Evaluation of the alpha-glucosidase inhibitory and free radical scavenging activities of selected traditional medicine plant species used in treating diabetes

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Abstract

Plants constitute a major ingredient in traditional or folk medicine. The therapeutic claims made on the use of these traditional medicinal plants range from simple conditions such as fevers and migraines, to more complex diseases such as cancer, metabolic syndrome and diabetes mellitus. The aqueous ethanolic extracts of five medicinal plant species; Cosmos caudatus, Leucaena leucocephala, Momordica charantia, Pereskia bleo and Averrhoa bilimbi were assessed for glucose lowering effect via the in vitro alpha-glucosidase inhibition assay. Their antioxidant potential, represented by their DPPH radical scavenging activity and total phenolic contents were also measured. The most potent alpha-glucosidase inhibitory activity was recorded for the leaf extract of C. caudatus with IC50 of 21.90 +/- 3.60 mu g/mL, followed by L. leucocephala with IC50 value of 30.80 +/- 2.50 mu g/mL. Momordica charantia, P. bleo and A. bilimbi did not show any significant inhibition of alpha-glucosidase. Meanwhile C. caudatus also gave the highest DPPH radical scavenging activity with IC50 value of 272.46 +/- 8.98 mu g/mL, and the highest total phenolic content with a value of 0.263 +/- 0.02 g GAE/g DW. The present work provides a priority list of interesting plants for further study with respect to the treatment of diabetes. (C) All Rights Reserved

Keywords

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1. **Chemical profile and antiacetylcholinesterase, antityrosinase, antioxidant and alpha-glucosidase inhibitory activity of Cynometra cauliflora L. leaves** — Times Cited: 9
   By: Ado, Muhammad Abubakar; Abas, Faridah; Ismail, Intan Safinar; et al.
   JOURNAL OF THE SCIENCE OF FOOD AND AGRICULTURE Volume: 95 Issue: 3 Pages: 635-642 Published: FEB 2015

2. **Hypotriglyceridemic and hypocholesterolemic effects of anti-diabetic Momordica charantia (karela) fruit extract in streptozotocin-induced diabetic rats** — Times Cited: 149
   By: Ahmed, I; Lakhani, MS; Gillett, M; et al.
   DIABETES RESEARCH AND CLINICAL PRACTICE Volume: 51 Issue: 3 Pages: 155-161 Published: MAR 2001

3. **CHARACTERIZATION OF THE HYPOGLYCEMIC EFFECTS OF TRIGONELLA-FOENUM-GRAECUM SEED** — Times Cited: 54
   By: ALI, L; KHAN, AKA; HASSAN, Z; et al.
   PLANTA MEDICA Volume: 61 Issue: 4 Pages: 358-360 Published: AUG 1995

4. **Flavonoid content and antioxidant activity of vegetables from Indonesia** — Times Cited: 97
   By: Andarwulan, Nuri; Batari, Ratna; Sandrasari, Diny Agustini; et al.
   FOOD CHEMISTRY Volume: 121 Issue: 4 Pages: 1231-1235 Published: AUG 15 2010

5. **Alfa-glucosidase-inhibiting activity of some Mexican plants used in the treatment of type 2 diabetes** — Times Cited: 66
   By: Andrade-Cetto, Adolfo; Becerra-Jimenez, Jaime; Cardenas-Vazquez, Rene
   JOURNAL OF ETHNOPHARMACOLOGY Volume: 116 Issue: 1 Pages: 27-32 Published: FEB 28 2008

6. **Potential new treatments for type 2 diabetes** — Times Cited: 64
   By: Bailey, CJ
   TRENDS IN PHARMACOLOGICAL SCIENCES Volume: 21 Issue: 7 Pages: 259-265 Published: JUL 2000

7. **Polyphenol content and antioxidant activity of California almonds depend on cultivar and harvest year** — Times Cited: 47
   By: Bolling, Bradley W.; Dolnikowski, Gregory; Blumberg, Jeffrey B.; et al.
   FOOD CHEMISTRY Volume: 122 Issue: 3 Pages: 819-825 Published: OCT 1 2010

8. **In vitro biological effects of two anti-diabetic medicinal plants used in Benin as folk medicine** — Times Cited: 13
   By: Bothon, Fifa T. D.; Debiton, Eric; Avlessi, Felicien; et al.
   BMC COMPLEMENTARY AND ALTERNATIVE MEDICINE Volume: 13 Article Number: 51 Published: MAR 1 2013

9. **Biochemistry and molecular cell biology of diabetic complications** — Times Cited: 5,103
   By: Brownlee, M

NATURE Volume: 414 Issue: 6865 Pages: 813-820 Published: DEC 13 2001

10. Title: [not available] Times Cited: 67
By: Burkill, IH.
A dictionary of the economic products of the Malay Peninsula Volume: II Published: 1966
I-Z
Publisher: Art Printing Works, Kuala Lumpur

11. Title: [not available] Times Cited: 78
By: Burkill, IH.
A dictionary of the economic products of the Malay Peninsula Volume: I Published: 1966
Publisher: A-H, Art Printing Works, Kuala Lumpur

12. Antioxidant activity and phenolic compounds of 112 traditional Chinese medicinal plants associated with anticancer Times Cited: 1,239
By: Cai, YZ; Luo, Q; Sun, M; et al.
LIFE SCIENCES Volume: 74 Issue: 17 Pages: 2157-2184 Published: MAR 12 2004

13. Antidiabetic Potentials of Momordica charantia: Multiple Mechanisms Behind the Effects Times Cited: 43
By: Chaturvedi, Padmaja
JOURNAL OF MEDICINAL FOOD Volume: 15 Issue: 2 Pages: 101-107 Published: FEB 2012

14. Title: [not available] Times Cited: 2
By: Chin, W. Y.
A guide to medicinal plants Pages: 21 Published: 1992
Publisher: Singapore Science Centre., Singapore

15. Antidiabetic and antioxidant activities of seed extract from Leucaena leucocephala (Lam.) de Wit Times Cited: 3
By: Chowtivannakul, Pichaya; Srichaikul, Buavaroon; Talubmook, Chusri
Agriculture and Natural Resources Volume: 50 Issue: 5 Pages: 357-361 Published: SEP 2016

16. Inhibition of glycohydrolase enzymes by aqueous extracts of Chinese medicinal herbs in a microplate format Times Cited: 53
By: Collins, RA; Ng, TB; Fong, WP; et al.
BIOCHEMISTRY AND MOLECULAR BIOLOGY INTERNATIONAL Volume: 42 Issue: 6 Pages: 1163-1169 Published: SEP 1997

17. Dietary flavonoid intake and risk of cancer in postmenopausal women: The Iowa Women's Health Study Times Cited: 94
By: Cutler, Gretchen J.; Nettleton, Jennifer A.; Ross, Julie A.; et al.
INTERNATIONAL JOURNAL OF CANCER Volume: 123 Issue: 3 Pages: 664-671 Published: AUG 1 2008

18. Pathogenesis of type 2 diabetes mellitus Times Cited: 526
By: DeFronzo, RA
MEDICAL CLINICS OF NORTH AMERICA Volume: 88 Issue: 4 Pages: 787-+ Published: JUL 2004

19. Hypoglycaemic activity of four plant extracts traditionally used in South Africa for diabetes Times Cited: 52
By: Deutschlaender, M. S.; van de Venter, M.; Roux, S.; et al.
JOURNAL OF ETHNOPHARMACOLOGY Volume: 124 Issue: 3 Pages: 619-624 Published: JUL 30 2009

20. Alternative therapies for type 2 diabetes Times Cited: 1
By: Dey, L.; Anoja, M. D.; Attele, S.
Alternative Medicinal Review Volume: 7 Pages: 56-57 Published: 2007

21. Antioxidant activity of herbal tea prepared from Cosmos caudatus leaves at different maturity stages Times Cited: 5
By: Dian-Nashiela, F.; Noriham, A.; Nooraain, H.; et al.
INTERNATIONAL FOOD RESEARCH JOURNAL Volume: 22 Issue: 3 Pages: 1189-1194 Published: 2015

22. An ethnobotanical study of plants used for the treatment of diabetes in the Eastern Cape Province, South Africa Times Cited: 58
By: Erasto, P; Adebola, PO; Grierson, DS; et al.
AFRICAN JOURNAL OF BIOTECHNOLOGY Volume: 4 Issue: 12 Pages: 1458-1460 Published: DEC 2005

23. Antioxidative and Radical Scavenging Properties of the Constituents Isolated from Cosmos caudatus Kunth (View record in KCI-Korean Journal Database) Times Cited: 10

By: FaridahAbas; KhozirahShaari; N.H.Lajis; et al.
Natural Product Sciences Volume: 9 Issue: 4 Pages: 245-248 Published: 2003

24. **Biological approaches to the screening and evaluating of natural products** Times Cited: 1
By: Farnsworth, N. R.
P IFS NAPRECA WORKSH Pages: 25-43 Published: 1993

25. **Identification of carotenoid composition in selected '*ulam*' or traditional vegetables in Malaysia.** Times Cited: 13
By: Fatimah, A. M. Z.; Norazian, M. H.; Rashidi, O.
International Food Research Journal Volume: 19 Issue: 2 Pages: 527-530 Published: 2012

26. **PHENYLPROPANE DERIVATIVES FROM ROOTS OF COSMOS-CAUDATUS** Times Cited: 11
By: FUZZATI, N; SUTARJADI; DYATMIKO, W; et al.
PHYTOCHEMISTRY Volume: 39 Issue: 2 Pages: 409-412 Published: MAY 1995

27. **Phenolic compounds, antioxidant activity and in vitro inhibitory potential against key enzymes relevant for hyperglycemia and hypertension of commonly used medicinal plants, herbs and spices in Latin America** Times Cited: 225
By: Galvez Ranilla, Lena; Kwon, Young-In; Apostolidis, Emmanouil; et al.
BIORESOURCE TECHNOLOGY Volume: 101 Issue: 12 Pages: 4676-4689 Published: JUN 2010

28. **Changes in antioxidant effects and their relationship to phytonutrients in fruits of sea buckthorn (Hippophae rhamnoides L.) during maturation** Times Cited: 321
By: Gao, XQ; Ohlander, M; Jeppsson, N; et al.
JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY Volume: 48 Issue: 5 Pages: 1485-1490 Published: MAY 2000

29. **Tea flavonoids may protect against atherosclerosis - The Rotterdam study** Times Cited: 169
By: Geleijnse, JM; Launer, LJ; Hofman, A; et al.
ARCHIVES OF INTERNAL MEDICINE Volume: 159 Issue: 18 Pages: 2170-2174 Published: OCT 11 1999

30. **Global estimates of diabetes prevalence for 2013 and projections for 2035** Times Cited: 1,606
By: Guariguata, L.; Whiting, D. R.; Hambleton, I.; et al.
DIABETES RESEARCH AND CLINICAL PRACTICE Volume: 103 Issue: 2 Pages: 137-149 Published: FEB 2014

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