

A REVIEW ON VARIOUS MEDICINAL PROPERTIES OF CINNAMON: A MAGICAL DRUG

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ABSTRACT

Cinnamon is mainly used in spices. It is aromatic. It is principally employed in cookery as a condiment and flavouring agent. It has been acquainted as one of the healthiest spices and has medicinal activity. When it is checked for chemical constituents it reveals phenolic flavonoid and carotenoid contents. They contains highly antioxidants like polyphenols. It impede growth of certain bacteria and fungi. It helps to reduce the blood glucose by increasing insulin in the body by the mechanism of resisting insulin depletion. It interferes with carbohydrate digesting enzyme and reduces degradation of carbohydrate as a result of which it decreases entry of glucose from intestine to blood stream. It reduces the growth of cancer cells. 'N' number of pharmacological investigations confirmed that the ability of

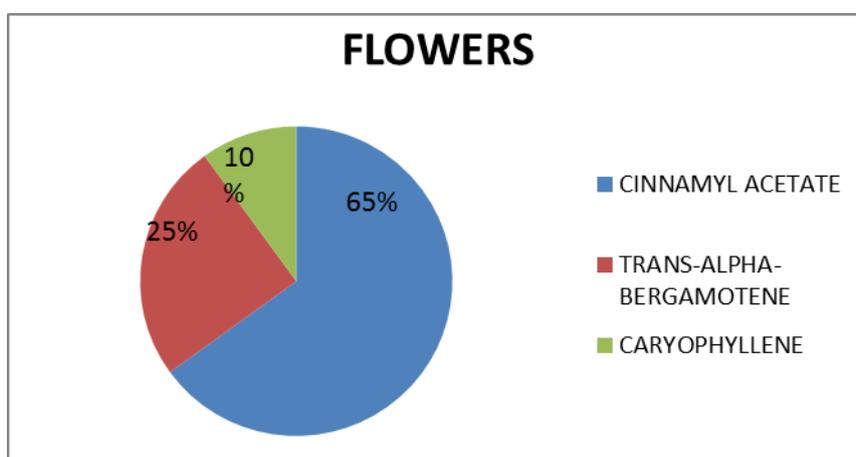
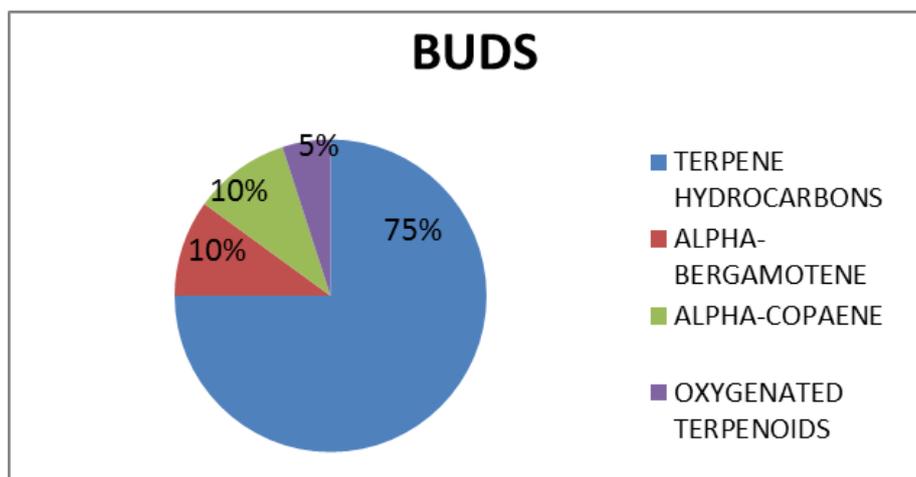
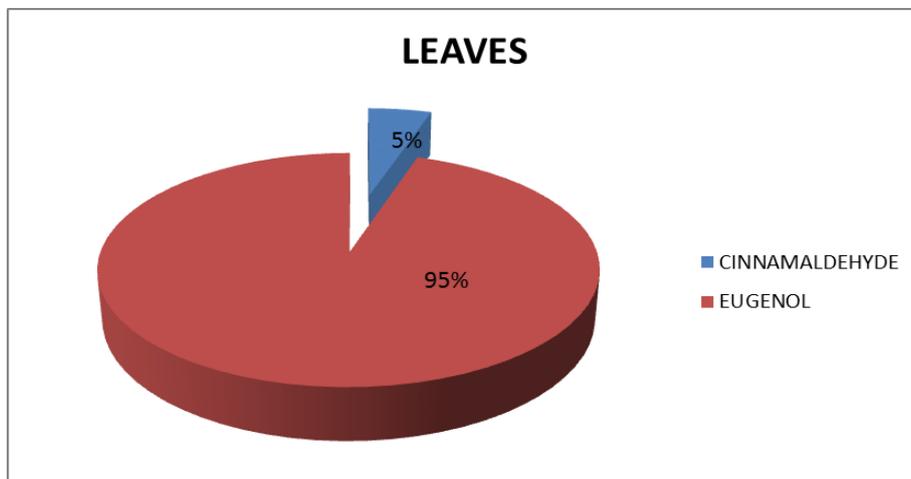
this plant is to exhibit and Anti-microbial, Anti-diabetics, Anti-cancer and cardioprotective action. This present article will provide you with detailed information on the most of the aspects of cinnamon.

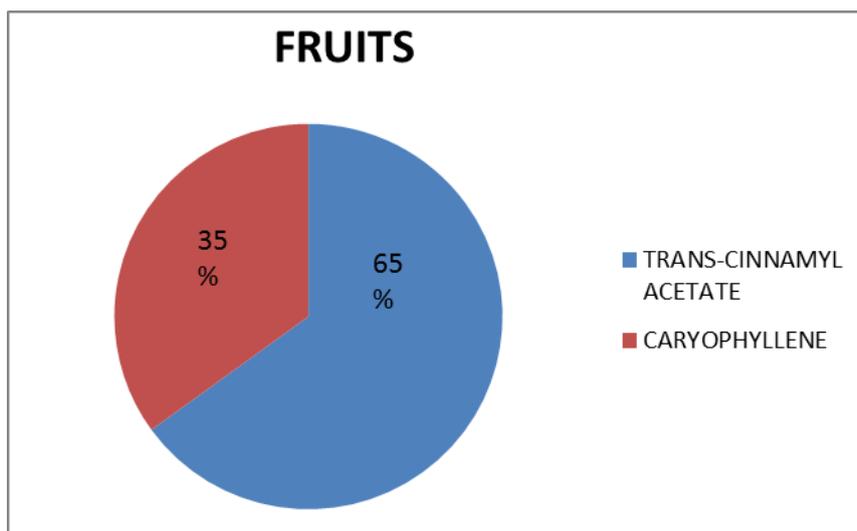
INTRODUCTION

The botanical name of cinnamon is *Cinnamomum zeylanicum* and the source is dried bark stem. It belongs to the family Lauraceae. It contains not less than 1% v/w volatile oil. It is commonly called as cinnamon, in French-cannelier, German- Zimtbaum, Italian-canella, portugese-caneleira, Spanish-canelo, India-Dalchini or karuvappadai in Tamilnadu. It is also known as Ceylon cinnamon or true cinnamon. It is exclusively available in cultivated plants. Since cinnamon is a dried stem bark the upper surface is blackish brown in colour and lower surface is reddish brown in colour.^[1] It is aromatic sweet in odour and taste. Shape is

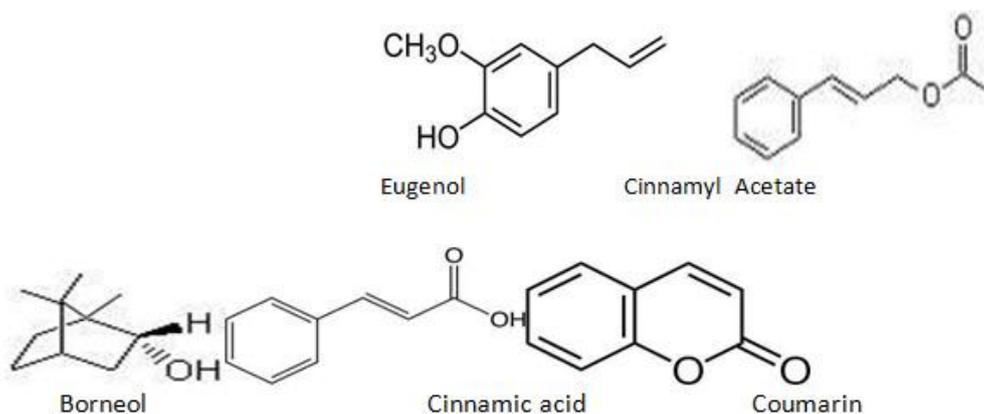
channeled or compound quills. Its length is upto 40cm. It is slightly fibrous in the inner part. The main constituent of volatile oil is cinnamic aldehyde(75-90%).^[6,7]

CHEMICAL COMPOSITION





Other compounds which are present in lesser percentages those are cinnamic acid, Hydroxyl cinnamaldehyde, Cinnamyl alcohol, Coumarin, Borneol etc.^[2,3]



Antimicrobial activity

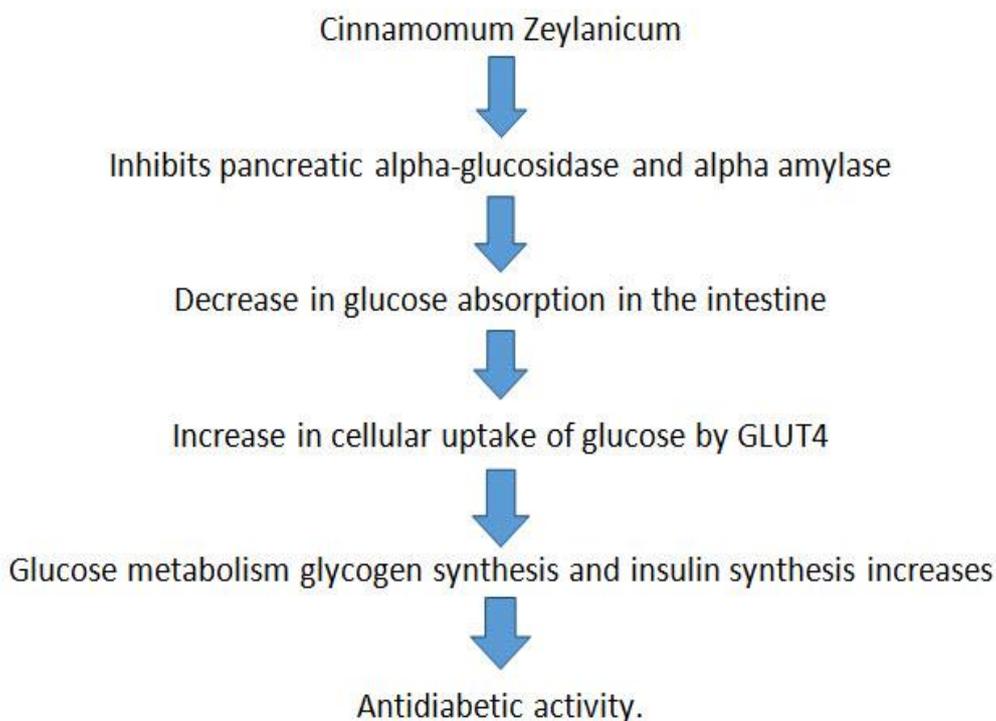
Various articles have reported the antimicrobial activity of cinnamon in their earlier studies. The combination of clove and cinnamon oil is highly effective against wide range of creature. The organisms which are effected are Gram negative bacteria (*E.Coli*, *Pseudomonas aeruginosa*, *Yersinia enterolitica*, *Salmonella choleraesuis*) and Gram positive organisms (*Enterococcus facelis*, *Listeria monocytogenes*, *Bacillus cereus*, *staphylococcus aureas*). These works were done by Goni et al.^[4,5]

20 Bacteria and 4 candida sps were destroyed by the antimicrobial activity of cinnamon which is obtained from bark.^[8] This activity has also found use against oral microorganisms. Recently studied that the aqueous extract of cinnamon, *Azadirachta indica* and *Syzigium aromaticum* have effective activity against oral microorganisms. But the oil obtained from it

has more antimicrobial activity than *S.aromaticum* and *A.indica*.^[10,11,12] Various other scientists experimented for the antimicrobial activity and all indicated to the point that cinnamon oil is effective against both Gram positive and Gram negative microorganisms.

Antidiabetic activity

“Insulin-potentiating factor was the word coined for the compound which was obtained from cinnamon bark. Some of the scientists concluded that other species of cinnamon have insulin potentiating factor 20 times lesser than that of *C.Zeylanicum*. Anderson et al isolated and characterized the polyphenol type-A polymers which acts like insulin which helps in the antidiabetic action of cinnamon.^[13,14,15]



Since cinnamon possess alpha glucosidase inhibiting property, it shows decrease in postprandial hyperglycemia in rats which is induced by streptozotocin. It shows reversible and competitive inhibition. It helps to reduce serum glycosylated Hemoglobin (HbA1C) in type 2 diabetes mellitus with the value over 7. Cinnamon intake every day which helps to decline fasting blood glucose level.^[16,17]

To examine whether cinnamon helps in reducing blood glucose level (lu et al). examined a total of 66 patients with type-2 diabetes mellitus and were divided into 3 groups: place low dose and high dose of cinnamon extract. The patients were also given with Gliclazide.

Patients receiving both the doses showed less fasting blood glucose level than the patients receiving placebo.^[18,19]

Cardioprotective activity

Cinnamon is obtained from the leaves and has the hypotensive effects. Cinnamophyllin is derived from *Cinnamomum philippinensis* and is a strong TXA2 receptor antagonist. In TXA2 disorders such as platelet aggregation this can be useful. The activity of cinnamon and atorvastatin Hepatic enzyme activity, antioxidant capacity and nitric oxide etc is determined by the [Amin et al].^[20,21,22,23] NO values and antioxidant activity were found to be increased in rats which were treated with cinnamon and atorvastatin than untreated. Subsequently cinnamaldehyde and cinnamic acid are the chemicals which isolated from cinnamon cassia. Thus this provides the evidence for the cardioprotective action of cinnamon.^[24,25,26]

Anticancer activity

Cinnamaldehyde was synthesized and was tested for inhibition against angiogenesis. When cinnamaldehyde was made to react with ethanolic extract of *C.cassia* it stimulates Nrf2 levels. Pretreatment also stimulates the cellular GSH levels and protects HCT116 cells against genotoxicity induced by hydrogen peroxide. When collaborative all the things together cinnamaldehyde is a powerful activator of Nrf2 and may exhibit an unappreciated anticarcinogenic activity. The site of target for anticancer activity of extract of cinnamon is the vascular endothelial growth factor (VEGF). It is one of the potent natural inhibitor of Nitrogen-activated protein kinase and stat3 mediated signaling pathway. This helps in the prevention and treatment of cancer. [Varalaxmi et al] showed that apoptosis was increased on treating with methanolic extract in the human hepatoma cancer cells.^[27,28,29]

CONCLUSION

The several study of the medicinal uses and medicinal properties of cinnamon in this article. In this article we study about Anti-microbial activity, Cardioprotective activity, Anti-diabetics activity and Anti-cancer activity which is present in cinnamon.

REFERENCES

1. Park, Eun Jung, and John M. Pezzuto. "Botanicals in cancer chemoprevention." *Cancer and Metastasis Reviews*, 2002; 21(3-4): 231-255.

2. Senanayake, Upali M., Terence H. Lee, and Ronald BH Wills. "Volatile constituents of cinnamon (*Cinnamomum zeylanicum*) oils." *Journal of agricultural and food chemistry*, 1978; 26(4): 822-824.
3. Singh, Gurdip, Sumitra Maurya, M. P. DeLampasona, and Cesar AN Catalan. "A comparison of chemical, antioxidant and antimicrobial studies of cinnamon leaf and bark volatile oils, oleoresins and their constituents." *Food and chemical toxicology*, 2007; 45(9): 1650-1661.
4. Tung, Yu-Tang, Pei-Ling Yen, Chun-Ya Lin, and Shang-Tzen Chang. "Anti-inflammatory activities of essential oils and their constituents from different provenances of indigenous cinnamon (*Cinnamomum osmophloeum*) leaves." *Pharmaceutical Biology*, 2010; 48(10): 1130-1136.
5. Unlu, Mehmet, Emel Ergene, Gulhan Vardar Unlu, Hulya Sivas Zeytinoglu, and Nilufer Vural. "Composition, antimicrobial activity and in vitro cytotoxicity of essential oil from *Cinnamomum zeylanicum* Blume (Lauraceae)." *Food and chemical toxicology*, 2010; 48(11): 3274-3280.
6. Cao, Heping, Marilyn M. Polansky, and Richard A. Anderson. "Cinnamon extract and polyphenols affect the expression of tristetraproline, insulin receptor, and glucose transporter 4 in mouse 3T3-L1 adipocytes." *Archives of biochemistry and biophysics*, 2007; 459(2): 214-222.
7. Li, Hua-Bin, Chi-Chun Wong, Ka-Wing Cheng, and Feng Chen. "Antioxidant properties in vitro and total phenolic contents in methanol extracts from medicinal plants." *LWT-Food Science and Technology*, 2008; 41(3): 385-390.
8. Yang, Cheng-Hong, Rong-Xian Li, and Li-Yeh Chuang. "Antioxidant activity of various parts of *Cinnamomum cassia* extracted with different extraction methods." *Molecules*, 2012; 17(6): 7294-7304.
9. Hili, P., C. S. Evans, and R. G. Veness. "Antimicrobial action of essential oils: the effect of dimethylsulphoxide on the activity of cinnamon oil." *Letters in applied microbiology*, 1997; 24(4): 269-275.
10. Prabuseenivasan, Seenivasan, Manickam Jayakumar, and Savarimuthu Ignacimuthu. "In vitro antibacterial activity of some plant essential oils." *BMC complementary and alternative medicine*, 2006; 6(1): 39.
11. Matan, N., H. Rimkeeree, A. J. Mawson, P. Chompreeda, V. Haruthaithanasan, and M. Parker. "Antimicrobial activity of cinnamon and clove oils under modified atmosphere conditions." *International journal of food microbiology*, 2006; 107(2): 180-185.

12. Gende, Liesel Brenda, Ignazio Floris, Rosalia Fritz, and Martin Javier Eguaras. "Antimicrobial activity of cinnamon (*Cinnamomum zeylanicum*) essential oil and its main components against *Paenibacillus* larvae from Argentina." *Bulletin of insectology*, 2008; 61(1): 1.
13. Goni, P., P. López, C. Sánchez, R. Gómez-Lus, R. Becerril, and C. Nerín. "Antimicrobial activity in the vapour phase of a combination of cinnamon and clove essential oils." *Food chemistry*, 2009; 116(4): 982-989.
14. Parthasarathy, Haripriya, and Smruti Thombare. "Evaluation of antimicrobial activity of *Azadirachta indica*, *Syzygium aromaticum* and *Cinnamomum zeylanicum* against oral microflora." *Asian Journal of Experimental Sciences*, 2013; 27(2): 13-16.
15. Varalakshmi, B., A. Vijaya Anand, T. Karpagam, J. Suguna Bai, and R. Manikandan. "In vitro antimicrobial and anticancer activity of *Cinnamomum zeylanicum* Linn bark extracts." *Int J Pharm Pharm Sci.*, 2014; 6(1): 12-8.
16. Khan, Alam, Noella A. Bryden, Marilyn M. Polansky, and Richard A. Anderson. "Insulin potentiating factor and chromium content of selected foods and spices." *Biological trace element research*, 1990; 24(2-3): 183-188.
17. Broadhurst, C. Leigh, Marilyn M. Polansky, and Richard A. Anderson. "Insulin-like biological activity of culinary and medicinal plant aqueous extracts in vitro." *Journal of Agricultural and Food Chemistry*, 2000; 48(3): 849-852.
18. Jarvill-Taylor, Karalee J., Richard A. Anderson, and Donald J. Graves. "A hydroxychalcone derived from cinnamon functions as a mimetic for insulin in 3T3-L1 adipocytes." *Journal of the American College of Nutrition*, 2001; 20(4): 327-336.
19. Kim, Sung Hee, Sun Hee Hyun, and Se Young Choung. "Anti-diabetic effect of cinnamon extract on blood glucose in db/db mice." *Journal of ethnopharmacology*, 2006; 104(1-2): 119-123.
20. Kreydiyyeh, S. I., J. Usta, and R. Copti. "Effect of cinnamon, clove and some of their constituents on the Na⁺-K⁺-ATPase activity and alanine absorption in the rat jejunum." *Food and chemical toxicology*, 2000; 38(9): 755-762.
21. Davis, Paul A., and Wallace Yokoyama. "Cinnamon intake lowers fasting blood glucose: meta-analysis." *Journal of medicinal food*, 2011; 14(9): 884-889.
22. Hoehn, Ashley N., and Amy L. Stockert. "The effects of *Cinnamomum cassia* on blood glucose values are greater than those of dietary changes alone." *Nutrition and Metabolic Insights*, 2012; 5: NMI-S10498.

23. Lu, Ting, Hongguang Sheng, Johnna Wu, Yuan Cheng, Jianming Zhu, and Yan Chen. "Cinnamon extract improves fasting blood glucose and glycosylated hemoglobin level in Chinese patients with type 2 diabetes." *Nutrition research*, 2012; 32(6): 408-412.
24. Akilen, Rajadurai, Zeller Pimlott, Amalia Tsiami, and Nicola Robinson. "Effect of short-term administration of cinnamon on blood pressure in patients with prediabetes and type 2 diabetes." *Nutrition*, 2013; 29(10): 1192-1196.
25. Sheng, Xiaoyan, Yuebo Zhang, Zhenwei Gong, Cheng Huang, and Ying Qin Zang. "Improved insulin resistance and lipid metabolism by cinnamon extract through activation of peroxisome proliferator-activated receptors." *PPAR research*, 2008 (2008).
26. Absalan, Abdorrahim, Javad Mohiti-Ardakani, Hossein Hadinedoushan, and Mohammad Ali Khalili. "Hydro-alcoholic cinnamon extract, enhances glucose transporter isotype-4 translocation from intracellular compartments into the cytoplasmic membrane of C2C12 myotubes." *Indian Journal of Clinical Biochemistry*, 2012; 27(4): 351-356.
27. Jiao, Lihua, Xin Zhang, Lianqi Huang, Hao Gong, Biao Cheng, Yue Sun, Yixuan Li, Qi Liu, Ling Zheng, and Kun Huang. "Proanthocyanidins are the major anti-diabetic components of cinnamon water extract." *Food and chemical toxicology*, 2013; 56: 398-405.
28. Lee, Shih-Chieh, Wen-Xin Xu, Li-Yun Lin, Jia-Jung Yang, and Cheng-Tzu Liu. "Chemical composition and hypoglycemic and pancreas-protective effect of leaf essential oil from indigenous cinnamon (*Cinnamomum osmophloeum* Kanehira)." *Journal of agricultural and food chemistry*, 2013; 61(20): 4905-4913.
29. Peng, Xiaofang, Ka-Wing Cheng, Jinyu Ma, Bo Chen, Chi-Tang Ho, Clive Lo, Feng Chen, and Mingfu Wang. "Cinnamon bark proanthocyanidins as reactive carbonyl scavengers to prevent the formation of advanced glycation endproducts." *Journal of agricultural and food chemistry*, 2008; 56(6): 1907-1911.