribute to various health issues (25).

It is noteworthy that in the context of COVID-19, the administration of coronavirus vaccines has been associated with an increased risk of blood thickening. Consequently, individuals may be predisposed to various diseases, including diabetes. While some resort to medications that thin the blood, individuals who do not use such drugs may still face cardiac-related issues such as heart attacks. It is crucial to recognize that certain individuals naturally thin their blood, even in the absence of pharmaceutical interventions.(1)

### Blood Clot Formation :- (1)



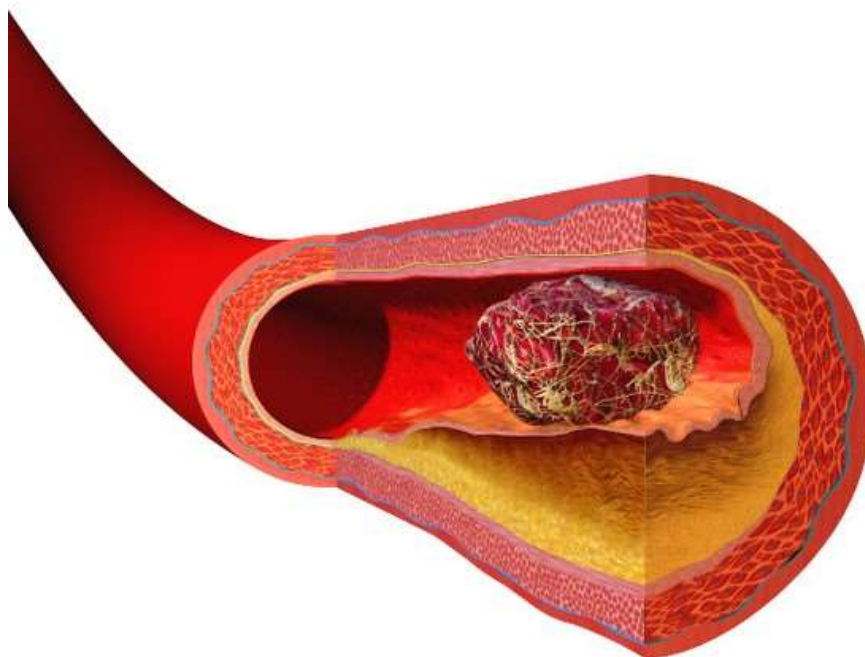
**Fig No-1 Blood Clot Formation**

Blood clot formation involves two crucial processes: the coagulation cascade and platelet activation. The mechanism of action of blood thinners revolves around targeting specific stages within each of these processes.

A. Coagulation cascade: The initiation of the coagulation cascade occurs when damaged tissue triggers a sequence of events that activate various proteins in the blood, known as clotting factors. These proteins undergo activation through a series of steps, ultimately culminating in the activation of fibrin. Fibrin, an insoluble protein derived from fibrinogen by the action of thrombin, plays a vital role in the clotting of blood.

**B. Platelet Activation:** The progression of platelet activation involves a series of interrelated events triggered by the exposure of platelets to injured tissue. These events include shape change, increased adhesiveness, aggregation, and release reactions. When these events are carried through to completion, they result in the formation of a stable blood clot. The intricate interplay between these processes highlights the targeted intervention of blood thinners in modulating coagulation and platelet activation to prevent excessive clot formation.

**Indications :- (1)**



**Fig No-2 Vein Thrombosis**

- Deep vein thrombosis (DVT) refers to the occurrence of a blood clot in the veins of the leg.
- Pulmonary embolism (PE) involves the presence of a blood clot in the blood vessels within the lungs.
- Acute coronary syndrome signifies the formation of a blood clot in the coronary arteries, leading to heart attacks.
- Prosthetic heart valves pose a risk for blood clot formation.
- Left ventricular thrombus denotes the presence of a blood clot within the heart.
- Acute limb ischemia results from a blood clot forming in an artery of the leg.
- Acute mesenteric ischemia is characterized by a blood clot in the artery that supplies blood to the bowel.
- Atrial fibrillation refers to an irregular and unusually rapid heartbeat.
- Hypercoagulable state encompasses conditions that induce thickening of the blood (25).

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**Blood Thinners: (2)**

Blood thinners, also known as anticoagulants and antiplatelets, are medications designed to prevent the formation and growth of blood clots. Contrary to the common misconception, they do not dissolve existing clots but effectively hinder their enlargement. Managing blood clots is crucial as they can lead to severe complications such as heart attacks, strokes, and vascular blockages.

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**Various types of blood thinners include:**

**Anticoagulants:** Examples include heparin or warfarin (Coumadin), which slow down the body's clot-forming process.

**Antiplatelets:** Such as aspirin and clopidogrel, prevent the clumping together of blood cells called platelets, reducing the risk of clot formation, especially in individuals who have experienced a heart attack or stroke.

Individuals may require blood thinners if they have specific heart or blood vessel diseases, atrial fibrillation, heart valve replacement, a heightened risk of blood clots after surgery, or congenital heart defects.

### **How Blood Thinners Work: (3)**

Blood thinners do not actually alter the thickness of the blood or dissolve clots but rather inhibit the formation of new clots and slow down the growth of existing ones. Anticoagulants may compete with vitamin K from the liver, which is crucial for producing clotting factors that aid in blood cell and platelet binding. Antiplatelets, on the other hand, prevent platelets from sticking together and forming clots. These medications are often prescribed to those at risk of future blood clots rather than as a treatment for existing clots.

### **Directions:**

When taking blood thinners, adherence to instructions is crucial. These medications may interact with specific foods, drugs, vitamins, and alcohol. Regular blood tests may be necessary to monitor clotting effectiveness and ensure a balance between preventing clots and avoiding excessive bleeding.

### **Side Effects:**

The most common side effect of blood thinners is bleeding, and additional side effects may include an upset stomach, nausea, and diarrhea. Signs of serious bleeding, such as unusual menstrual bleeding, discolored urine or bowel movements, persistent bleeding from the gums or nose, and other symptoms, should be promptly addressed .

### **Natural Blood Thinner Products: (4)**

For those seeking natural alternatives, various substances are known for their potential blood-thinning properties. These include turmeric, ginger, cayenne pepper, vitamin E, garlic, cassia cinnamon, ginkgo biloba, grape seed extract, dong quai, feverfew, bromelain, aloe, evening primrose, and melatonin.

#### **1.Turmeric: (4,5,6)**



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Monocots

Clade :- Commelinids

Order :- Zingiberales

Family :- Zingiberaceae

Genus :- Curcuma

Species :- C. longa

Binomial name :- Curcuma longa

Synonyms :- Curcuma domestica Valetton (10)

People have long used turmeric for culinary and medicinal purposes. Curcumin is an active ingredient in turmeric and appears to have anti-inflammatory and blood-thinning or anticoagulant properties.

A 2019 review indicates that turmeric may help block blood clotting. However, it advises caution when combining turmeric with blood-thinning drugs.

How to use:

- in savory dishes and soups
- mixed with hot water to make a tea
- in capsule form after checking with a doctor (7)

Chemical constituents :- Curcuminoids :- curcumin; desmethoxy curcumin; bidesmethoxy curcumin volatile oil (5%) sugars; bitter substances; fixed oils and acids.(2)

## 2. Ginger: (4,7)



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Monocots

Clade :- Commelinids

Order :- Zingiberales

Family :- Zingiberaceae

Genus :- Zingiber

Species :- *Z. officinale*

Binomial name :- *Zingiber officinale*

Ginger is another anti-inflammatory spice that may help prevent blood clotting.

A 2015 literature review notes that it may do this by reducing thromboxane, a hormone that causes platelets to aggregate, or stick together. Ginger also contains salicylates, the same substances that give aspirin its blood-thinning properties.

How to use:

- fresh or dried in sweet or savory dishes and baked goods
- chopped, bruised, and steeped in water to make ginger tea
- in juices and smoothies
- in capsule form after checking with a doctor



### 3. Cayenne pepper: (4)



Scientific Classification :-

Genus :- Capsicum

Species :- C. annum

Cultivar :- Cayenne

Heat :- Hot

Scoville scale :- 30,000–50,000 SHU (12)

Cayenne pepper also contains salicylates, and some people say including it in food can help with blood-thinning. However, reliable scientific evidence has not shown it has blood-thinning qualities.

How to use:

- 1) added to stews and soups for a spicy flavor
- 2) sprinkled sparingly on hard-boiled eggs
- 3) using a pinch to spice up cocoa or other chocolate goodies
- 4) in capsule form after checking with a doctor

### 4. Vitamin E: (4,8)



Vitamin E may reduce blood clotting in various ways, depending on how much a person takes.

The National Institutes of Health's Office of Dietary Supplements suggests that people taking blood-thinning drugs should avoid large doses of vitamin E.

It is unclear how much vitamin E thins the blood, although it is likely that people would need to take more than 400 international units (IU) per day to have a blood-thinning effect.

However, long-term use of high doses — for instance above 1,500 IU daily — may have negative effects.

How to take:

While supplements are available, foods that contain vitamin E include:

- almonds
- safflower oil
- sunflower oil
- sunflower seeds
- peanut butter
- whole grains

#### 5. Garlic: (4,9)



Scientific Classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Monocots

Order :- Asparagales

Family :- Amaryllidaceae

Subfamily :- Allioideae

Genus :- *Allium*

Subgenus :- *A. subg. Allium*

Species :- *A. sativum*

Binomial name :- *Allium sativum*

Synonyms :- *Allium controversum* Schrad. ex Wild.

*Allium longicuspis* Regel

**Allium pekinense Prokh.(13)**

A 2018 rodent study found evidence of antithrombotic activity in garlic, which means it may help prevent blood clots.

A 2020 review found that garlic supplements helped reduce blood pressure and had mild antithrombotic effects in people with hypertension.

A review from 2015 notes that some dietary supplements, including garlic, may affect platelet function and coagulation. The authors recommend avoiding them before surgery.

How to use:

- i. fresh or dried in savory dishes
- ii. by adding freshly chopped garlic and olives to bread dough before baking
- iii. as supplements if a doctor recommends

Constituents :-

Garlic contains a large number of sulphur compounds which are responsible for the flavour and odour of garlic, as well as the medicinal effects. The main compound in the fresh plant is alliin, which on crushing undergoes enzymatic hydrolysis by alliinase to produce allicin (S-allyl-2-propenylthiosulphonate); This in turn forms a wide range of compounds such as allylmethyltri-sulphide, diallyldisulphide, ajoene and others, many of which are volatile. Sulphur-containing peptides such as glutamyl-S-methylcysteine, glutamyl-S-methylcysteine sulphoxide and others are also present.

Other benefits :- garlic are antibacterial, antiviral and antifungal effects, and chemopreventative activity against carcinogenesis in various experimental models.

**6. Cinnamomum cassia: (4,11,12)**

Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Magnoliids

Order :- Laurales

Family :- Lauraceae

Genus :- Cinnamomum

Species :- C. cassia

Binomial name :- Cinnamomum cassia

Synonyms :- Camphorina cassia (L.) Farw.

Cinnamomum aromaticum Nees.

*Cinnamomum longifolium* Lukman.

*Cinnamomum medium* Lukman.

Cinnamon contains coumarin, a blood-thinning agent. Warfarin, a commonly used blood-thinning drug, is derived from coumarin.

Consuming small amounts of cinnamon in the diet may help support the action of other natural blood thinners. However, research in humans is needed.

Taking large doses of coumarin-rich cinnamon on a long-term basis can cause liver damage.

How to use:

- in powder form in cakes, baked goods, and drinks
- by combining whole or powdered cinnamon with other spices in savory dishes, such as Moroccan harira
- as capsules if a doctor advises

Chemical constituents :-

Volatile oil :- cinnamic aldehyde (75– 90%); terpene aldehyde and esters.

Other Uses :- Flavouring agent; mild astringent; powerful germicide

#### 7. *Ginkgo biloba*: (4, 13,14)



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Gymnospermae

Division :- Ginkgophyta

Class :- Ginkgoopsida

Order :- Ginkgoales

Family :- Ginkgoaceae

Genus :- *Ginkgo*

Species :- *G. biloba*

Binomial name :- *Ginkgo biloba*

Synonyms :- *Ginkgo macrophylla* K.Koch

*Salisburia biloba* (L.) Hoffmanns.

*Salisburia macrophylla* Reyn.



Ginkgo biloba is a popular herbal supplement that people take for blood disorders and memory problems.

One laboratory study found that Ginkgo biloba contains compounds that may block thrombin, an enzyme that causes blood clotting.

However, more research is necessary to see if ginkgo affects blood clotting in the human body.

How to use:

- 1) The extract of Ginkgo biloba leaves is available in supplements as tablets or capsules, but check first with a doctor.
- 2) Ginkgo (Ginkgo biloba) contains physiologically active bioflavonoids and proanthocyanidins.

#### 8. Grape seed extract: (4)



Some evidence suggests that grape seed extract may benefit people with various heart and blood conditions, including high blood pressure.

One test tube study also found evidence that grape seed extract can stop platelets sticking together. The authors concluded that grape seed extract may help prevent blood clots, but research in humans is needed.

How to use:

- Grape seed extract is available as liquid, capsules, or tablets, but it is essential to check with a doctor before using it.

The National Center for Complementary and Integrative Health suggests avoiding grape seed extract if a person:

- has a blood disorder
- takes blood-thinning medications
- is about to have surgery

#### 9. Angelica sinensis: (4, 15)



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Eudicots

Clade :- Asterids

Order :- Apiales

Family :- Apiaceae

Genus :- *Angelica*

Species :- *A. sinensis*

Binomial name :- *Angelica sinensis*

Synonyms :- *Angelica omeiensis* C.Q.Yuan & R.H.Shan

*Angelica wilsonii* H.Wolff

*Angelica sinensis*, also known as “female ginseng,” is another traditional Chinese herb that may reduce blood clotting.

This may be because *angelica sinensis* contains coumarin, also present in cinnamon.

However, a small 2015 study found that taking 1,000 milligrams (mg) of dong quai daily did not significantly affect blood clotting.

How to use:

- 1) as a tea
- 2) as sliced *angelica* added to a chicken herbal soup
- 3) as supplements if a doctor advises

#### 10. *Tanacetum parthenium*: (4,16,17)



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Eudicots

Clade :- Asterids

Order :- Asterales

Family :- Asteraceae

Genus :- *Tanacetum*

Species :- *T. parthenium*

Binomial name :- *Tanacetum parthenium*

Synonyms :- *Chrysanthemum parthenium* (L.) Bernh.

*Matricaria parthenium* L.

*Pyrethrum parthenium* (L.) Sm

Feverfew is a medicinal herb that comes from the same family as daisies, or the Asteraceae family.

According to one case report, one person who was taking very high doses of feverfew (800 mg, three times daily) experienced vaginal bleeding and a longer menstrual cycle.

After stopping feverfew, their blood coagulation returned to normal. The authors cautioned against taking feverfew before surgery or with blood-thinning drugs.

More research is needed to confirm the effects of feverfew on blood clotting.

How to use:

1. by steeping the flowers and leaves in hot water to make a tea
2. in savory pastries for a slightly bitter taste
3. as supplements in capsule or liquid form if a doctor advises
4. Typical doses are 100–300 mg per day.

Feverfew consists of the dried, whole or fragmented aerial parts of *Tanacetum parthenium* (L.) Schultz Bip. It contains not less than 0.20% of parthenolide, calculated with reference to the dried drug. Feverfew has a camphoraceous odour.

#### 11. Bromelain: (4, 18, 19, 20)

Synonyms :- Bromelin, bromelain.

Biological Source :- Bromelain is a mixture of proteolytic enzymes isolated from the juice of *Ananas comosus* (pineapple), belonging to family Bromeliaceae.

Bromelain is an enzyme present in pineapples. Bromelain is a type of enzyme called a proteolytic enzyme. It may have anti-inflammatory properties and it might help manage cardiovascular diseases. Bromelain causes the body to make substances that fight pain and swelling. Bromelain also contains chemicals that seem to interfere with tumor cells and slow blood clotting. Don't confuse bromelain with other proteolytic enzymes (proteases), such as chymotrypsin, ficin, papain, serrapeptase, or trypsin. These are not the same. Bromelain is possibly safe. It might cause allergic reactions in some people.

A 2016 laboratory study found that bromelain added to blood samples increased the time the blood took to clot. However, injecting bromelain into a small number of mice did not show this effect.

How to take:

9. Bromelain is present in pineapple or as a supplement, if a doctor advises.

#### 12. Aloe vera: (4,21)



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Monocots

Order :- Asparagales

Family :- Asphodelaceae

Subfamily :- Asphodeloideae

Tribe :- Aloeeae

Genus :- Aloe

Type species :- Aloe perfoliata

Synonyms :- Lomatophyllum Willd.

Rhipidodendrum Willd.

Phylloma Ker Gawl.

Pachidendron Haw.

Like ginger and cayenne pepper, aloe contains salicylates, which may have blood-thinning effects.

One 2020 laboratory study found that adding aloe vera gel to blood produced an antiplatelet effect similar to aspirin. However, more research is needed on aloe as a dietary supplement in humans.

How to take:

- as a gel, mashed into avocado, banana, and other foods
- as a juice either alone or combined with other juices or smoothies
- as a capsule or other supplement form if a doctor advises

Because of its potential effects on bleeding, people should stop taking aloe at least 2 weeks before having surgery.

### 13. *Oenothera biennis*: (4,22)



Scientific classification :-

Kingdom :- Plantae

Clade :- Tracheophytes

Clade :- Angiosperms

Clade :- Eudicots



Clade :- Rosids

Order :- Myrtales

Family :- Onagraceae

Genus :- Oenothera

Species :- O. biennis

Binomial name :- Oenothera biennis

Synonyms :- Brunyera biennis Bubani

*Oenothera chicaginensis* de Vries ex Renner & Cleland

Evening primrose (*Oenothera biennis*) oil may reduce blood clotting.

A 2020 case study reported that one person's thrombocytopenia — a low number of platelets in the blood — likely worsened due to the use of black seed oil and evening primrose oil.

Rodent research has also indicated that taking evening primrose oil may help prevent drug-induced thrombosis, a dangerous condition in which blood clots form within blood vessels when using certain medications.

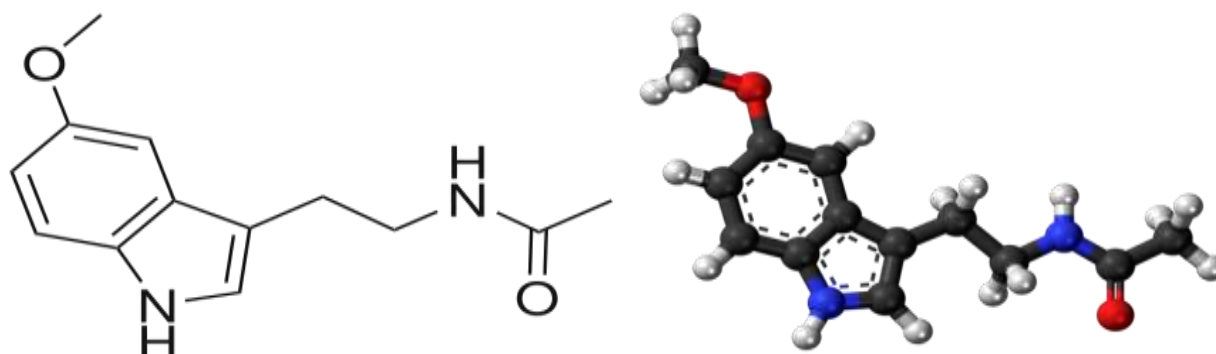
However, more research is needed to evaluate the safety and effectiveness of evening primrose oil in humans.

How to take:

- Evening primrose oil is available as capsules if a doctor advises.

#### 14. Melatonin: (4, 23)

Structure :-



IUPAC name :- N-[2-(5-methoxy-1H-indol-3-yl)ethyl]acetamide

Other names :- 5-Methoxy-N-acetyltryptamine; N-Acetyl-5-methoxytryptamine; NSC-113928

Chemical formula :- C<sub>13</sub>H<sub>16</sub>N<sub>2</sub>O<sub>2</sub>

Molar mass :- 232.281 g/mol

Melting point :- 117 °C

Biological half life :- 20-50 minutes (20)

The body produces the hormone melatonin to regulate circadian rhythms, also known as the body clock.

One 2020 research review indicates that melatonin may also block the clumping of platelets to form clots.

Another study found that melatonin inhibited platelet activation, a process that leads to clots.

How to take:

- Melatonin is available as a supplement, but check first with a doctor as it may interact with other medications and have other adverse effects.
- Taken alongside warfarin (Coumadin), for instance, it may increase the risk of bleeding.

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## Conclusion:

Certain natural compounds found in foods and supplements have the potential to lower the risk of clot formation, although they are not likely to match the effectiveness of prescription medications, nor can they actively "bust" or dissolve existing blood clots. It is crucial to recognize that natural remedies for blood clotting should not serve as substitutes for prescription medications. Before incorporating them into one's routine, it is imperative to consult with a healthcare professional to verify their safety and assess potential interactions with existing medications.

Furthermore, it is important to note that regulatory authorities do not oversee herbs and supplements as rigorously as they do with food and pharmaceuticals. Therefore, individuals should exercise diligence in researching various brands before making a purchase, ensuring that the products meet high-quality standards. This precautionary measure is vital for guaranteeing the safety and efficacy of natural remedies in supporting overall health.

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