

MORE SORGHUM REFERENCES

1. Flight, I.; Clifton, P. Cereal grains and legumes in the prevention of coronary heart disease and stroke: A review of the literature. *Eur. J. Clin. Nutr.* **2006**, *60*, 1145–1159.
 2. National Health and Medical Research Council. *Australian Dietary Guidelines*; National Health and Medical Research Council: Canberra, Australia, 2013.
 3. Sahyoun, N.R.; Jacques, P.F.; Zhang, X.L.; Juan, W.; McKeown, N.M. Whole-grain intake is inversely associated with the metabolic syndrome and mortality in older adults. *Am. J. Clin. Nutr.* **2006**, *83*, 124–131.
 4. Venn, B.J.; Mann, J.I. Cereal grains, legumes and diabetes. *Eur. J. Clin. Nutr.* **2004**, *58*, 1443–1461.
 5. Williams, P.G.; Grafenauer, S.J.; O'Shea, J.E. Cereal grains, legumes, and weight management: A comprehensive review of the scientific evidence. *Nutr. Rev.* **2008**, *66*, 171–182.
 6. McIntosh, G.H. Cereal foods, fibres and the prevention of cancers. *Aust. J. Nutr. Diet.* **2001**, *58* (Suppl 2), S35–S48.
 7. U.S. Department of Agriculture; U.S. Department of Health and Human Services. *Dietary Guidelines for Americans*; U.S. Department of Agriculture, U.S. Department of Health and Human Services: Washington, DC, 2010.
 8. Food and Agriculture Organisation of the United Nations. Production—Sorghum 2012. 2012. <http://faostat.fao.org/site/339/default.aspx> (accessed May 22, 2014).
 9. Taylor, J.R.N.; Schober, T.J.; Bean, S.R. Novel food and non-food uses for sorghum and millets. *J. Cereal Sci.* **2006**, *44*, 252–271.
 10. Awika, J.M.; Rooney, L.W. Sorghum phytochemicals and their potential impact on human health. *Phytochemistry* **2004**, *65*, 1199–1221.
 11. Ezeogu, L.I.; Duodu, K.G.; Taylor, J.R.N. Effects of endosperm texture and cooking conditions on the *in vitro* starch digestibility of sorghum and maize flours. *J. Cereal Sci.* **2005**, *42*, 33–44.
 12. Ezeogu, L.I.; Duodu, K.G.; Emmanbux, M.N.; Taylor, J.R.N. Influence of cooking conditions on the protein matrix of sorghum and maize endosperm flours. *Cereal Chem.* **2008**, *85*, 397–402.
 13. Bach Knudsen, K.E.; Munck, L. Dietary fibre contents and compositions of sorghum and sorghum-based foods. *J. Cereal Sci.* **1985**, *3*, 153–164.
 14. Khan, I.; Yousif, A.; Johnson, S.K.; Gamlath, S. Effect of sorghum flour addition on resistant starch content, phenolic profile and antioxidant capacity of durum wheat pasta. *Food Res. Int.* **2013**, *54*, 578–586.
 15. Niba, L.L.; Hoffman, J. Resistant starch and b-glucan levels in grain sorghum (*Sorghum bicolor* M.) are influenced by soaking and autoclaving. *Food Chem.* **2003**, *81*, 113–118.
 16. Glew, R.H.; Vanderjagt, D.J.; Lockett, C.; Grivetti, L.E.; Smith, G.C.; Pastuszyn, A.; Millson, M. Amino Acid, Fatty Acid, and Mineral Composition of 24 Indigenous Plants of Burkina Faso. *J. Food Compos. Anal.* **1997**, *10*, 205–217.
 17. Avato, P.; Bianchi, G.; Murelli, C. Aliphatic and cyclic lipid components of Sorghum plant organs. *Phytochemistry* **1990**, *29*, 1073–1078.
 18. Ciacci, C.; Maiuri, L.; Caporaso, N.; Bucci, C.; Del Giudice, L.; Rita Massardo, D.; Pontieri, P.; Di Fonzo, N.; Bean, S.R.; Ioerger, B.; Londei, M. Celiac disease: *In vitro* and *in vivo* safety and palatability of wheat-free sorghum food products. *Clin. Nutr.* **2007**, *26*, 799–805.
 19. Kayitesi, E.; Duodu, K.G.; Minnaar, A.; de Kock, H.L. Sensory quality of marama/sorghum composite porridges. *J. Sci. Food Agric.* **2010**, *90*, 2124–2132.
 20. Amegovu, A.K.; Ogowok, P.; Ochola, S.; Yiga, P.; Musalima, J.H.; Mutenyo, E. Formulation of sorghum-peanut blend using linear programming for treatment of moderate acute malnutrition in Uganda. *J. Food Chem. Nutr.* **2013**, *1*, 67–77.
- Downloaded by [Anita Stefoska-Needham] at 03:44 19 August 2015
- Sorghum Grain to Assist in Prevention of Chronic Disease 429*
21. da Silva, L.S.; Taylor, J.; Taylor, J.R. Transgenic sorghum with altered kafirin synthesis: Kafirin solubility, polymerization, and protein digestion. *J. Agric. Food Chem.* **2011**, *59*, 9265–9270.
 22. World Health Organization. *Global Status Report On Noncommunicable Diseases 2010*; World Health Organization: Geneva, April 2011.
 23. Dicko, M.H.; Gruppen, H.; Traoré, A.S.; Voragen, A.G.J.; van Berkel, W.J.H. Review: Sorghum grain as human food in Africa: Relevance of starch content and amylase activities. *Afr. J. Biotechnol.* **2006**, *5*, 384–395.
 24. Taylor, J.R.N.; Emmambux, M.N. Review: Developments in our understanding of sorghum polysaccharides and their health benefits. *Cereal Chem.* **2010**, *87*, 263–271.
 25. United States Department of Agriculture (USDA). USDA National Nutrient Database for Standard Reference, Release 27. 2014; <http://ndb.nal.usda.gov/ndb/foods/show/6477> (accessed January 8, 2015).

26. Serna-Saldivar, S.; Rooney, L.W. Structure and chemistry of sorghum and millets. In *Sorghum and Millets Chemistry and Technology*; Dendy, D.A.V., Ed.; American Association of Cereal Chemists: St Paul, MN, 1995; pp 69–124.
 27. Duodu, K.G.; Taylor, J.R.N.; Belton, P.S.; Hamaker, B.R. Factors affecting sorghum protein digestibility. *J. Cereal Sci.* **2003**, *38*, 117–131.
 28. Badi, S.; Pedersen, B.; Monowar, L.; Eggum, B.O. The nutritive value of new and traditional sorghum and millet foods from Sudan. *Plant Food Hum. Nutr.* **1990**, *40*, 5–19.
 29. Gopalan, C.; Srikantia, S.G. Leucine and pellagra. *Lancet* **1960**, *275*, 954–957.
 30. Nakagawa, I.; Ohguri, S.; Sasaki, A.; Kajimoto, M.; Sasaki, M.; Takahashi, A. Effects of excess intake of leucine and valine deficiency on tryptophan and niacin metabolites in humans. *J. Nutr.* **1975**, *105*, 1241–1252.
 31. Nakagawa, I.; Sasaki, A. Effect of an excess intake of leucine, with and without additions of vitamin B₆ and/or niacin, on tryptophan and niacin metabolism in rats. *J. Nutr. Sci. Vitaminol.* **1977**, *23*, 535–548.
 32. Cook, N.E.; Carpenter, K.J. Leucine excess and niacin status in rats. *J. Nutr.* **1987**, *117*, 519–526.
 33. Hegedüs, M.; Pedersen, B.; Eggum, B.O. The influence of milling on the nutritive value of flour from cereal grains. 7. Vitamins and tryptophan. *Qual. Plant.* **1985**, *35*, 175–180.
 34. Khalil, J.K.; Sawaya, W.N.; Safi, W.J.; Al-Mohammad, H.M. Chemical composition and nutritional quality of sorghum flour and bread. *Qual. Plant.* **1984**, *34*, 141–150.
 35. Hurrell, R.F.; Reddy, M.B.; Juillerat, M.-A.; Cook, J.D. Degradation of phytic acid in cereal porridges improves iron absorption by human subjects. *Am. J. Clin. Nutr.* **2003**, *77*, 1213–1219.
 36. Mohammed, N.A.; Ahmed, I.A.M.; Babiker, E.E. Nutritional evaluation of sorghum flour (*Sorghum bicolor* L. Moench) during processing of injera. *World Acad. Sci. Eng. Technol.* **2011**, *75*, 72–76.
 37. Daiber, K.H. Enzyme inhibition by polyphenols of sorghum grain malt. *J. Sci. Food Agric.* **1975**, *26*, 1399–1411.
 38. Beta, T.; Rooney, L.W.; Marovatsangaa, L.T.; Taylor, J.R.N. Effect of chemical treatments on polyphenols and malt quality in sorghum. *J. Cereal Sci.* **2000**, *31*, 295–302.
 39. Barros, F.; Awika, J.M.; Rooney, L.W. Interaction of tannins and other sorghum phenolic compounds with starch and effects on in vitro starch digestibility. *J. Agric. Food Chem.* **2012**, *60*, 11609–11617.
 40. Lemlioglu-Austin, D.; Turner, N.D.; McDonough, C.M.; Rooney, L.W. Effects of sorghum [*Sorghum bicolor* (L.) Moench] crude extracts on starch digestibility, Estimated Glycemic Index (EGI), and Resistant Starch (Rs) contents of porridges. *Molecules* **2012**, *17*, 11124–11138.
 41. Hargrove, J.L.; Greenspan, P.; Hartle, D.K.; Dowd, C. Inhibition of aromatase and α -amylase by flavonoids and proanthocyanidins from *Sorghum bicolor* bran extracts. *J. Med. Food* **2011**, *14*, 799–807.
 42. Kim, J.-S.; Hyun, T.K.; Kim, M.-J. The inhibitory effects of ethanol extracts from sorghum, foxtail millet and proso millet on α -glucosidase and α -amylase activities. *Food Chem.* **2011**, *124*, 1647–1651.
- Downloaded by [Anita Stefoska-Needham] at 03:44 19 August 2015
- 430 Stefoska-Needham et al.
43. Akingbala, J.O.; Gomez, M.H.; Rooney, L.W.; Sweat, V.E. Thermal properties of sorghum starch. *Starch Stärke* **1988**, *40*, 375–378.
 44. Parada, J.; Aguilera, J.M. Review: Starch matrices and the glycemic response. *Food Sci. Technol. Int.* **2011**, *17*, 187–204.
 45. Licata, R.; Chu, J.; Wang, S.; Coorey, R.; James, A.; Zhao, Y.; Johnson, S. Determination of formulation and processing factors affecting slowly digestible starch, protein digestibility and antioxidant capacity of extruded sorghum-maize composite flour. *Int. J. Food Sci. Technol.* **2014**, *49*, 1408–1419.
 46. Yousif, A.; Nhepera, D.; Johnson, S. Influence of sorghum flour addition on flat bread in vitro starch digestibility, antioxidant capacity and consumer acceptability. *Food Chem.* **2012**, *134*, 880–887.
 47. Sajilata, M.G.; Singhal, R.S.; Kulkarni, P.R. Resistant starch—A review. *Compr. Rev. Food Sci. Food Saf.* **2006**, *5*, 1–17.
 48. Ferguson, L.R.; Tasman-Jones, C.; Englyst, H.; Harris, P.J. Comparative effects of three resistant starch preparations on transit time and short-chain fatty acid production in rats. *Nutr. Cancer* **2000**, *36*, 230–237.
 49. Flint, H.J.; Scott, K.P.; Duncan, S.H.; Louis, P.; Forano, E. Microbial degradation of complex carbohydrates in the gut. *Gut Microbes* **2012**, *4*, 289–306.
 50. Martínez, I.; Kim, J.; Duffy, P.R.; Schlegel, V.L.; Walter, J. Resistant starches types 2 and 4 have

differential effects on the composition of the fecal microbiota in human subjects. PLoS ONE **2010**, *5*, e15046.

51. Topping, D.L. Soluble fiber polysaccharides: Effects on plasma cholesterol and colonic fermentation. *Nutr. Rev.* **1991**, *49*, 195–203.
 52. Warrand, J. Healthy polysaccharides the next chapter in food products. *Food Technol. Biotechnol.* **2006**, *44*, 355–370.
 53. Verbruggen, M.A.; Beldman, G.; Voragen, A.G.J.; Hollemans, M. Water-unextractable cell wall material from sorghum: Isolation and characterization. *J. Cereal Sci.* **1993**, *17*, 71–82.
 54. Bach Knudsen, K.E.; Kirleis, A.W.; Eggum, B.O.; Munck, L. Carbohydrate composition and quality for rats of sorghum to prepared from decorticated white and whole grain red flour. *J. Nutr.* **1988**, *118*, 588–597.
 55. Verbruggen, M.A.; Beldman, G.; Voragen, A.G.J. The selective extraction of glucuronoarabinoxylans from sorghum endosperm cell walls using barium and potassium hydroxide solutions. *J. Cereal Sci.* **1995**, *21*, 271–282.
 56. Henry, R.J. Pentosan and (1→3),(1→4)- β -glucan concentrations in endosperm and wholegrain of wheat, barley, oats and rye. *J. Cereal Sci.* **1987**, *6*, 253–258.
 57. Hatfield, R.D.; Wilson, J.R.; Mertens, D.R. Composition of cell walls isolated from cell types of grain sorghum stems. *J. Sci. Food Agric.* **1999**, *79*, 891–899.
 58. Maclean, W.C., Jr.; Lopez De Romana, G.; Gastanaduy, A.; Graham, G.G. The effect of decortication and extrusion on the digestibility of sorghum by preschool children. *J. Nutr.* **1983**, *113*, 2071–2077.
 59. Taylor, J.R.N.; Anyango, J.O. Sorghum Flour and flour products: Production, nutritional quality, and fortification. In *Flour and Breads and their Fortification in Health and Disease Prevention*; Preedy, V., Watson, R., Patel, V., Eds.; Oxford, U.K.: Academic Press, 2011; pp 127–139.
 60. de Mesa-Stonestreet, N.J.; Alavi, S.; Bean, S.R. Sorghum proteins: The concentration, isolation, modification, and food applications of kafirins. *J. Food Sci.* **2010**, *75*, R90–R104.
 61. Belton, P.S.; Delgadillo, I.; Halford, N.G.; Shewry, P.R. Kafirin structure and functionality. *J. Cereal Sci.* **2006**, *44*, 272–286.
 62. Taylor, J.R.N.; Schussler, L. The protein compositions of the different anatomical parts of sorghum grain. *J. Cereal Sci.* **1986**, *4*, 361–369.
 63. Hager, A.-S.; Wolter, A.; Czerny, M.; Bez, J.; Zannini, E.; Arendt, E.K.; Czerny, M. Investigation of product quality, sensory profile and ultrastructure of breads made from a range of commercial gluten-free flours compared to their wheat counterparts. *Eur. Food Res. Technol.* **2012**, *235*, 333–344.
- Downloaded by [Anita Stefoska-Needham] at 03:44 19 August 2015
- Sorghum Grain to Assist in Prevention of Chronic Disease 431*
64. Axtell, J.D.; Kirleis, A.W.; Hassen, M.M.; D’Cros Mason, N.; Mertz, E.T.; Munck, L. Digestibility of sorghum proteins. *Proc. Natl. Acad. Sci. U. S. A.* **1981**, *78*, 1333–1335.
 65. Cherney, D.J.R. In vitro ruminal fiber digestion as influenced by phenolic-carbohydrate complexes released from sorghum cell walls. *Anim. Feed Sci. Technol.* **1992**, *39*, 79–93.
 66. Taylor, J.; Taylor, J.R.N. Alleviation of the adverse effect of cooking on sorghum protein digestibility through fermentation in traditional African porridges. *Int. J. Food Sci. Technol.* **2002**, *37*, 129–137.
 67. Cornu, A.; Delpeuch, F. Effect of fiber in sorghum on nitrogen digestibility. *Am. J. Clin. Nutr.* **1981**, *34*, 2454–2459.
 68. Llopart, E.E.; Drago, S.R.; De Greef, D.M.; Torres, R.L.; Gonzalez, R.J. Effects of extrusion conditions on physical and nutritional properties of extruded whole grain red sorghum (*Sorghum* spp). *Int. J. Food Sci. Nutr.* **2014**, *65*, 34–41.
 69. Lin, P.; Wong, J.H.; Ng, T.B.; Ho, V.S.; Xia, L. A sorghum xylanase inhibitor-like protein with highly potent antifungal, antitumor and HIV-1 reverse transcriptase inhibitory activities. *Food Chem.* **2013**, *141*, 2916–2922.
 70. Strumeyer, D.H.; Malin, M.J. Identification of the amylase inhibitor from seeds of *Leoti sorghum*. *Biochim. Biophys. Acta* **1969**, *184*, 643–645.
 71. Kumar, P.M.; Virupaksha, T.K.; Vithayathil, P.J. Sorghum proteinase inhibitors: Purification and some biochemical properties. *Int. J. Peptide Protein Res.* **1978**, *12*, 185–196.
 72. Dicko, M.H.; Gruppen, H.; Hilhorst, R.; Voragen, A.G.; van Berkel, W.J. Biochemical characterization of the major sorghum grain peroxidase. *FEBS J.* **2006**, *273*, 2293–2307.
 73. Camargo Filho, I.; Cortez, D.A.G.; Ueda-Nakamura, T.; Nakamura, C.V.; Dias Filho, B.P. Antiviral activity and mode of action of a peptide isolated from *Sorghum bicolor*. *Phytomedicine* **2008**, *15*, 202–208.
 74. Cavazos, A.; Gonzalez de Mejia, E. Identification of bioactive peptides from cereal storage

- proteins and their potential role in prevention of chronic diseases. *Compr. Rev. Food Sci. Food Saf.* **2013**, *12*, 364–380.
75. Mehmood, S.; Orhan, I.; Ahsan, Z.; Aslan, S.; Gulfraz, M. Fatty acid composition of seed oil of different *Sorghum bicolor* varieties. *Food Chem.* **2008**, *109*, 855–859.
76. Adeyeye, A.; Ajewole, K. Chemical composition and fatty acid profiles of cereals in Nigeria. *Food Chem.* **1992**, *44*, 41–44.
77. Carr, T.; Weller, C.; Schlegel, V.; Cuppett, S.; Guderian, D., Jr.; Johnson, K. Grain sorghum lipid extraction reduces cholesterol absorption and plasma non-HDL cholesterol concentrations in hamsters. *Nutrition* **2005**, *135*, 2236–2240.
78. Lee, B.H.; Carr, T.P.; Weller, C.L.; Cuppett, S.; Dweikat, I.M.; Schlegel, V. Grain sorghum whole kernel oil lowers plasma and liver cholesterol in male hamsters with minimal wax involvement. *J. Funct. Foods.* **2014**, *7*, 709–718.
79. Irmak, S.; Dunford, N.T.; Milligan, J. Policosanol contents of beeswax, sugar cane and wheat extracts. *Food Chem.* **2006**, *95*, 312–318.
80. Gouni-Berthold, I.; Berthold, H.K. Policosanol: Clinical pharmacology and therapeutic significance of a new lipid-lowering agent. *Am. Heart J.* **2002**, *143*, 356–365.
81. Martinez, I.; Wallace, G.; Zhang, C.; Legge, R.; Benson, A.K.; Carr, T.P.; Moriyama, E.N.; Walter, J. Diet-induced metabolic improvements in a hamster model of hypercholesterolemia are strongly linked to alterations of the gut microbiota. *Appl. Environ. Microbiol.* **2009**, *75*, 4175–4184.
82. Macfarlane, S.; Macfarlane, G.T.; Cummings, J.H. Review article: Prebiotics in the gastrointestinal tract. *Alimen. Pharmacol. Ther.* **2006**, *24*, 701–714.
83. Wong, J.M.W.; De Souza, R.; Kendall, C.W.C.; Emam, A.; Jenkins, D.J.A. Colonic health: Fermentation and short chain fatty acids. *J. Clin. Gastroenterol.* **2006**, *40*, 235–243.
84. Broekaert, W.F.; Courtin, C.M.; Verbeke, K.; Van de Wiele, T.; Verstraete, W.; Delcour, J.A. Prebiotic and other health-related effects of cereal-derived arabinoxylans, arabinoxylanoligosaccharides, and xylooligosaccharides. *Crit. Rev. Food Sci. Nutr.* **2011**, *51*, 178–194.
- Downloaded by [Anita Stefoska-Needham] at 03:44 19 August 2015
- 432 Stefoska-Needham et al.*
85. Zbasnik, R.; Carr, T.; Weller, C.; Hwang, K.T.; Wang, L.J.; Cuppett, S.; Schlegel, V. Anti proliferation properties of grain sorghum dry distiller's grain lipids in Caco-2 cells. *J. Agric. Food Chem.* **2009**, *57*, 10435–10441.
86. Awika, J.M.; Rooney, L.W.; Waniska, R.D. Anthocyanins from black sorghum and their antioxidant properties. *Food Chem.* **2005**, *90*, 293–301.
87. Rooney, L.W.; Awika, J.M. Overview of products and health benefits of specialty sorghums. *Cereal Food World* **2005**, *50*, 109–115.
88. Awika, J.M.; Rooney, L.W.; Waniska, R.D. Properties of 3-deoxyanthocyanins from sorghum. *J. Agric. Food Chem.* **2004**, *52*, 4388–4394.
89. Dykes, L.; Rooney, L.W.; Waniska, R.D.; Rooney, W.L. Phenolic compounds and antioxidant activity of sorghum grains of varying genotypes. *J. Agric. Food Chem.* **2005**, *53*, 6813–6818.
90. Towo, E.; Matuschek, E.; Svanberg, U. Fermentation and enzyme treatment of tannin sorghum gruels: Effects on phenolic compounds, phytate and in vitro accessible iron. *Food Chem.* **2006**, *94*, 369–376.
91. Dlamini, N.R.; Taylor, J.R.N.; Rooney, L.W. The effect of sorghum type and processing on the antioxidant properties of African sorghum-based foods. *Food Chem.* **2007**, *105*, 1412–1419.
92. N'Dri, D.; Mazzeo, T.; Zaupa, M.; Ferracane, R.; Fogliano, V.; Pellegrini, N. Effect of cooking on the total antioxidant capacity and phenolic profile of some whole-meal African cereals. *J. Sci. Food Agric.* **2012**, *93*, 29–30.
93. Kayodé, A.P.P.; Hounhouigan, J.D.; Nout, M.J.R. Impact of brewing process operations on phytate, phenolic compounds and in vitro solubility of iron and zinc in opaque sorghum beer. *LWT Food Sci. Technol.* **2007**, *40*, 834–841.
94. Wu, L.; Huang, Z.H.; Qin, P.Y.; Ren, G.X. Effects of processing on phytochemical profiles and biological activities for production of sorghum tea. *Food Res. Int.* **2013**, *53*, 678–685.
95. Adom, K.K.; Liu, R.H. Antioxidant activity of grains. *J. Agric. Food Chem.* **2002**, *50*, 6182–6187.
96. Hsu, C.L.; Yen, G.C. Phenolic compounds: Evidence for inhibitory effects against obesity and their underlying molecular signaling mechanisms. *Mol. Nutr. Food Res.* **2008**, *52*, 53–61.
97. Montonen, J.; Knekt, P.; Jarvinen, R.; Reunanen, A. Dietary antioxidant intake and risk of type 2 diabetes. *Diabetes Care* **2004**, *27*, 362–366.
98. Farrar, J.L.; Hartle, D.K.; Hargrove, J.L.; Greenspan, P. A novel nutraceutical property of select sorghum (*Sorghum bicolor*) brans: Inhibition of protein glycation. *Phytother. Res.* **2008**, *22*, 1052–1056.

99. Dykes, L.; Rooney, L.W. Sorghum and millet phenols and antioxidants. *J. Cereal Sci.* **2006**, *44*, 236–251.
100. Dykes, L.; Seitz, L.M.; Rooney, W.L.; Rooney, L.W. Flavonoid composition of red sorghum genotypes. *Food Chem.* **2009**, *116*, 313–317.
101. Dykes, L.; Peterson, G.C.; Rooney, W.L.; Rooney, L.W. Flavonoid composition of lemonyellow sorghum genotypes. *Food Chem.* **2011**, *128*, 173–179.
102. Carbonneau, M.A.; Cisse, M.; Mora-Soumille, N.; Dairi, S.; Rosa, M.; Michel, F.; Lauret, C.; Cristol, J.P.; Dangles, O. Antioxidant properties of 3-deoxyanthocyanidins and polyphenolic extracts from Cote d'Ivoire's red and white sorghums assessed by ORAC and in vitro LDL oxidisability tests. *Food Chem.* **2014**, *145*, 701–709.
103. Devi, P.S.; Kumar, M.; Mohandas, S. In Vitro Antiproliferative Effects of anthocyanin extracted from red sorghum (*Sorghum bicolor*) bran on human larynx carcinoma cell line. *Int. J. Pharm. Pharm. Sci.* **2012**, *4*, 532–536.
104. Awika, J.M.; Yang, L.Y.; Browning, J.D.; Faraj, A. Comparative antioxidant, antiproliferative and phase II enzyme inducing potential of sorghum (*Sorghum bicolor*) varieties. *LWT Food Sci. Technol.* **2009**, *42*, 1041–1046.
105. Yang, L.Y.; Browning, J.D.; Awika, J.M. Sorghum 3-deoxyanthocyanins possess strong phase II enzyme inducer activity and cancer cell growth inhibition properties. *J. Agric. Food Chem.* **2009**, *57*, 1797–1804.
- Downloaded by [Anita Stefoska-Needham] at 03:44 19 August 2015
Sorghum Grain to Assist in Prevention of Chronic Disease 433
106. Yang, L.; Allred, K.F.; Geera, B.; Allred, C.D.; Awika, J.M. Sorghum phenolics demonstrate estrogenic action and induce apoptosis in nonmalignant colonocytes. *Nutr. Cancer* **2012**, *64*, 419–427.
107. Suganyadevi, P.; Saravanakumar, K.M.; Mohandas, S. The antiproliferative activity of 3-deoxyanthocyanins extracted from red sorghum (*Sorghum bicolor*) bran through P53-dependent and Bcl-2 gene expression in breast cancer cell line. *Life Sci.* **2013**, *92*, 379–382.
108. Hwang, J.M.; Choi, K.C.; Bang, S.J.; Son, Y.O.; Kim, B.T.; Kim, D.H.; Choi, G.J.; Kim, D.H.; Shi, X.L.; Lee, J.C. Anti-oxidant and anti-inflammatory properties of methanol extracts from various crops. *Food Sci. Biotechnol.* **2013**, *22*, 265–272.
109. Earp, C.F.; McDonough, C.M.; Awika, J.; Rooney, L.W. Testa development in the caryopsis of *Sorghum bicolor* (L.) Moench. *J. Cereal Sci.* **2004**, *39*, 303–311.
110. Gu, L.; House, S.E.; Rooney, L.W.; Prior, R.L. Sorghum extrusion increases bioavailability of catechins in weanling pigs. *J. Agric. Food Chem.* **2008**, *56*, 1283–1288.
111. Chung, I.-M.; Kim, E.-H.; Yeo, M.-A.; Kim, S.-J.; Seo, M.C.; Moon, H.-I. Antidiabetic effects of three Korean sorghum phenolic extracts in normal and streptozotocin-induced diabetic rats. *Food Res. Int.* **2011**, *44*, 127–132.
112. Haslam, E. Protein-polyphenol interactions. In *International Congress and Symposium Series*, No. 226; Royal Society of Medicine: London, 2000; p 25.
113. Emmambux, N.M.; Taylor, J.R.N. Sorghum kafirin interaction with various phenolic compounds. *J. Sci. Food Agric.* **2003**, *83*, 402–407.
114. Hagerman, A.E.; Butler, L.G. The specificity of proanthocyanidin-protein interactions. *J. Agric. Food Chem.* **1980**, *28*, 947–952.
115. Naczki, M.; Shahidi, F. Nutritional implications of canola condensed tannins. In *Antinutrients and Phytochemicals in Food*; ACS Symposium Series, Vol. 662; Shahidi, F., Ed.; American Chemical Society: Washington, DC, 1997; pp 186–208.
116. Lizardo, R.; Peiniau, J.; Aumaitre, A. Effect of sorghum on performance, digestibility of dietary components and activities of pancreatic and intestinal enzymes in the weaned piglet. *Anim. Feed Sci. Technol.* **1995**, *56*, 67–82.
117. Al-Mamary, M.; Al-Habori, M.; Al-Aghbari, A.; Al-Obeidi, A. In vivo effects of dietary sorghum tannins on rabbit digestive enzymes and mineral absorption. *Nutr. Res.* **2001**, *21*, 1393–1401.
118. King, D.; Fan, M.Z.; Ejeta, G.; Asem, E.K.; Adeola, O. The effects of tannins on nutrient utilisation in the White Pekin duck. *Br. Poult. Sci.* **2000**, *41*, 630–639.
119. Sarni-Manchado, P.; Cheynier, V.; Moutounet, M. Interactions of grape seed tannins with salivary proteins. *J. Agric. Food Chem.* **1999**, *47*, 42–47.
120. Muriu, J.I.; Njoka-Njiru, E.N.; Tuitoek, J.K.; Nanua, J.N. Evaluation of sorghum (*Sorghum bicolor*) as replacement for maize in the diet of growing rabbits (*Oryctolagus cuniculus*). *Asian Aust J. Anim Sci.* **2002**, *15*, 565–569.
121. Bralley, E.; Greenspan, P.; Hargrove, J.L.; Hartle, D.K. Inhibition of hyaluronidase activity by select sorghum brans. *J. Med. Food* **2008**, *11*, 307–312.
122. Burdette, A.; Garner, P.L.; Mayer, E.P.; Hargrove, J.L.; Hartle, D.K.; Greenspan, P. Antiinflammatory

activity of select sorghum (*Sorghum bicolor*) brans. J. Med. Food **2010**, *13*, 879–887.

123. Grimmer, H.R.; Parbhoo, V.; McGarth, R.M. Antimutagenicity of polyphenol-rich fractions from *Sorghum bicolor* grain. J. Agric. Food Chem. **1992**, *59*, 251–256.

124. Gomez-Cordoves, C.; Bartolome, B.; Vieira, W.; Virador, V.M. Effects of wine phenolics and sorghum tannins on tyrosinase activity and growth of melanoma cells. J. Agric. Food Chem. **2001**, *49*, 1620–1624.

125. Deosthale, Y.G.; Gopalan, C. The effect of molybdenum levels in sorghum (*Sorghum vulgare* Pers.) on uric acid and copper excretion in man. Br. J. Nutr. **1974**, *31*, 351–355.

126. Krishnaswamy, K.; Rao, B.; Raghuram, T.C.; Srikantia, S.G. Effect of vitamin B₆ on leucine induced changes in human subjects. Am. J. Clin. Nutr. **1976**, *29*, 177–181.

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127. Obizoba, I.C.; Ezekwe, M.O.; Akaiwe, B.N. Utilization of sorghum, wheat, and navy beans by human adults: Protein metabolism. Nutr. Rep. Int. **1979**, *20*, 291–301

128. Wang, R.S.; Kies, C. Niacin status of humans as affected by eating decorticated and wholeground sorghum (*Sorghum gramineae*) grain, ready-to-eat breakfast cereals. Plant Food Hum. Nutr. **1991**;41:355–369.

129. Schmid, M.A.; Salomeyesudas, B.; Satheesh, P.; Hanley, J.; Kuhnlein, H.V. Intervention with traditional food as a major source of energy, protein, iron, vitamin C and vitamin A for rural Dalit mothers and young children in Andhra Pradesh, South India. Asia Pac. J. Clin. Nutr. **2007**;16:84–93.

130. Derman, D.P.; Bothwell, T.H.; Torrance, J.D.; Bezwoda, W.R.; MacPhail, A.P.; Kew, M.C.; Sayers, M.H.; Disler, P. B.; Charlton, R.W. Iron absorption from maize (*Zea mays*) and sorghum (*Sorghum vulgare*) beer. Br. J. Nutr. **1980**, *43*, 271–279.

131. Radhakrishnan, M.R.; Sivaprasad, J. Tannin content of sorghum varieties and their role in iron bioavailability. J. Agric. Food Chem. **1980**, *28*, 55–57.

132. Gillooly, M.; Bothwell, T.H.; Charlton, R.W.; Torrance, J.D.; Bezwoda, W.R.; MacPhail, A.P.; Derman, D.P.; Novelli, L.; Mayet, F. Factors affecting the absorption of iron from cereals. Br. J. Nutr. **1984**, *51*, 37–46.

133. Haidar, J.; Nekatibeb, H.; Urga, K. Iron deficiency anaemia in pregnant and lactating mothers in rural Ethiopia. East Afr. Med. J. **1999**, *76*, 618–622.

134. Suhasini, G.E.; Krishna, D.R. Influence of unrefined sorghum or maize on serum lipids. Anc. Sci. Life. **1991**, *1–2*, 26–27.

135. Mani, U.V.; Prabhu, B.M.; Damle, S.S.; Mani, I. Glycaemic index of some commonly consumed foods in western India. Asia Pac. J. Clin. Nutr. **1993**, *2*, 111–114.

136. Lakshmi, K.B.; Vimala, V. Hypoglycemic effect of selected sorghum recipes. Nutr. Res. **1996**, *16*, 1651–1658.

137. Abdelgadir, M.; Abbas, M.; Jarvi, A.; Elbagir, M.; Eltom, M.; Berne, C. Glycaemic and insulin responses of six traditional Sudanese carbohydrate-rich meals in subjects with Type 2 diabetes mellitus. Diabet. Med. **2005**, *22*, 213–217.

138. Poquette, N.M.; Gu, X.; Lee, S.O. Grain sorghum muffin reduces glucose and insulin responses in men. Food Funct. **2014**, *5*, 894–899.

139. Khan, I.; Yousif, A.M.; Johnson, S.K.; Gamlath, S. Acute effect of sorghum flour-containing pasta on plasma total polyphenols, antioxidant capacity and oxidative stress markers in healthy subjects: A randomised controlled trial. Clin. Nutr. **2015**, *34*, 415–421.

140. Fedail, S.S.; Badi, S.M.; Musa, R.M. The effects of sorghum and wheat bran on the colonic functions of healthy Sudanese subjects. Am. J. Clin. Nutr. **1984**, *40*, 776–779.

141. Cornu, A.; Delpeuch, F. Effects of Dietary Fiber intake on the digestibility of lipids in an african sorghum-consuming population. Ann. Nutr. Metab. **1986**, *30*, 227–232.

142. Kurien, P.P.; Narayanarao, M.; Kurien, M.; Swaminathan, M.; Subrahmanyam, V. The metabolism of nitrogen, calcium and phosphorus in undernourished children. The effect of partial or complete replacement of rice in poor vegetarian diets by kaffir corn (*Sorghum vulgare*). Br. J. Nutr. **1960**, *14*, 339.

143. Nicol, B.M.; Phillips, P.G. The utilization of proteins and amino acids in diets based on cassava (*Manihot utilissima*), rice or sorghum (*Sorghum sativa*) by young Nigerian men of low income. Br. J. Nutr. **1978**;39:271–287.

144. Maclean, W.C., Jr.; Lopez De Romana, G.; Placko, R.P.; Graham, G.G. Protein quality and digestibility of sorghum in preschool children: Balance studies and plasma free amino acids. J. Nutr. **1981**, 1928–1936.

145. Dibari, F.; Bahwere, P.; Huerga, H.; Irena, A.H.; Owino, V.; Collins, S.; Seal, A. Development of a cross-over randomized trial method to determine the acceptability and safety of novel

ready-to-use therapeutic foods. *Nutrition* **2013**, *29*, 107–112.

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Sorghum Grain to Assist in Prevention of Chronic Disease 435

146. Bisimwa, G.; Owino, V.O.; Bahwere, P.; Dramaix, M.I.; Donnen, P.; Dibari, F.; Collins, S. Randomized controlled trial of the effectiveness of a soybean-maize-sorghum-based ready-to-use complementary food paste on infant growth in South Kivu, Democratic Republic of Congo. *Am. J. Clin. Nutr.* **2012**, *95*, 1157–1164.
147. Mustafa, S.A.; Karrar, Z.E.; Suliman, J.I. Cereal-based oral rehydration solutions in Sudanese children with diarrhoea: A comparative clinical trial of rice-based and sorghum-based oral rehydration solutions. *Ann. Trop. Paediatr.* **1995**, *15*, 313–319.
148. Molla, A.M.; Molla, A.; Nath, S.K.; Khatun, M. Food-based oral rehydration salt solution for acute childhood diarrhoea. *Lancet* **1989**, *2*, 429–431.
149. Pelleboer, R.A.; Felius, A.; Goje, B.S.; Gelderen, H.H. Sorghum-based oral rehydration solution in the treatment of acute diarrhoea. *Trop. Geogr. Med.* **1990**, *42*, 63–68.
150. Vazquez-Araujo, L.; Chambers, E.; Cherdchu, P. Consumer input for developing human food products made with sorghum grain. *J. Food Sci.* **2012**, *77*, S384–S389.
151. Muhimi, A.; Gimbi, D.; Njelekela, M.; Shemaghembe, E.; Mwambene, K.; Chiwanga, F.; Malik, V.S.; Wedick, N.M.; Spiegelman, D.; Hu, F.B.; Willett, W.C. Consumption and acceptability of whole grain staples for lowering markers of diabetes risk among overweight and obese Tanzanian adults. *Glob. Health* **2013**, *9*.
152. Motswagole, B.S.; Mongwaketse, T.C.; Mokotedi, M.; Kobue-Lekalake, R.I.; Bulawayo, B.T.; Thomas, T.S.; Kurpad, A.V.; Kwape, L.D. The efficacy of micronutrient-fortified sorghum meal in improving the immune status of HIV-positive adults. *Ann. Nutr. Metab.* **2013**;62:323–330.
153. Ayuba, G.I.; Jensen, G.S.; Benson, K.F.; Okubena, A.M.; Okubena, O. Clinical efficacy of a West African *Sorghum bicolor*-based traditional herbal preparation Jobelyn shows increased hemoglobin and CD4+ T-lymphocyte counts in HIV-positive patients. *J. Altern. Complement Med.* **2014**, *20*, 53–56.
154. Featherstone, W.R. Influence of tannins on the utilization of sorghum grain by rats and chicks. *Nutr. Rep. Int.* **1975**, *11*, 491.
155. Cousins, B.W.; Tanksley, T.D., Jr.; Knabe, D.A.; Zebrowska, T. Nutrient digestibility and performance of pigs fed sorghums varying in tannin concentration. *J. Anim. Sci.* **1981**, *53*, 1524–1537.
156. Liu, S.; Willett, W.C.; Manson, J.E.; Hu, F.B.; Rosner, B.; Colditz, G. Relation between changes in intakes of dietary fiber and grain products and changes in weight and development of obesity among middle-aged women. *Am. J. Clin. Nutr.* **2003**, *78*, 920–927.
157. Lairon, D.; Arnault, N.; Bertrais, S.; Planells, R.; Clero, E.; Hercberg, S.; Boutron-Ruault, M.-C. Dietary fiber intake and risk factors for cardiovascular disease in French adults. *Am. J. Clin. Nutr.* **2005**, *82*, 1185–1194.
158. Flint, H.J. The impact of nutrition on the human microbiome. *Nutr. Rev.* **2012**, *70* (Suppl 1), S10–S13.
159. Shen, R.L.; Zhang, W.L.; Dong, J.L.; Ren, G.X.; Chen, M. Sorghum resistant starch reduces adiposity in high-fat diet-induced overweight and obese rats via mechanisms involving adipokines and intestinal flora. *Food Agric. Immunol.* **2015**, *26*, 120–130.
160. Appleton, D.J.; Rand, J.S.; Priest, J.; Sunvold, G.D.; Vickers, J.R. Dietary carbohydrate source affects glucose concentrations, insulin secretion, and food intake in overweight cats. *Nutr. Res.* **2004**, *24*, 447–467.
161. Kim, J.; Park, Y. Anti-diabetic effect of sorghum extract on hepatic gluconeogenesis of streptozotocin-induced diabetic rats. *Nutr. Metab.* **2012**, *9*, 1–7.
162. Park, J.H.; Lee, S.H.; Chung, I.M.; Park, Y. Sorghum extract exerts an anti-diabetic effect by improving insulin sensitivity via PPAR-gamma in mice fed a high-fat diet. *Nutr. Res. Pract.* **2012**, *6*, 322–327.
163. Cervantes-Pahm, S.K.; Liu, Y.; Stein, H.H. Comparative digestibility of energy and nutrients and fermentability of dietary fiber in eight cereal grains fed to pigs. *J. Sci. Food Agric.* **2014**, *94*, 841–849.

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164. Dixit, A.A.; Azar, K.M.; Gardner, C.D.; Palaniappan, L.P. Incorporation of whole, ancient grains into a modern Asian Indian diet to reduce the burden of chronic disease. *Nutr. Rev.* **2011**, *69*, 479–488.
165. Chung, I.M.; Yeo, M.A.; Kim, S.J.; Kim, M.J.; Park, D.S.; Moon, H.I. Antilipidemic activity of organic solvent extract from *Sorghum bicolor* on rats with diet-induced obesity. *Hum. Exp.*

Toxicol. **2011**, *30*, 1865–1868.

166. Cho, S.H.; Ha, T.Y. In vitro and in vivo effects of prosomillet and sorghum on cholesterol metabolism. *Food Sci. Biotechnol.* **2003**, *12*, 485–490.
167. Hoi, J.T.; Weller, C.L.; Schlegel, V.L.; Cuppett, S.L.; Lee, J.-Y.; Carr, T.P. Sorghum distillers dried grain lipid extract increases cholesterol excretion and decreases plasma and liver cholesterol concentration in hamsters. *J. Funct. Foods.* **2009**, *1*, 381–386.
168. Klopfenstein, C.F.; Varriano-Marston, E.; Hosoney, R.C. Cholesterol-lowering effect of sorghum diet in guinea pigs. *Nutr. Rep. Int.* **1981**, *24*, 621–626.
169. Lee, S.H.; Chung, I.M.; Cha, Y.S.; Park, Y. Millet consumption decreased serum concentration of triglyceride and C-reactive protein but not oxidative status in hyperlipidemic rats. *Nutr. Res.* **2010**, *30*, 290–296.
170. Lee, S.M.; Pan, B.S. Effect of dietary sorghum distillery residue on hematological characteristics of cultured grey mullet (*Mugil cephalus*)—An animal model for prescreening antioxidant and blood thinning activities. *J. Biotechnol.* **2003**, *27*, 1–18.
171. Loeffler, I.J.P. Sorghum in oesophageal cancer. *Lancet* **1985**, *2*, 562.
172. Van Rensburg, S.J. Epidemiologic and dietary evidence for a specific nutritional predisposition to esophageal cancer. *J. Natl. Cancer Inst.* **1981**, *67*, 243–251.
173. Chen, F.; Cole, P.; Mi, Z.; Xing, L.Y. Corn and wheat-flour consumption and mortality from esophageal cancer in Shanxi, China. *Int. J. Cancer* **1993**, *53*, 902–906.
174. Isaacson, C. The change of the staple diet of black South Africans from sorghum to maize (corn) is the cause of the epidemic of squamous carcinoma of the oesophagus. *Med. Hypotheses* **2005**, *64*, 658–660.
175. Park, J.H.; Darvin, P.; Lim, E.J.; Joung, Y.H.; Hong, D.Y.; Park, E.U.; Park, S.H.; Choi, S.K.; Moon, E.S.; Cho, B.W.; Park, K.D.; Lee, H.K.; Kim, M.J.; Park, D.S.; Chung, I.M.; Yang, Y.M. Hwanggeumchal sorghum induces cell cycle arrest, and suppresses tumor growth and metastasis through Jak2/STAT pathways in breast cancer xenografts. *PLoS ONE* **2012**, *7*, e40531.
176. Wu, L.; Huang, Z.; Qin, P.; Yao, Y.; Meng, X.; Zou, J.; Zhu, K.; Ren, G. Chemical characterization of a procyanidin-rich extract from sorghum bran and its effect on oxidative stress and tumor inhibition in vivo. *J. Agric. Food Chem.* **2011**, *59*, 8609–8615.
177. Beck, E.J.; Tosh, S.M.; Batterham, M.J.; Tapsell, L.C.; Huang, X.F. Oat beta-glucan increases postprandial cholecystokinin levels, decreases insulin response and extends subjective satiety in overweight subjects. *Mol. Nutr. Food Res.* **2009**, *53*, 1343–1351.
178. Hall, R.S.; Baxter, A.L.; Fryirs, C.; Johnson, S.K. Liking of health-functional foods containing lupin kernel fibre following repeated consumption in a dietary intervention setting. *Appetite* **2010**, *55*, 232–237.
179. National Health and Medical Research Council. *Final Guidance General Level Health Claims September 2013*; National Health and Medical Research Council: Canberra, Australia, 2013.
180. Sacks, F.M.; Bray, G.A.; Carey, V.J.; Smith, S.; Ryan, D.; Anton, S.; McManus, K.; Champagne, C.; Bishop, L.; Laranjo, N.; Leboff, M.; Rood, J.; De Jonge, L.; Greenway, F.; Loria, C.M.; Obarzanek, E.; Williamson, D.A. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N. Engl. J. Med.* **2009**, *360*, 859–873.
181. Kamath, V.G.; Chandrashekar, A.; Rajini, P.S. Antiradical properties of sorghum (*Sorghum bicolor* L. Moench) flour extracts. *J. Cereal Sci.* **2004**, *40*, 283–288.
182. Oboh, G.; Akomolafe, T.L.; Adetuyi, A.O. Inhibition of cyclophosphamide-induced oxidative stress in brain by dietary inclusion of red dye extracts from sorghum (*Sorghum bicolor*) stem. *J. Med. Food* **2010**, *13*, 1075–1080.
183. Moraes, É.A.; Natal, D.I.G.; Queiroz, V.A.V.; Schaffert, R.E.; Cecon, P.R.; de Paula, S.O.; Benjamim, L.A.; Ribeiro, S.M.R.; Martino, H.S.D. Sorghum genotype may reduce low-grade inflammation response and oxidative stress and maintains jejunum morphology of rats fed a hyperlipidic diet. *Food Res. Int.* **2012**, *49*, 553–559.
184. Ajiboye, T.O.; Komolafe, Y.O.; Oloyede, O.B.; Ogunbode, S.M.; Adeoye, M.D.; Abdulsalami, I.O.; Nurudeen, Q.O. Diethylnitrosamine-induced redox imbalance in rat microsomes: Protective role of polyphenolic-rich extract from *Sorghum bicolor* grains. *J. Basic Clin. Physiol. Pharmacol.* **2013**, *24*, 41–49.
185. He, J.; Giusti, M.M. Anthocyanins: Natural colorants with health-promoting properties. *Ann. Rev. Food Sci. Technol.* **2010**, *1*, 163–187.