

Supplementary Material

Table S1. Summary of Publications Included in this Study

Source	Latitude	MAT (°C)	Precipitation (mm)	Ecosystem	Extract solution	Standard	Values	Sites
Abrahamson <i>et al.</i> (2003)	27°11'N	22.3	1351	Temperate forest	Acetone	Proanthocyanidin	6	1
Adams <i>et al.</i> (2009)	30°09'N - 44°58'N	4.6 – 20.3	722 - 1347	Temperate forest	Acetone	Purified	316	43
Bryant (2003)	64°51'N	-3.1	1345	Boreal forest	NA	Purified	8	1
Chacon & Armesto (2006)	41°53'S	8.9	2120	Temperate forest	MeOH	Quebracho	8	1
Cooper & Owen-Smith (1985)	24°38'S	19.6	630	Woodland	NA	Sorghum	26	1
Donaldson <i>et al.</i> (2006)	43°03'N	7.3	752	Temperate forest	NA	Purified	21	1
Erwin <i>et al.</i> (2001)	44°17'N	4.1	152	Temperate forest	NA	Purified	1	1
Gartlan <i>et al.</i> (1980)	0°25'N, 3°27'N	20.8 – 26.7	1500 - 3500	Tropical forest	MeOH	Quebracho	93	2
Graglia <i>et al.</i> (2001)	68°21'N, 68°38'N	-9.7 – -1	189 – 304	Subarctic forest	NA	NA	6	2
Greenberg & Bichier (2005)	13°04'N	21.0	873	Tropical forest	MeOH	Purified	4	1
Hattenschwiler <i>et al.</i> (2003)	20°45'N	16.0	2500	Tropical montane forest	MeOH	Purified	4	1
Jackson <i>et al.</i> (1996)	19°15'S, 3°30'N	24.0 – 24.7	806 – 1207	Tropical forest	Acetone	Purified	40	2
Kurokawa & Nakashizuka (2008)	4°12'N	26.0	2428	Tropical lowland forest	MeOH	Cyanidin	37	1
Lill & Marquis (2001)	38°58'N	12.3	820	Temperate forest	NA	Quebracho	8	1
Lin <i>et al.</i> (2006)	24°24'N	20.7	1488	Subtropical mangrove	Acetone	Purified	14	1
Lin <i>et al.</i> (2007)	24°24'N	20.7	1488	Subtropical mangrove	Acetone	Purified	7	1
Nakamura <i>et al.</i> (2008)	42°40'N	7.2	1450	Temperate forest	NA	NA	8	1
Norconk & Conklin-Brittain (2004)	7°46'N	25.6	1100	Tropical forest	NA	Quebracho	4	1
Oates <i>et al.</i> (1980)	8°33'N	23.7	3084	Tropical montane forest	MeOH	Quebracho	16	1
Oates <i>et al.</i> (1990)	7°33'N	27.5	2833	Tropical forest	MeOH	Quebracho	20	1
Scogings <i>et al.</i> (2004)	32°47'S	18.3	617	Savanna	NA	Sorghum	12	1
Simon <i>et al.</i> (2007)	17°22'S	22.0	3584	Tropical forest	MeOH	Catechin	8	1
Stolter <i>et al.</i> (2009)	63°45'N	1.4	590	Boreal forest	MeOH	Quebracho	3	1
Tikkanen & Julkunen-Tiitto (2003)	57°05'N	7.2	927	Secondary mixed forest	NA	Purified	44	1
Ward & Young (2002)	0°15'N	19.0	550	Woody grassland	NA	Quebracho	6	1
Waterman <i>et al.</i> (1984)	3°27'N	26.7	3500	Tropical lowland forest	EtOH	Quebracho	26	1
Yamasaki & Kikuzawa (2003)	35°18'N	11.4	2548	Temperate forest	MeOH	NA	56	1
Zhang <i>et al.</i> (2009)	23°40'N	21.4	1104	Subtropical forest	Acetone	Purified	4	1
Total	Range						Total	
28 studies	41°53'S - 68°38'N	-9.7 – 27.5	152 - 3584				805	72

“Values” and “Sites” indicate the number of values and sites obtained from a study, respectively.

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Table S2. AIC of the Seven Different Model Formulae with Three Linear Models

Model structure	Linear model	Linear mixed model (random~site)	Linear mixed model (random~site, variance~site)
CT ~ MAT	9571.153	9282.524	8537.505
CT ~ Precipitation	9567.815	9294.712	8550.515
CT ~ absLAT	9575.666	9286.598	8541.472
CT ~ MAT + Precipitation	9544.098	9288.145	8543.658
CT ~ MAT + absLAT	9554.189	9277.288	8534.535
CT ~ Precipitation+ absLAT	9559.635	9294.073	8549.149
CT ~ MAT + Precipitation + absLAT	9537.523	9284.287	8541.575

Bold values indicate the lowest AIC within each column. Mean annual temperature, precipitation, and absolute latitude are abbreviated as MAT, Precipitation, and absLAT, respectively.

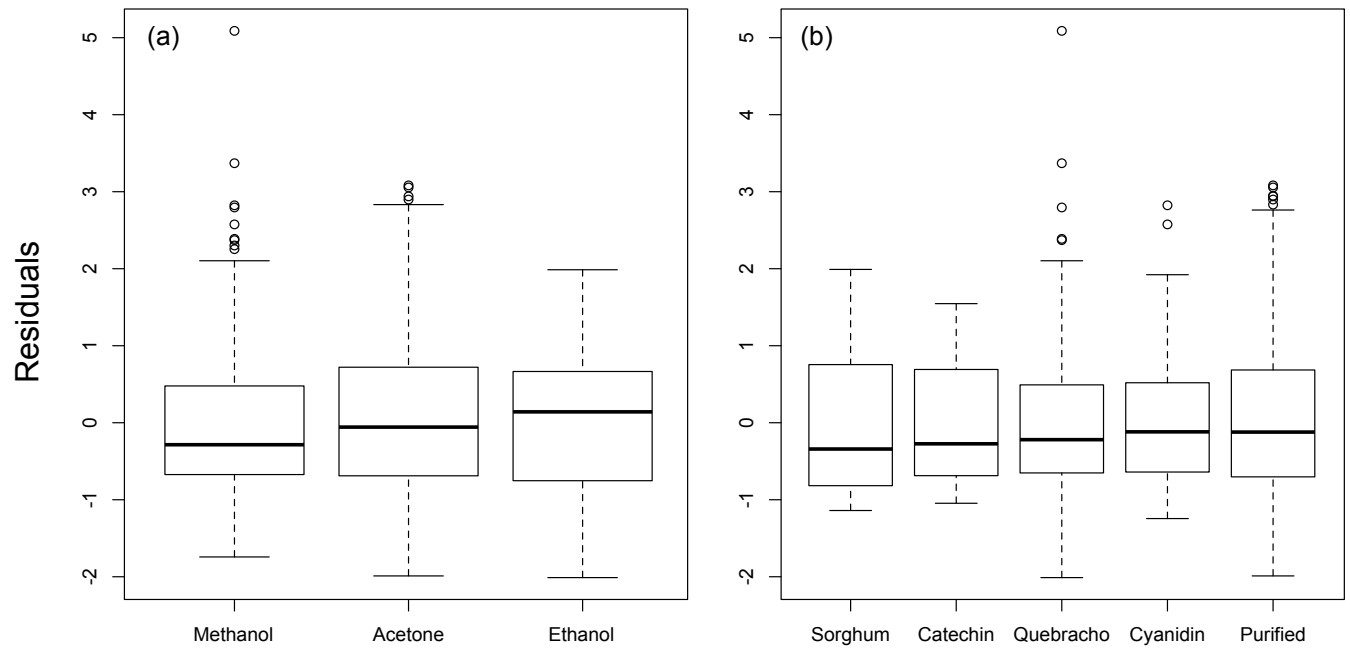


Fig. (S1). Dependence of the extract solution, (a) and standard substances for calibration curve (b) on CT quantification. Effects of the methodologies on CT quantification were considered by taking residuals of the best model (i.e., additive mixed model including mean annual temperature, annual precipitation, and latitude with random effects of study site and random variation). Sorghum tannins, quebracho tannins, cyaniding chloride, and purified tannins are abbreviated as Sorghum, Quebracho, Cyanidin, and Purified.