Protective Effect of α-(-)-Bisabolol on Markers of Oxidative Stress in Erythrocytes Subjected to Oxidative Insult

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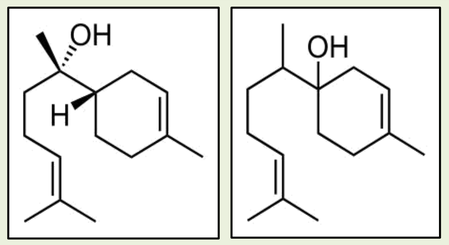
- α-(-)-Bisabolol or more formally levomenol, is a natural monocyclic sesquiterpene alcohol found as the primary constituent of the essential oil from various plant species.
- Synthetic bisabolol is usually a racemic mixture of the two enantiomers: α-(-)-bisabolol and α-(+)-bisabolol.
- The use of α-bisabolol or bisabolol-rich oil as an anti-inflammatory agent is ubiquitous. It has also been used for hundreds of years in cosmetics because of its perceived skin healing properties.

Family	Plant	Part(s)
Apiaceae	*Angelica archangelica*	Plant
Asteraceae	*Achillea millefolium*	Leaf
	Artemisia annua	Shoot
	Matricaria recutita L.	Flower
Cannabaceae	*Cannabis sativa L.*	Plant, Flower, Essential Oil
Lamiaceae	*Sideritis mugronensis*	Flower, Leaf
	Scutellaria parvula	Plant
	Lavandula latifolia	Plant
	Acinos alpinus var. meridionalis	Shoot
	Thymus riatarum	Shoot
	Satureja obovata	Leaf
	Ocimum basilicum L.	Essential Oil
	Salvia sclarea L.	Plant
	Teucrium sp.	Shoot
Lauraceae	*Cinnamomum camphora L.*	Plant

Medicinal Properties
Analgesic
Antiarthritic
Antibacterial
Antiburn
Antiinflammatory
Antipeptic
Antipyretic
Antiseptic
Antispasmodic
Antituberculic
Antiulcer
Candidicide
Cicatrizant
Cosmetic
Fungicide
Musculotropic
Perfumery
Pesticide
Protisticide



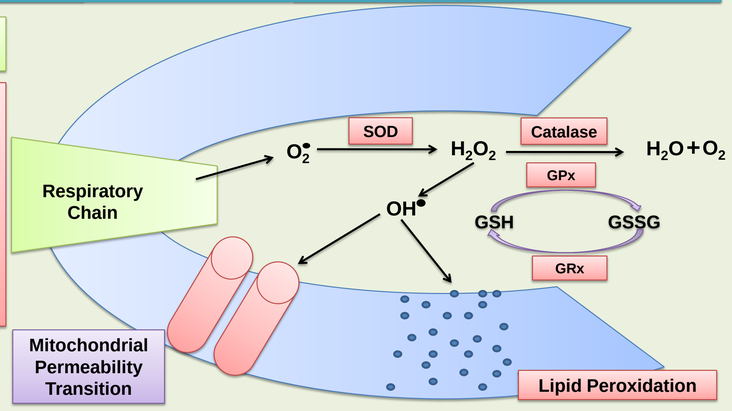
α-(-)-Bisabolol β-(-)-Bisabolol

Markers of Oxidative Stress

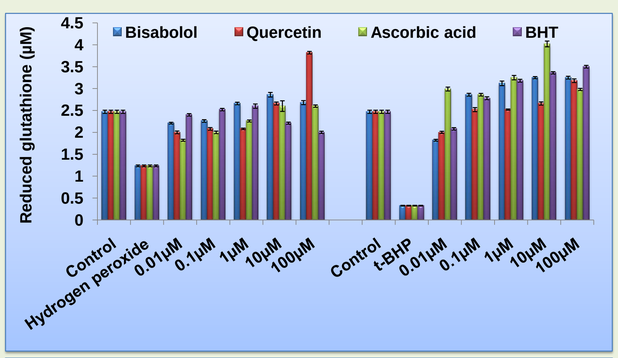
Oxidants	Antioxidants	Oxidation Products	Antioxidant-Pro-oxidant balance
Superoxide radical	Glutathione	Protein carbonyls	GSH/GSSH ratio
Hydroxyl radical	Ascorbate	Isoprotanes	Cysteine redox state
Hydrogen peroxide	α-Tocopherol	Nitrotyrosine	Thiol/ disulphide state
Peroxynitrite	Bilirubin	8-OH-dG	
	Uric acid	4-hydroxy-nonenal	
	α- Lipoic acid	Malonaldehyde	

EXPERIMENTAL REFERENCES

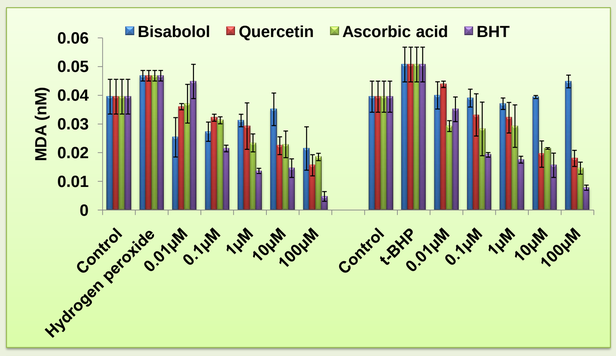
Glutathione Estimation:
Pharmaceutical Biology (2009); 47(6): 483-490.
Lipid Peroxidation Estimation:
Phytotherapy Research (2006); 20(4):303-306.
Superoxide Dismutase Activity Determination:
Journal of Biological Chemistry (1969); 244, 6049-6055.
Catalase Activity Determination:
Journal of Biochemistry (1983), 94: 403-408.



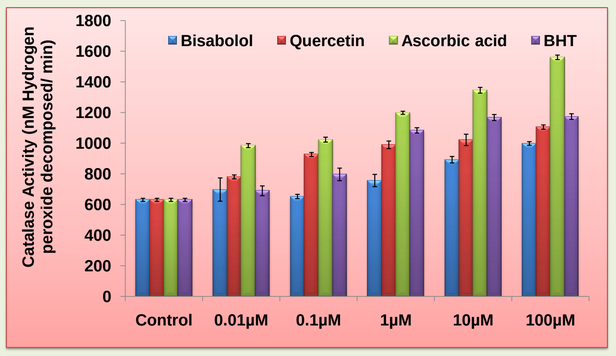
RESULTS



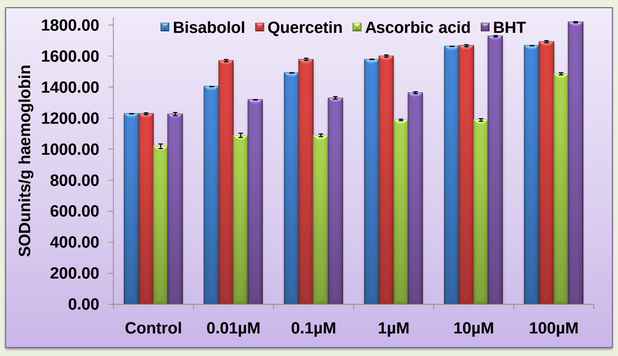
α-(-) Bisabolol, maintain the basal GSH level of erythrocytes, stressed with H_2O_2 & t-BHP, even at 10nm concentration and protection was found comparable to that of quercetin, ascorbic acid and BHT.



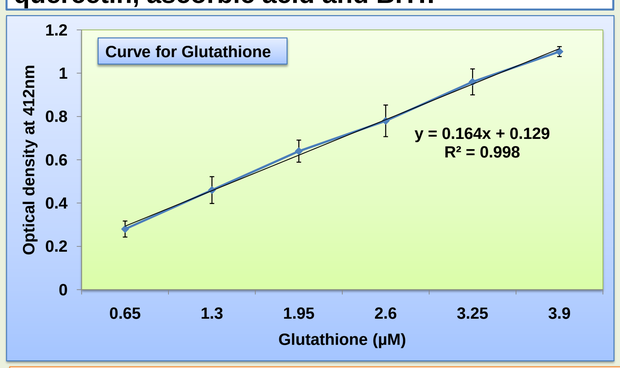
α-(-) Bisabolol also lowers MDA level of erythrocytes subjected to oxidative insult in a concentration-dependent manner. Protection was more evident in H_2O_2-induced oxidative stress.

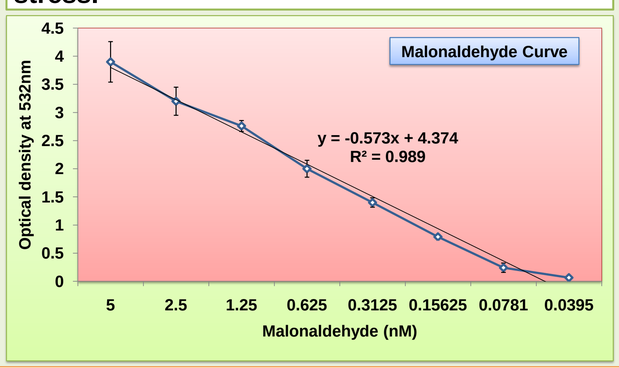


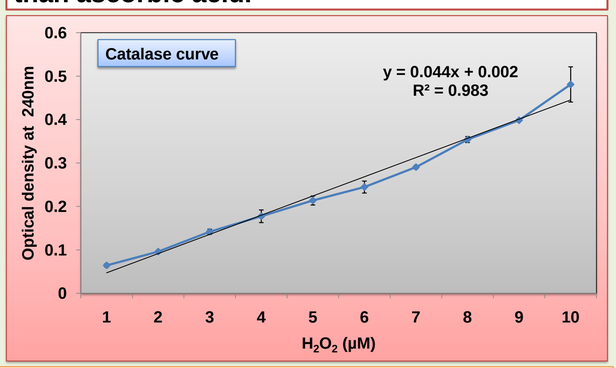
The Catalase activity of the plasma increases with an increase in the concentration of α-(-) bisabolol (0.01-100μM). The effect was comparable to quercetin and BHT but lower than ascorbic acid.

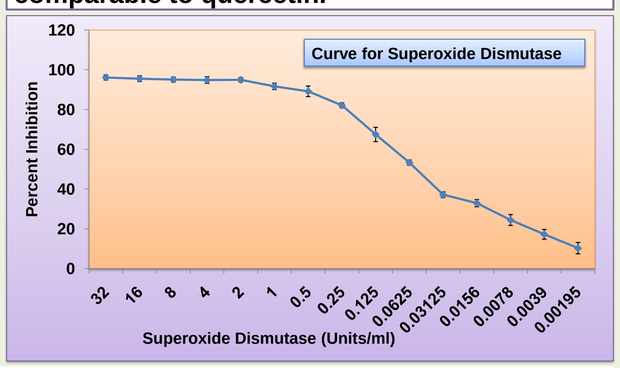


The Superoxide dismutase activity of the blood increases with an increase in the concentration of α-(-) bisabolol (0.01-100μM). The effect was better than ascorbic acid and BHT but comparable to quercetin.









CONCLUSION

Reactive oxygen species production during oxidative stress has been associated with changes in substrate metabolism and lower concentration of antioxidant enzymes, leading to damage of macromolecules. Our findings provide evidence for the protection of oxidative stress in erythrocytes and plasma by α-(-) Bisabolol which could be further explored for disease associated with ROS generation such as ageing, cancer, artheroscleriosis, neurodegeneration, cardiovascular disorders, etc.

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