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## Comparison of the effects of three different *Baccaurea angulata* whole fruit juice doses on plasma, aorta and liver MDA levels, antioxidant enzymes and total antioxidant capacity

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### Abstract

*Baccaurea angulata* (common names: belimbing dayak or belimbing hutan) is a Malaysian underutilized fruit. The preliminary work on *B. angulata* fruit juice showed that it possesses antioxidant properties. Therefore, further work is needed to confirm the efficacy and proper dosage of *B. angulata* as a potential natural antioxidant. The present study was thus carried out to compare the effects of three different *B. angulata* whole fruit (WF) juice doses administered at nutritional doses of 0.50, 1.00 and 1.50 ml/kg/day on plasma, aorta and liver malondialdehyde (MDA) levels, antioxidant enzymes (superoxide dismutase, glutathione peroxidase and catalase) as well as total antioxidant capacity in rabbits fed high-cholesterol diet.

Thirty-five male rabbits of New Zealand strain were randomly assigned to seven groups. For 12 weeks, group CH was fed 1% cholesterol diet only; group C1 was fed 1% cholesterol diet and 0.50 ml/kg/day *B. angulata* WF juice; group C2 was fed 1% cholesterol diet and 1.00 ml/kg/day *B. angulata* WF juice; group C3 was fed 1% cholesterol diet and 1.50 ml/kg/day *B. angulata* WF juice; group N was fed standard pellet only; group N1 was fed standard pellet and 0.50 ml/kg/day *B. angulata* WF juice; and group N2 was fed standard pellet and 1.00 ml/kg/day *B. angulata* WF juice.

The three doses reduced the formation of MDA and enhanced the expression of endogenous antioxidant enzymes. The highest dose used (1.50 ml/kg/day) was, however, seen as the most potent.

Higher doses of *B. angulata* juice exerted better antioxidant activity.

### Keywords

**Author Keywords:** [Antioxidant enzymes](#); [Baccaurea angulata](#); [Doses](#); [Malondialdehyde](#); [Underutilized fruit](#)

**KeyWords Plus:** [HIGH-FAT DIET](#); [TYPE-2 DIABETES-MELLITUS](#); [INDUCED OXIDATIVE STRESS](#); [CHOLESTEROL-FED RABBITS](#); [HEMATOLOGICAL PARAMETERS](#); [LIPID-PEROXIDATION](#); [RAT ERYTHROCYTES](#); [L. FRUIT](#); [EXTRACT](#); [HYPERCHOLESTEROLEMIA](#)

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- ANTIOXIDANT ACTIVITIES OF THE LEAVES OF CHRYSOPHYLLUM ALBIDUM G.** Times Cited: 7

By: Adebayo, Abiodun Humphrey; Abolaji, Amos Olalekan; Kela, Roseline; et al.  
PAKISTAN JOURNAL OF PHARMACEUTICAL SCIENCES Volume: 24 Issue: 4 Pages: 545-551 Published: OCT 2011
- Inhibition of Acetylcholinesterase Activity and Fe<sup>2+</sup>-Induced Lipid Peroxidation in Rat Brain In Vitro by Some Citrus Fruit Juices** Times Cited: 9

By: Ademosun, Ayokunle O.; Oboh, Ganiyu  
JOURNAL OF MEDICINAL FOOD Volume: 15 Issue: 5 Pages: 428-434 Published: MAY 2012
- Antioxidant activity and phenolic profile of various morphological parts of underutilised *Baccaurea angulata* fruit** Times Cited: 12

By: Ahmed, Idris Adewale; Mikail, Maryam Abimbola; Bin Ibrahim, Muhammad; et al.  
FOOD CHEMISTRY Volume: 172 Pages: 778-787 Published: APR 1 2015
- Bridelia ferruginea* Promotes Reactive Oxygen Species Detoxification in N-Nitrosodiethylamine-Treated Rats** Times Cited: 2

By: Ajiboye, T. O.; Abdussalam, F. A.; Adeleye, A. O.; et al.  
Journal of Dietary Supplements Volume: 10 Issue: 3 Pages: 210-228 Published: SEP 2013
- Protection against hydrogen peroxide induced oxidative damage in rat erythrocytes by *Mangifera indica* L. peel extract** Times Cited: 103

By: Ajila, C. M.; Rao, U. J. S. Prasada  
FOOD AND CHEMICAL TOXICOLOGY Volume: 46 Issue: 1 Pages: 303-309 Published: JAN 2008
- Ameliorative effect of *Opuntia ficus indica* juice on ethanol-induced oxidative stress in rat erythrocytes** Times Cited: 12

By: Alimi, Hichem; Hfaeidh, Najla; Bouoni, Zouhour; et al.  
EXPERIMENTAL AND TOXICOLOGIC PATHOLOGY Volume: 65 Issue: 4 Pages: 391-396 Published: MAY 2013
- Ameliorative effect of ajwain extract on hexachlorocyclohexane-induced lipid peroxidation in rat liver** Times Cited: 16

By: Anilakumar, K. R.; Saritha, V.; Khanum, Farhath; et al.  
FOOD AND CHEMICAL TOXICOLOGY Volume: 47 Issue: 2 Pages: 279-282 Published: FEB 2009
- Oxidative stress: A dead end or a laboratory hypothesis?** Times Cited: 43

By: Azzi, Angelo  
BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS Volume: 362 Issue: 2 Pages: 230-232 Published: OCT 19 2007
- Differential effects of konbu and nori seaweed dietary supplementation on liver glutathione status in normo- and hypercholesterolaemic growing rats** Times Cited: 30

By: Bocanegra, A; Benedi, J; Sanchez-Muniz, FJ

BRITISH JOURNAL OF NUTRITION Volume: 95 Issue: 4 Pages: 696-702 Published: APR 2006

10. **Probucol and cilostazol exert a combinatorial anti-atherogenic effect in cholesterol-fed rabbits** Times Cited: 11  
By: Chen, Yulong; Zhao, Sihai; Huang, Bingqiao; et al.  
THROMBOSIS RESEARCH Volume: 132 Issue: 5 Pages: 565-571 Published: NOV 2013
11. **The possible effect of diets containing fish oil (omega-3) on hematological, biochemical and histopathological alterations of rabbit liver and kidney.** Times Cited: 4  
By: El-Moghazy, M.; Zedan, N. S.; El-Atrsh, A. M.; et al.  
Biomedicine & Preventive Nutrition Volume: 4 Issue: 3 Pages: 371-377 Published: 2014
12. **Cardioprotective effect of Cornus mas fruit extract against carbon tetrachloride induced-cardiotoxicity in albino rats** Times Cited: 11  
By: Eshaghi, M; Zare, S; Banihabib, N; et al.  
J Basic Appl Sci Res Volume: 2 Issue: 11 Pages: 11106-11114 Published: 2012  
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13. **Polyphenol antioxidants from natural sources and contribution to health promotion** Times Cited: 4  
By: Fasolo, D.; Andrade, J.M.M.  
Polyphenols Hum. Health Dis. Volume: 1 Pages: 253-265 Published: 2014  
chapter 20
14. Title: [not available] Times Cited: 1  
By: Ford, LD.  
2014 hospital compliance manual Published: 2012  
Publisher: Orion Publishing Company, London
15. **Phytochemical and in vitro antioxidant properties of the methanolic extract of fruits of Blighia sapida, Vitellaria paradoxa and Vitex doniana** Times Cited: 5  
By: Hamzah, RU; Egwim, EC; Kabiru, AY; et al.  
Oxidants and Antioxidants in Medical Science Volume: 2 Pages: 217-223 Published: 2013  
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16. **Curcumin modulation of high fat diet-induced atherosclerosis and steatohepatosis in LDL receptor deficient mice** Times Cited: 55  
By: Hasan, S. T.; Zingg, J. -M.; Kwan, P.; et al.  
ATHEROSCLEROSIS Volume: 232 Issue: 1 Pages: 40-51 Published: JAN 2014
17. **Anticancer and antioxidant effects of extracts from different parts of indigo plant** Times Cited: 18  
By: Heo, Buk-Gu; Park, Yun-Jum; Park, Yong-Seo; et al.  
INDUSTRIAL CROPS AND PRODUCTS Volume: 56 Pages: 9-16 Published: MAY 2014
18. **Sub-chronic toxicological evaluation of the *Baccaurea angulata* (Belimbing Dayak) fruit juice in rats.** Times Cited: 4  
By: Ibrahim, D.; Hazali, N.; Jauhari, N.; et al.  
International Journal of Applied Research in Natural Products Volume: 6 Issue: 4 Pages: 23-32 Published: 2013
19. **DIETS CONTAINING CORN-OIL, COCONUT OIL AND CHOLESTEROL ALTER VENTRICULAR HYPERTROPHY, DILATION AND FUNCTION IN HEARTS OF RATS FED COPPER-DEFICIENT DIETS** Times Cited: 18  
By: JENKINS, JE; MEDEIROS, DM  
JOURNAL OF NUTRITION Volume: 123 Issue: 6 Pages: 1150-1160 Published: JUN 1993
20. **The inhibitory effect of black soybean on hepatic cholesterol accumulation in high cholesterol and high fat diet-induced non-alcoholic fatty liver disease** Times Cited: 23  
By: Jung, Ji-Hye; Kim, Hyun-Sook  
FOOD AND CHEMICAL TOXICOLOGY Volume: 60 Pages: 404-412 Published: OCT 2013
21. **The role of oxidative stress in alterations of hematological parameters and inflammatory markers induced by early hypercholesterolemia** Times Cited: 19  
By: Karbiner, Maria Sofia; Sierra, Liliana; Minahk, Carlos; et al.  
LIFE SCIENCES Volume: 93 Issue: 15 Pages: 503-508 Published: OCT 10 2013
22. **Low beta-carotene concentrations increase the risk of cardiovascular disease mortality among Finnish men with risk factors** Times Cited: 16

By: Karppi, J.; Laukkanen, J. A.; Makikallio, T. H.; et al.

NUTRITION METABOLISM AND CARDIOVASCULAR DISEASES Volume: 22 Issue: 10 Pages: 921-928 Published: OCT 2012

23. **Protective effect of lactofermented red beetroot juice against aberrant crypt foci formation, genotoxicity of fecal water and oxidative stress induced by 2-amino-1-methyl-6-phenylimidazo[4,5-b] pyridine in rats model** Times Cited: 8  
By: Klewicka, Elzbieta; Nowak, Adriana; Zdunczyk, Zenon; et al.  
ENVIRONMENTAL TOXICOLOGY AND PHARMACOLOGY Volume: 34 Issue: 3 Pages: 895-904 Published: NOV 2012
24. **Hypercholesterolemia in the rabbit induced by feeding graded amounts of low-level cholesterol - Methodological considerations regarding individual variability in response to dietary cholesterol and development of lesion type** Times Cited: 101  
By: Kolodgie, FD; Katocs, AS; Largis, EE; et al.  
ARTERIOSCLEROSIS THROMBOSIS AND VASCULAR BIOLOGY Volume: 16 Issue: 12 Pages: 1454-1464 Published: DEC 1996
25. **Aqueous extract of *Gleditsia sinensis* Lam. fruits improves serum and liver lipid profiles and attenuates atherosclerosis in rabbits fed a high-fat diet** Times Cited: 21  
By: Lai, Peng; Du, Jun-Rong; Zhang, Meng-Xue; et al.  
JOURNAL OF ETHNOPHARMACOLOGY Volume: 137 Issue: 3 Pages: 1061-1066 Published: OCT 11 2011
26. **Hypoglycemic and antioxidative effects of *Anacardium occidentale* Linn** Times Cited: 1  
By: Ling, L.  
Diabetic rats Published: 2006  
Publisher: Universiti Putra Malaysia, Serdang
27. **Hypolipemic and antioxidant activities from *Tamarindus indica* L. pulp fruit extract in hypercholesterolemic hamsters** Times Cited: 86  
By: Martinello, F.; Soares, S. M.; Franco, J. J.; et al.  
FOOD AND CHEMICAL TOXICOLOGY Volume: 44 Issue: 6 Pages: 810-818 Published: JUN 2006
28. **Regulation of oxidative stress and inflammation by hepatic adiponectin receptor 2 in an animal model of nonalcoholic steatohepatitis** Times Cited: 22  
By: Matsunami, Tokio; Sato, Yukita; Ariga, Satomi; et al.  
INTERNATIONAL JOURNAL OF CLINICAL AND EXPERIMENTAL PATHOLOGY Volume: 3 Issue: 5 Pages: 472-481 Published: 2010
29. ***Baccaurea angulata* fruit inhibits lipid peroxidation and induces the increase in antioxidant enzyme activities** Times Cited: 3  
By: Mikail, Maryam Abimbola; Ahmed, Idris Adewale; Ibrahim, Muhammad; et al.  
EUROPEAN JOURNAL OF NUTRITION Volume: 55 Issue: 4 Pages: 1435-1444 Published: JUN 2016
30. **Antioxidant Activity of African Medicinal Plants** Times Cited: 5  
By: Nafiu, Mikhail Olugbemi; Salawu, Musa Oyewole; Kazeem, Mutiu Idowu  
MEDICINAL PLANT RESEARCH IN AFRICA: PHARMACOLOGY AND CHEMISTRY Book Series: Elsevier Insights Pages: 787-803 Published: 2013

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