

REFERENCES

- Adom, K.K. and R.H. Liu. (2002). Antioxidant activity of grains. **Journal of Agricultural and Food Chemistry**, 50, 6182-6187.
- Alcázar, Á., J.M. Jurado, M.J. Martín, F. Pablos, and A.G. González. (2005). **Enzymatic-spectrophotometric determination of sucrose in coffee beans. Talanta**, 67, 760–766.
- Alegre, C. (1959). Climates caféiers d'Arabie. **Agronomie Tropicale**, 14, 25-48.
- Alvin, P. (1960). Physiology of growth and flowering in coffee. **Coffee**, 2, 57-62.
- Aminuddin, B. M. (1986). Light requirements of *Shorea materialis* seedlings. **Pertanika**, 9, 285-290.
- Angkasith, P. and B. Warrit. (1999). **Highland Arabica Coffee Production**. Chiang Mai, Thailand: Ming Muang Publisher Ltd:
- _____. (2002). Coffee production status and potential of organic Arabica coffee in Thailand. **AU Journal of Technology**, 5, 20-27.
- AOAC. (1990). **Official Methods of Analysis: Association of Official Analytical Chemistry**. (15th edition). [n.p.]: Washington D.C.
- Avelino, J., B. Barboza, J.C. Araya, C. Fonseca, F. Davrieux, B. Guyot, and C. Cilas. (2005). Effects of slope exposure, altitude and yield on coffee quality in two altitude terroirs of Costa Rica, Orosi and Santa Mari´a de Dota. **Journal of Agricultural and Food Chemistry**, 85, 1869-1876.
- Baggenstoss J., L. Poisson, R. Kaegi, R. Perren, and F. Escher. (2008). Coffee Roasting and Aroma Formation: Application of Different Time -Temperature Conditions. **Journal of Agricultural and Food Chemistry**, 56: 5836-5846.
- Barradas, V.L. and L. Fanjul. (1986). Microclimatic characterization of shaded and open-grown coffee (*Coffea arabica* L.) plantations in Mexico. **Agricultural and Forest Meteorology**, 38, 101-112.
- Beer, J., R. Muschler, D. Kass, and E. Somarriba. (1998). Shade management in coffee and cacao plantations. **Agroforestry Systems**, 38, 134-164.
- Begonia, G.B, R.J. Aldrich, and C.J. Nelson. (1988). Effect of simulated weed shade on soybean photosynthesis, biomass partitioning and axillary bud development. **Photosynthetica**, 22, 309-319.

- Belay, A., K. Ture, M. Redi, and A. Asfaw. (2008). Measurement of caffeine in coffee beans with UV/vis spectrometer. **Food Chemistry**, 108, 310-315.
- Belitz, R. and W. Grosch. (1999). Phenolic compounds. **Food Chemistry**, 7, 764-775.
- Bencoechea, M.L., A.I. Sancho, and B. Bartolomé. (1997). Phenolic composition of industrially manufactured purées and concentrates from peach and apple fruits. **Journal of Agricultural and Food Chemistry**, 45, 4071-4075.
- Benjawan Thanuwattana. (2004). **An analysis of market share and elasticities of substitution for Thai coffee bean exports**. Bangkok: Kasetsart University.
- Berry, P.M., M.D.A. Rounsevell, P.A. Harrison, and E. Audsley. (2006). Assessing the viler ability of agricultural land use and species in climate change and the role of policy in facilitating adaptation. **Environmental Science and Policy**, 9, 189-204.
- Bjorkman, O. (1968). Further studies on differentiation of photosynthetic properties in sun and shade ecotypes of *Solidago virgaurea* L. **Physiologia Plantarum**, 21, 84-89.
- _____. (1981). Responses to different quantum flux density. **Encyclopaedia of Plant Physiology New Series**, 120, 57-107.
- Bjorkman, O. and P. Holmgren. (1963). Adaptability of the photosynthetic apparatus to light intensity in ecotypes from exposed and shaded habitats. **Physiologia Plantarum**, 16, 889-914.
- Bjorkman, O., N.K. Boardman, J.M. Anderson, S.W. Thome, D.J. Goodchild, and N.A. Pyliotis. (1972). **Effect of light intensity during growth of *Atriplex patula* on the capacity of photosynthetic reactions, chloroplast component and structure**. Washington: Carnegie Institution of Washington Year Book.
- Boardman, N.K. (1977). Comparative photosynthesis of sun and shade plants. **Annual Review of Plant Physiology**, 28, 355-377.
- Bonilla, F., M. Mayen, and M. Merida. (1999). Extraction of phenolic compounds from red grape marc for use as food lipid antioxidants. **Food Chemistry**, 66, 209-215.
- Boardman, N.K. (1977). Comparative photosynthesis of sun and shade plants. **Annual Review of Plant Physiology**, 28, 355-377.

- Borkhataria, R.R., J.A. Collazo, and M.J. Groom. (2006). Additive effects of vertebrate predators on insects in a Puerto Rican coffee plantation. **Ecological Applications**, 16, 696-703.
- Bosselmann, A.S., K. Dons, T. Oberthur, C.S. Olsen, A. Raebild, and H. Usma. (2009). The influence of shade trees on coffee quality in small holder coffee agroforestry systems in Southern Colombia. **Agriculture Ecosystems and Environment**, 129, 253-260.
- Braca, A., N.D. Tommasi, L.D. Bari, C. Pizza, M. Politi, and I. Morelli. (2001). Antioxidant principles from *Bauhinia terapotensis*. **Journal of Natural Products**, 64, 892-895.
- Butsat, S., N. Weerapreeyakul, and S. Siriamornpun. (2009). Changes in phenolic acids and antioxidant activity in Thai rice husk at five growth stages during grain development. **Journal Agricultural and Food Chemistry**, 57, 4566-4571.
- Camargo, M.B.P. (2008). **The impact of climatic variability on the coffee crop**. In: The 22nd International conference on coffee science, 2008, Campinas, Brazil. Proceedings, Campinas: ASIC. 1058-1065.
- Camargo, M.B.P., M.A. Santos, J. R. Pedro, and M.J. Fahl. (2006). **Agrometeorological model for monitoring and predicting coffee (*Coffea arabica* L.) productivity**. In: 21 September, 2006, International Conference on coffee science in Sao Paulo State, Brazil. Proceedings, Montpellier, France.
- Cannell, M.G.R. (1976). **Crop physiological aspects of coffee bean yield: A review. Kenya Coffee**. [n.p.].
- _____. (1985). Physiology of the coffee crop. 108-134. In: Clifford M.N, Wilson KC, eds. **Coffee: Botany, Biochemistry and Production of Beans and Beverage**. London: Croom Helm.
- Casal, S., E. Mendes, M.B. Oliveira, and M.M. Ferreira. (2005). Roast effects on coffee amino acid enantiomers. **Food Chemistry**, 89, 333-340
- Castillo, Z. J. (1961). Ensayo de analisis del-erecimiento in cage (Growth analysis study with coffee). **Cenicafe**, 12, 1-16.

- Castro, R.D.D. and P. Marraccini. (2006). Cytology biochemistry and molecular changes during coffee fruit development. **Brazilian Journal of Plant Physiology**, 18, 175-199.
- Chabot, B. F, T. W. Jurik, and J. F. Chabot. (1979). Influence of instantaneous and intergrated light-flux density on leaf anatomy and photosynthesis. **American Journal of Botany**, 66, 940-945.
- Chan, E.W.C., Y.Y. Lim, S.K Wong, K.K. Lim, F.S.Tan, and M.Y. Lianto. (2009). Effect of different drying methods on the antioxidant properties of leaves and tea of ginger species. **Food Chemistry**, 113, 892-895.
- Chism, G.W. and N.F. Haard. (1996). Characteristics of edible plant tissues. In: **Food Chemistry**. 3rd editions. Fennema, O.R., Ed. Dekker, New York, 943-1011.
- Clarke R.J. (1985). Green coffee processing. In: M.N. Clifford and K.C. Willson, editors. **Coffee: Botany, biochemistry and production of beans and beverage**. London: Croom Helm Ltd.
- Clifford, M.N. (1985). Chemical and physical aspects of green coffee and coffee products. In: M.N. Clifford and K.C. Wilson, editors. **Coffee: Botany biochemistry and production of beans and beverage**. West Port, CN. AVI Publishing.
- Coffee Research Institute**. (2001). Retrieved September 15: 2003, from <http://www.coffeeresearch.com/science.htm>
- Coste, R. (1992). **Coffee: The plant and the product**. London: MacMillan Press..
- Cuvelier, M.E., H. Richard, and C. Berset. (1992). Antioxidative activity and phenolic composition of pilot-plant and commercial extracts of sage and rosemary. **Journal of the American Oil Chemists' Society**, 73, 645-652.
- Da Matta, F.M. (2004). Ecophysiological constraints on the production of shaded and unshaded coffee: a review. **Field Crops Research**, 86, 99-114.
- Da Matta, F.M. and J.D.C. Ramalho. (2006). Impacts of drought and temperature stress on coffee physiology and production: a review. **Brazilian Journal of Plant Physiology**, 18, 55-81.
- Da Porto, C., M.C. Nicoli, C. Severini, A. Sensidoni, and C.R. Lerici. (1991). Study on physical and physico-chemical changes of coffee beans during roasting. Note 2. **Italian Journal of Food Science**, 3,197-207.

- De Castro, F. S, M, Moreno, L. Montenegro, and M. Bolonos. (1962). Influence of shade, organic matter and planting distances upon growth of coffee seedlings. **Coffee**, 4, 25-35.
- Deibler K.D., T.E. Acree, and E.H. Lavin. (1998). Food Flavors: Formation, Analysis and Packaging Influences, Contis ET, Ho C-T, Mussinan C.J. (eds). **Elsevier: Amsterdam**, 69-78.
- Dorea, J. G. and da Costa. (2005). Is coffee a functional food?. **British Journal of Nutrition**, 93, 773-82.
- Ducrey, M. (1992). Variation in leaf morphology and branching pattern of some tropical rain forest species from Guadeloupe French West Indies under semi controlled light conditions. **Annals des Sciences Forestieres** 49, 553-570.
- Fails, B. S., A. J. Lewis, and J. A. Baden. (1982). Net photosynthesis and transpiration of sun and shade grown *Ficus bejamina* leaves. **Journal of American Society of Horticultural Science**, 107, 758-761.
- Farah, A., T. De Paulis, L.C. Trugo, and P.R. Martin. (2005). Effect of roasting on the formation of chlorogenic acid lactones. **Journal Agricultural and Food Chemistry**, 53,1505-1513.
- Farah, A. and C.M. Donangelo. (2006). Phenolic compounds in coffee. **British Journal of Plant Physiology**, 18, 23-26.
- Farah, A., M.C. Monteiro, V. Calado, A. Franca, and L.C. Trugo. (2006). Correlation between cup quality and chemical attributes of Brazilian coffee. **Food Chemistry**, 98, 373-380.
- Franca, A.S., J.F.C. Mendonç and D.S. Oliveira. (2005). Composition of green and roasted coffees of different cup qualities. **LWT- Food Science Technology**, 38, 709-715.
- Franco, C.M. (1985). Influence of temperature on growth of coffee plant. **IBEC Research Institute Bull**, 16, 24-28.
- Flament, V. (2002). **Coffee flavor chemistry**. British Library Cataloguing in Publish Data: London, England: John Wiley & Sons.

- Geromel, C., L.P. Ferreira, A.A. Cavalari, L.F.P. Pereira, S.M.C. Guerreiro, D. Pot, T. Leroy, L.G.E. Vieira, P. Mazzafera, and P. Marraccini. 2006. Biochemical and genomic analysis of sucrose metabolism during coffee (*Coffea arabica*) fruit development. **Journal of Experimental Botany**, 57, 3243-3258.
- Gomez, K.A. and A.A. Gomez. (1984). **Statistical procedures for agricultural research**. 2nd editions. USA.: John Wiley & Sons, New York.
- Griffin, M. J. and D. N. Blauch. (1999). **Determination of the relationship between phosphate concentration and perceived acidity in coffee**. Department of Chemistry, Davidson College, Davidson, North Carolina.
- Guiscafre, A. J. and Gomez, L. A. (1942). Effect of solar radiation intensity on the vegetative growth and yield of coffee. **Journal of Agriculture**, 26, 73-90.
- Gulluce, M., F. Sahin, M. Sokmen, H. Ozer, D. Daferera, A. Sokmen, M. Polissiou, A. Adiguzel, and H. Ozkan. (2007). Antimicrobial and antioxidant properties of the essential oils and methanol extract from *Mentha longifolia* L. ssp. *longifolia*. **Food Chemistry**, 103, 1449-1456.
- Guyot, B., D. Gueule, J.C. Manez, J.J. Perriot, J. Giron, and L. Villian. (1996). Influence de l'altitude et de l'ombrage sur la qualite' des cafe' s Arabica. **Plantation recherché développement**, 3, 272-283.
- Hampson, C. R., A. N. Azarenko, and J.R. Potter. (1996). Photosynthetic rate, flowering and yield component alteration in hazelnut in response to different light environments. **Journal of the American Society for Horticultural Science**, 121, 1103-1111.
- Hariri, M., and J. L. Prioul. (1978). Light-induced adaptive responses under greenhouse and controlled condition in the fern *Pteris cretica* var. *ouverdii* II. Photosynthetic capacities. **Physiologia Plantarum**, 42, 97-102.
- Huang, J. H. and S. R. Kuo. (1996). The morphological changes of Formosan *Michilia* seedling grown under different light intensities. **Quarterly Journal of the Experimental Forest of national Taiwan University**, 10, 49-65.
- Huerta, S. A. (1954). **La influencia de la intensidad de luz en la eficiencia asimilatoria y el crecimiento de cafeto (The influence of light intensity on the efficiency of assimilation and on grow of coffee)**. Ph.D. thesis, Inter American Institute of Agricultural Science, costa Rica.

- Huxley, P. A. (1967). The effects of artificial shading on some growth characteristics of Arabica and Robusta coffee seedling I. The effects of shading on dry weight, leaf area and derived growth data. **Journal of Applied Ecology**, 4, 291-308.
- Iqbal, S., M.I. Bhangar and F. Anwar. (2005). Antioxidant Properties and Components of Some Commercially Available Varieties of Rice Bran in Pakistan. **Food Chemistry**, 93, 265-272
- Jirasawat, P. (2003). **Production factors affecting flavor compounds in Thai coffee**. Department of Food Science and Technology, Kasetsart University.
- Jones, J.B. Jr., B. Wolf, and H.A. Mills. (1991). **Plant Analysis Handbook**. Athens, GA.: Micro-Macro Publishing.
- Kalra, Y.P., and D.G. Maynard. (1998). Microwave digestion of plant tissue in an open vessel. p. 63-67. In: Yash Kalra (editor). **Handbook of Reference Methods for Plant Analysis**. CRC Press, New York.
- Karakaya, S., S.N. EI, and A.A. Tas. (2001). **Antioxidant activity of some foods containing phenolic compounds**. [n.p.].
- Kaul, A. and K. Khanduja. (1998). Polyphenol inhibit promotion phase of umorigenesis relevance of superoxide radicals. **Nutritional Research**, 32, 81-85.
- Kjelgren, R. (1994). Growth and water relations of Kentucky coffee tree in protective shelters during establishment. **Hort Science** 29, 777-780.
- Knopp, S., G. Bytof, and D. Selmar. (2006). Influence of processing on the content of sugars in green Arabica coffee beans. **European Food Research and Technology**, 223, 195-201.
- Kodama, Mika. (2005). **The Emergence and Development of New Coffee Culture in Thailand**. Bangkok: Chulalongkorn University.
- Kohyama, T. and M. Hotta. (1990). Significance of allometry in tropical saplings. **Functional Ecology** 4, 515-522.
- Kumar, D. and L.L. Tieszen. (1980). Photosynthesis in *Coffea arabica*. I. Effects of light and temperature. **Experimental Agriculture**, 16, 13-19.

- Ky, C.L., J. Louarn, S. Dussert, B. Guyot, S. Hamon, and M. Noirot. (2001). Caffeine, trigonelline, chlorogenic acids and sucrose diversity in wild *Coffea Arabica* L. and *C. canephora* P. accessions. **Food Chemistry**, 75, 223-230.
- Lakshmmamma, P. and I. V. Rao. (1996). Response of blackgram (*Vigna mungo* L.) to shade and naphthalene acetic acid. **Indian Journal of Plant Physiology**, 1, 63-64.
- Lozano, J. E. and A. Ibarz. (1997). Color changes in concentrated fruit pulp during heating at high temperatures. **Journal of Food Engineering**, 31, 365-373.
- Magalhaes, A.C. and L.R. Angelocci. (1976). Sudden alterations in water balance associated with flower bud opening in coffee plants. **Journal of Horticultural Science**, 51, 419-421.
- Manach, C., A. Scalber, C. Morand, C. Rémésy, and L. Jimenez. (2004). Polyphenols: food sources and bioavailability. **The American Journal of Clinical Nutrition**, 79, 727-747.
- Marinova, E.M. and N.V. Yanishlieva. (2003). Effect of lipid unsaturation on the antioxidant activity of some phenolic acid. **Journal of the American Oil Chemists' Society**, 70, 301-307.
- Marler, T. E., B. Schaffer, and J. H. Crane. (1994). Developmental light level affects growth, morphology and leaf physiology of young carambola trees. **Journal of the American Society for Horticultural Science**, 119, 711-718.
- McClelland, T. B. (1934). Coffee investigations-shading favors coffee development. Rep. Puerto Rico fedagric. **Experiment Station**, 7, 13-15.
- Mendes, L.C. (2001). Optimization of the roasting of Robusta coffee (*C. canephora*conillon) using acceptability tests and RSM. **Journal of Food Quality and Preference**, 12, 153-162.
- Merken, H.M., C.D. Merken, and G.R. Beecher. (2001). Kinetics methods for the quantitation of anthocyanidins, flavonols, and flavones in foods. **Journal of Agricultural and Food Chemistry**, 49, 2727-2732.
- Messier, C., T. W. Honer, and J. P. Kimmins. (1989). Photosynthetic photon flux density red to far-red ratio and minimum light requirement for survival of *Gaultheria shallon* in western red Cedar western hemlock stands in Coastal British Columbia Canada. **Canadian Journal of Forest Research**, 19, 1470-1477.

- Montavon, P., E. Duruz, G. Rumo, and G. Pratz. (2003). Evolution of green coffee protein profiles with maturation and relationship to coffee cup quality. **Journal of Agricultural and Food Chemistry**, 51, 2328-2334.
- Moreira D.P., M.C. Monteiro, M. Ribeiro-Alves, C.M. Donangelo, and L.C. Trugo. (2005). Contribution of chlorogenic acids to the iron-reducing activity of coffee beverages. **Journal of Agricultural and Food Chemistry**, 53, 1399-1402.
- Moss, J.R. and L. Otten. (1989). A relationship between color development and moisture content during roasting of peanut. **Canadian Institute of Food Science and Technology Journal**, 22, 34-39.
- Moure, A.(2001). Natural antioxidants from residual sources. **Food Chemistry**, 72, 145-171.
- Muschler, R.G. (2001). Shade improves coffee quality in a sub-optimal coffee-zone of Costa Rica. **Agroforestry Systems**, 51, 131-139.
- Nobel, P. S. (1976). Photosynthetic rates of sun versus shade leaves of *Hyptis emoryi* Torr. **Plant Physiology**, 58, 218-23.
- Noggle, G. R. and G. J. Fritz. (1977). **Introductory Plant Physiology**. New Delhi: Prentice Hall of India Pvt.
- O'Connell, B. M. and M. J. Kelty. (1994). Crown architecture of under story and open grown white pine (*Pinus strobes* L.) sapling. **Tree Physiology**, 14, 89-102.
- Oliveira, A. L., S. S., Silva, M.A.P. Da Silva, M.N. Eberlin, F.A. Cabral. (2001). Sensory and yield response surface analysis of supercritical CO₂ extracted aromatic oil from roasted coffee. **Journal of Food Science and Technology**, 38, 38-42.
- Oosterveld, A., A.G.J. Voragen, and H.A. Scols. (2003). Effect of roasting on carbohydrate composition of *Coffea arabica* beans. **Journal of Carbohydrate Polymers**, 54, 183-192.
- Orlando, C. S. (1963). Influencia de siete intensidades de sombra en almacigos decafe. (The effects of six shade intensities in coffee nurseries). **Revta cafet. (Guatem.)**, 23, 6-12.
- Özdemir, M. and O. Devres. (2000). Kinetics of color changes of hazelnuts during roasting. **Journal of Food Engineering**, 44, 31-38.

- Patterson, D. T., D. J. Longstreth, and M. M. Peet. (1977). Photosynthetic adaptation to light intensity in Sakhalin knotweed (*Polygonum sachalinense*). **Weed science**, 25, 319-323.
- Patterson, D. T., S. O. Duke and R. E. Hoagland. (1978). Effects of irradiance during growth on adaptive photosynthetic characteristics of velvet leaf and cotton. **Plant Physiology**, 61, 402-405.
- Pratt, D. E. and B. J. F. Hudson. (1990). Natural antioxidants not exploited commercially. In: **Food Antioxidants**. Hudson, B.J.F. editor. Amsterdam: Elsevier science publishers.
- Perfecto, I., J.H. Vandermeer, G.L. Bautista, G.I. Nunez, R. Reenberg, P. Bichier, and S. Langridge. (2004). Greater predation in shaded coffee farms: the role of resident geotrophically birds. **Ecology**, 85, 2677-2681.
- Raghavan, B., K.O. Abraham, M.L. Shankaranarayana, and W.D. Koller. 1994. Studies on flavor changes during drying of dill (*Anethumsowa Roxb.*) leaves. **Journal of Food Quality**, 17, 457-466.
- Ramos, F.A., E. Bautista, and A.L. Morales. (1998). Obtention of brewed coffee aroma extract by optimized supercritical CO₂ based process. **Journal of Agricultural and Food Chemistry**, 46, 4011-4016.
- Ramos, F.A., J.L. Delgado, E. Bautista, A.L. Morales, and C. Duque. (2005). Changes in volátiles with the application of progressive freeze-concentration to Andes berry (*Rubus glaucus* Benth). **Journal of Food Engineering**, 69, 291-297.
- Redgwell, J.R., V. Trovato, D. Curti, and M. Fischer. (2002). Effect of roasting on degradation and structural features of polysaccharides in Arabica coffee beans. **Journal of Carbohydrate Research**, 337, 421-431.
- Regnier, E. E., M. E. Salvucci, and E.W. Stoller. (1988). Photosynthesis and growth responses to irradiance in soybean *Glycine max* and three broad leaf weeds. **Weed Science**, 36, 487-496.
- Regnier, E. E. and S. K. Harrison. (1993). Compensatory responses of common cocklebur (*Xanthium strumarium*) and velvet leaf (*Abutilon theophrasti*) to partial shading. **Weed Science**, 41, 541-547.

- Rosenzweig, C., K. M. Strzepek, D.C. Major, A. Iglesias, D.N. Yates, A. McCluskey, and D. Hillel. (2004). Water resources for agriculture in a changing climate: International case studies. **Global Environmental Change: Human and Policy Dimensions**, 14, 345-360.
- Roy, M.K., M. Takenaka, S. Isobe, and T. Tsushida. (2007). Antioxidant potential, antiproliferative, and phenolic content in water-soluble fractions of some commonly consumed vegetables: Effect of thermal treatment. **Food Chemistry**, 103, 106-114.
- Saklar, S., S. Katnas, and S. Urgan. (2001). Determination of optimum hazelnut roasting conditions. **International Journal of Food Science and Technology**, 36, 271-281.
- Sarazin, C., J. L. Quere, C. Gretsch, and R. Liardon. (2000). Representativeness of coffee aroma extracts: a comparison of different extraction methods. **Food Chemistry**, 70, 99-106.
- Scalbert, A. and G. Williamson. (2000). Dietary Intake and Bioavailability of Polyphenols. **American Society for Nutritional Sciences**, 130, 2073-2085.
- Scalbert, A., I.T. Johnson, and M. Saltmarsh. (2005). Polyphenols: Antioxidants and beyond. **The American Journal of Clinical Nutrition**, 81, 215-217.
- Schenker, S., C. Heinemann, R. Huber, R. Pompizzi, R. Ferren, and F. Escher. (2002). **Impact of roasting temperature profiles on chemical reaction conditions in coffee beans**. In: Proceedings of the 19th International Scientific Colloquium on Coffee. Paris: Association Scientifique Internationale du Café.
- Shimada, K., K. Fujikawa, K. Yahara, and T. Nakamura. (1992). Antioxidative properties of xanthan on the autoxidation of soybean oil in cyclodextrin emulsion. **Journal Agricultural and Food Chemistry**, 40, 945-948.
- Shiraishi, S., T. C Hsiung, M. Shiraishi, and M. Kitazaki. (1996). **Changes in the leaf morphology of *Vitis* grown under different temperature and light conditions**. Science Bulletin of the Faculty of Agriculture, Kyushu University.
- Singleton, V.L. and J.A. Rossi. (1965). Colorimetry of total phenolics with phosphomolybdic-phosphotungstic acid reagents. **American Journal of Enology and Viticulture**, 16, 144-158.

- Siles, P., J. Harmand, and P. Vaast. (2010). Effects of *Inga densiflora* on the microclimate of coffee (*Coffea arabica* L.) and overall biomass under optimal growing conditions in Costa Rica. **Agroforestry Systems**, 78, 269-286.
- Sivetz, M. 1963. Coffee Processing Technology. New York: The AVI publishing company, Inc. 379 p.
- Sivetz, M. and Foote, H. E. (1963). Control of soluble coffee processing and product quality. **Coffee Processing Technology**, 2, 187-206.
- Sivetz, M. and N. W. Desrosier. (1979). **Coffee Technology**. Washington: AVI Publishing Company.
- Soto-Pinto, L., I. Perfecto, J. Castillo-Hernandez, and J. Caballero-Nieto. (2000). Shade effect on coffee production at the northern Tzeltal zone of the state of Chiapas, Mexico. **Agriculture Ecosystems and Environment**, 80, 61-69.
- Stalmach, A., W. Mullen, C. Nagai, and A. Crozier. (2006). On-line HPLC analysis of the antioxidant activity of phenolic compounds in brewed, paper-filtered coffee. **Brazilian Journal of Plant Physiology**, 18, 253-262.
- Steiman, S.R. (2008). **Shade coffee in Hawaii- quality, physiology, and biochemistry**. PhD Dissertation, University of Hawaii at Manoa.
- Stoller, E. W. and R. A. Myers. (1989). Response of soybeans (*Glycine max*) and four broad leaf weed to reduced irradiance. **Weed Science**, 37, 570-374.
- Stone, H. and J.L. Sidle. (1993). **Sensory Evaluation Practices**. 2nd Edition. California: Academic Press.
- Sturdy, D. (1935). Observation on coffee under artificial shade at Selian Coffee Estate, Arusha. **East African Agricultural Journal**, 1, 135-139.
- Summa, C., F.C. Raposo, J. McCourt, R.L. Scalzo, K.H. Wagner, I. Elmadfa, and E. Anklam. (2006). Effect of roasting on the radical scavenging activity of cocoa beans. **European Food Research and Technology**, 222, 368-375.
- Sylvain, P. G. (1952). **Effect of shade upon growth and differentiation of coffee seedlings as expressed by physical measurement and chemical composition**. Mimeographed report. Costa Rica: Inter American Institute of Agricultural Science, Turrialba.

- Tomaino, F., V. Cimino, V. Zimbalatti, V. Venuti, A. Sulfaro, De Pasquale, and A. Saija. (2005). Influence of heating on antioxidant activity and the chemical composition of some spice essential oils. **Food Chemistry**, 89, 549-554.
- Trugo, L.C. (2001). **Café: Composição química e potencial nutracêutico. Ciência de Alimentos: avanços e perspectivas**. Vol. II. In: Mercadante AZ et al. editors. Campinas, SP, Brasil: Universidade de Campinas,
- Tsai, P. J., J. McIntosh, P. Pearce, B. Camden, and R. Jordan. (2002). Anthocyanin and antioxidant capacity in Roselle (*Hibiscus sabdariffa* L.) extract. **Food Research International**, 35, 351-356.
- Utsunormiya, N. and H. Higuchi. (1996). Effects of irradiance level on the growth and photosynthesis of cherimoya, sugar apple and soursop of seedlings. **Environment Control in Biology**, 34, 201-207.
- Uzelac, D.V., J. Pospisil, B. Levaj, and K. Delonga. (2005). The study of phenolic profiles of raw apricots and apples and their purees by HPLC for the evaluation of apricot nectars and jams authenticity. **Food Chemistry**, 91, 373-383.
- Vaast, P., B. Bertrand, J.J. Perriot, B. Guyot, and M. Genard. (2006). Fruit thinning and shade improve bean characteristics and beverage quality of coffee (*Coffea arabica* L.) under optimal conditions. **Journal Agricultural and Food Chemistry**, 86, 197-204.
- Varnam, H.A. and J.P. Sutherland. (1994). **Beverage Technology, Chemistry and Microbiology**. New York: Chapman and Hall.
- Velino, J., B. Barboza, J.C. Araya, C. Fonseca, F. Davrieux, B. Guyot, and C. Cilas. (2005). Effects of slope exposure, altitude and yield on coffee quality in two altitude terroirs of Costa Rica, Orosi and Santa Mari'a de Dota. **Journal of the Science of Food and Agriculture**, 85, 1869-1876.
- Voilley, A. and D. Silmatos. 1980. Modeling the solubilization process during coffee brewing. **Journal Food Process Engineering**, 4, 185-197.
- Wanyo, P., S. Siriamornpun, and N. Meeso. (2011). Improvement of quality and antioxidant properties of dried mulberry leaves with combined far-infrared radiation and air convection in Thai tea process. **Food and Bioproducts Processing**, 89, 22-30

- Williams, W.W., M.E. Cuvelier, and C. Berset. (1995). Use of free radical method to evaluate antioxidant activity. **LWT- Food Science and Technology**, 28, 25-30.
- Wintgens, J. (2004). Factors Influencing the Quality of Green Coffee. In: Wintgens. Edition. **Coffee: Growing, Processing, Sustainable Production**. Alemania, Wiley-VCH. 798-809.
- Zheng, W. and S.Y. Wang. (2001). Antioxidant activity and phenolic compounds in selected herbs. **Journal of Agricultural and Food Chemistry**, 49, 5165-5170.

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