
Article

Essential Oil Yield, Composition, and Bioactivity of Sagebrush Species in the Bighorn Mountains

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Supplemental tables

Table S1. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. tridentata* Nutt. var. *vaseyana* (Rydb.) Boivin accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT(mins)	Accessions											
		#201	#202	#203	#204	#205	#206	#207	#209	#210	#211	#212	#214
1-Heptene	2.55	-	-	-	0.63	-	-	-	-	-	-	-	-
1-Octene	4.76	-	-	-	0.21	-	-	0.04	-	-	-	-	-
Hexanal	4.96	-	0.03	-	-	-	-	-	-	-	-	-	-
Ethyl isovalerate/Hexanol	6.92	-	-	-	0.02	-	-	-	-	-	-	-	-
1-Nonene	8.30	-	-	-	2.48	-	-	-	-	-	-	-	-
2-Acetylfuran	8.69	-	-	-	-	-	-	0.09	-	-	-	-	-
Santolina triene	8.92	0.10*	0.33	-	-	-	-	2.51	-	0.40	0.18	0.24	2.46
Tricyclene	9.49	0.33	0.31	-	-	-	-	0.42	-	-	0.65	0.64	-
Alpha-thujene	9.69	-	-	-	0.19	-	-	0.08	-	0.14	-	-	-
Alpha-pinene	9.96	2.98	2.92	0.94	2.94	0.04	-	1.62	29.0	35.5	5.27	5.65	1.34
Camphene	10.54	6.55	6.75	0.11	-	0.21	-	8.37	2.89	2.2	13.76	13.58	6.55
Thuja-2,4(10)-diene	10.70	-	-	-	-	-	-	-	0.25	-	-	-	-
4,4-Dimethyl-2-butenolide/Thuja-2,4(10)-diene	10.79	-	-	-	-	-	-	0.05	-	-	-	-	-
Isobutyl butyrate	10.81	-	-	-	0.22	-	-	-	-	-	-	-	-
Sabinene	11.54	0.24	0.17	0.03	12.32	-	-	0.36	0.42	0.42	0.77	0.59	-
Arthole / Beta-pinene	11.68	-	0.67	-	-	-	-	-	-	-	-	-	-
Arthole	11.71	-	-	-	-	-	-	6.91	-	-	-	-	12.97
Beta-pinene	11.72	0.45	-	-	7.23	-	-	-	1.93	2.68	2.34	1.72	-
Dehydro-1,8-cineole	12.21	-	-	-	-	-	-	0.24	0.33	0.27	0.25	0.21	-
1,6-Dimethylhepta-1,3,5-triene	12.25	0.41	-	0.2	-	0.16	0.11	-	-	-	-	-	0.56
Dehydro-1,8-cineole / 1,6-dimethylhepta-1,3,5-triene	12.26	-	0.40	-	-	-	-	-	-	-	-	-	-
Mesitylene	12.32	0.09	-	-	-	-	-	0.06	-	-	-	-	-
Myrcene	12.36	-	-	-	7.46	-	-	-	-	-	-	-	-
Delta-3-carene	12.44	-	0.03	-	-	-	-	-	-	-	-	-	-
Butyl butanoate	12.45	-	-	-	0.12	-	-	-	-	-	-	-	-
Yomogi alcohol	12.54	0.09	0.09	0.10	-	0.13	0.20	0.08	0.22	-	-	-	0.17
Alpha-phellendrene	12.76	-	-	-	16.86	-	-	0.11	-	-	-	-	-
Ortho-methylanisole	13.05	-	-	-	0.06	-	-	-	-	-	-	-	-
Hexyl acetate	13.09	0.04	-	-	-	-	-	-	-	-	-	-	-
Alpha-terpinene	13.23	0.07	0.08	-	0.46	-	-	0.24	0.37	0.41	0.31	0.21	-
1,2,4-Trimethyl benzene	13.46	0.06	-	-	-	-	-	-	-	-	-	-	-
Para-cymene	13.52	0.12	0.09	0.06	31.83	-	-	0.54	0.54	0.53	0.47	0.51	0.37
Limonene	13.71	0.19	0.31	0.04	3.30	0.18	-	-	-	-	-	-	-
Eucalyptol	13.81	1.23	2.35	0.75	-	0.20	-	14.81	12.27	12.82	17.94	14.14	9.72
Cis-ocimene	14.13	-	-	-	0.10	-	-	-	-	-	-	-	-
Sorbyl acetate	14.15	0.10	0.08	0.09	-	0.09	0.05	-	-	-	-	-	-

Table S1 Continued. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. tridentata* Nutt. var. *vaseyana* (Rydb.) Boivin accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT(mins)	Accessions											
		#201	#202	#203	#204	#205	#206	#207	#209	#210	#211	#212	#214
Trans-ocimene	14.55	-	-	-	0.94	-	-	-	3.05	2.30	-	-	-
Cis-arbusculone	14.63	-	0.04	-	-	-	-	0.08	-	-	-	-	0.18
Santolina epoxide	14.70	-	-	-	-	-	-	0.29	-	-	-	-	-
Pentyl isobutanoate	14.90	-	-	-	0.16	-	-	-	-	-	-	-	-
Isoterpinolene / Isoterpinene	14.91	0.13	0.18	-	-	-	-	-	-	-	-	-	-
Gamma-terpinene	14.92	-	-	-	-	-	-	1.34	0.72	1.01	0.67	0.51	1.02
Isopentyl butanoate/ Gamma-terpinene	14.97	-	-	-	0.87	-	-	-	-	-	-	-	-
Bergamal	15.01	-	-	-	-	-	-	-	-	-	-	-	-
Cis-sabinene hydrate	15.26	-	-	-	-	-	-	-	0.19	0.30	-	-	0.22
Trans-arbusculone	15.44	-	0.06	-	-	-	-	-	2.00	1.71	-	-	0.89
Artemisia alcohol	15.87	-	-	-	-	-	-	-	0.16	-	-	-	0.20
Terpinolene	16.06	-	-	-	0.50	-	-	0.20	0.24	0.26	0.15	0.08	-
2,6-xylenol / Alpha-pinene oxide	16.43	-	-	-	-	-	-	-	-	-	-	-	-
Alpha pinene oxide / 2,6-Xylenol	16.43	-	-	-	-	-	-	0.13	-	-	-	-	-
Linalool / Ipsenol	16.49	-	-	-	0.22	-	-	-	-	-	-	-	-
Nonanal	16.63	-	-	-	0.16	-	-	-	-	-	-	-	0.24
Cis-thujone	16.71	0.39	0.16	0.09	0.05	-	-	-	-	-	4.26	7.50	-
2,6-xylenol / Benzyl ethanol	16.90	0.12	0.06	-	-	-	-	-	-	-	-	-	-
Trans-thujone	17.10	-	-	-	0.05	-	-	-	-	-	0.35	0.57	-
Chrysanthenone	17.23	17.97	1.21	-	-	-	-	11.86	1.54	0.39	2.29	1.37	0.17
Methyl octanoate	17.39	-	-	-	0.14	-	-	-	-	-	-	-	-
Alpha-campholenal	17.50	-	-	-	0.04	-	-	-	-	-	-	-	0.40
Cis-para-mentha-2,8-dien-1-ol	17.72	-	-	-	-	-	-	-	-	-	0.17	0.24	-
1-terpineol	17.79	-	0.10	-	-	-	-	-	-	-	-	-	-
Trans-pinocarveol	18.00	-	5.79	0.08	0.06	-	-	-	24.82	20.94	-	-	0.24
Camphor	18.21	24.91	23.43	0.28	-	0.43	-	29.32	1.76	0.58	44.85	45.37	13.51
Alpha-santoline alcohol	18.28	-	-	-	-	-	-	9.72	-	-	-	-	3.71
Isobutyl hexanoate	18.36	-	-	-	0.19	-	-	-	-	-	-	-	-
Trans-chrysanthemol	18.85	3.83	3.67	2.52	-	3.96	4.48	-	-	-	-	-	-
Chrysanthemyl alcohol	18.91	-	-	-	-	-	-	0.76	-	-	-	-	11.37
Pinocarvone	18.91	-	0.83	0.25	-	-	-	0.62	5.33	6.90	1.03	1.24	8.07
Borneol / lavandulol	19.05	1.35	1.11	-	-	0.22	-	-	-	-	1.85	1.93	-
Borneol	19.10	-	-	-	-	-	-	2.03	0.44	0.28	-	-	1.55
Atremisyl acetate	19.21	-	-	-	-	-	-	-	-	-	-	-	-
(3E,5Z)-1.3.5-undecatriene	19.24	-	-	-	0.24	-	-	-	-	-	-	-	-
Artemisyl acetate	19.31	-	-	-	-	-	-	-	2.88	-	-	-	-
Hexyl butanoate	19.88	-	-	-	0.24	-	-	-	-	-	-	-	-
Alpha-terpineol	19.98	-	-	-	-	-	-	-	-	-	0.25	0.10	-
Myrtenal / Methyl chavicol	20.15	-	-	-	0.24	-	-	-	-	-	-	-	-

Table S1 Continued. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. tridentata* Nutt. var. *vaseyana* (Rydb.) Boivin accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT(mins)	Accessions											
		#201	#202	#203	#204	#205	#206	#207	#209	#210	#211	#212	#214
Myrtenal / Myrtenol	20.19	-	-	-	-	-	-	-	-	-	-	-	0.80
Cis-dihydrocarvone/Myrtenol/Myrtenal	20.20	-	-	-	-	-	-	0.61	-	-	-	-	-
Myrtenal	20.21	-	-	-	-	-	-	-	-	-	0.71	0.66	-
Myrtenol	20.23	-	-	-	-	-	-	-	1.22	1.24	-	-	-
Decanal	20.37	-	-	-	0.30	-	-	-	-	-	-	-	-
Bornyl acetate	20.39	-	-	-	-	-	-	0.49	-	-	0.44	0.39	0.33
Fragranol	21.01	7.48	12.37	20.29	-	14.88	15.00	-	-	-	-	-	-
Trans-ethyl-chrysanthemumate / Trans-alpha-necrodol-acetate	23.33	10.24	13.48	25.91	-	34.78	45.15	-	-	-	-	-	8.17
Isobornyl acetate	23.61	-	-	0.59	-	-	-	-	-	-	-	-	-
Lavandulyl acetate	23.65	0.39	-	0.27	-	0.27	0.91	-	-	-	-	-	0.21
Trans-pinocaryyl acetate	23.81	-	-	-	-	-	-	-	0.26	0.27	-	-	-
3-thujanol acetate / Cis-alpha-necrodol acetate	24.22	-	-	-	-	0.25	-	-	-	-	-	-	-
Grandisol	25.14	8.78	17.64	36.18	-	31.08	26.18	-	-	-	-	-	-
Alpha-cubebene	25.77	-	-	-	-	-	-	-	-	-	-	-	-
Beta-elemene	26.08	-	-	-	0.38	-	-	-	-	-	-	-	-
Piperitenone / Citronellyl acetate	26.35	5.74	4.59	4.43	-	4.75	3.2	-	-	-	-	-	6.60
Beta-caryophyllene	26.64	0.53	0.74	-	1.27	0.98	0.48	-	0.34	0.27	-	-	0.42
Linalool isovalerate	26.96	0.82	0.85	2.64	-	2.37	0.85	-	-	-	-	-	-
2-phenyl-ethyl butanoate	26.97	-	-	-	0.44	-	-	-	-	-	-	-	-
Cis-beta-farnesene	27.20	-	-	-	0.35	-	-	-	-	-	-	-	-
Gamma-curcumene	27.64	0.38	0.74	0.81	-	0.64	0.55	-	0.39	0.36	-	-	-
Curcumene ar / Germacrene D	27.73	1.04	0.96	0.74	-	0.53	0.24	-	-	-	-	-	-
Germacrene D	27.78	-	-	-	1.06	-	-	-	0.75	0.76	-	-	0.54
Davana ether isomer	27.81	-	-	-	-	-	-	-	1.14	1.73	-	-	-
Beta-selinene	27.87	-	-	-	0.11	-	-	-	-	-	-	-	-
Bicyclogermacrene	28.03	-	-	-	-	-	-	-	0.26	-	-	-	-
Germacrene A	28.03	-	-	-	0.38	-	-	-	-	-	-	-	-
Delta-cadinene	28.39	-	-	-	0.48	-	-	-	-	-	-	-	-
Cis-3-hexenyl benzoate	29.04	-	-	-	0.50	-	-	-	-	-	-	-	-
Trans-2-hexenyl benzoate	29.21	-	-	-	0.43	-	-	-	-	-	-	-	-
Caryophyllene oxide	29.36	-	-	-	-	-	-	-	-	-	-	-	-
Davanone B	29.54	-	-	-	-	-	-	-	0.43	0.41	-	-	-
Davanone	29.61	-	-	-	-	-	-	-	0.65	0.62	-	-	-
Beta-oplophenone	29.68	-	-	-	0.36	-	-	-	-	-	-	-	-
Davanol D1 isomer	29.95	-	-	-	-	-	-	-	0.77	0.61	-	-	-
Davanol D2 isomer	30.48	-	-	-	-	-	-	-	0.27	0.26	-	-	-
Anthracene-1,2,3,4,5,6,7,8-octahydro-9,10-dimethyl	32.04	-	-	-	0.96	-	-	-	-	-	-	-	-

Pyran-5-one(2,2-dimethyl-7-isobutyl-2H,5H-pyrano(4,3-b)-)	32.95	-	-	-	-	0.28	-	-	-	-	-	-	-
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Table S2. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. tridentata* Nutt. var. *tridentata* accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT (mins)	Accessions	
		#221	#222
Santolina triene	8.95	1.68	-
Tricyclene	9.50	0.51	1.02
Alpha-pinene	10.02	3.23	4.32
Camphene	10.68	10.48	21.54
Sabinene	11.56	0.40	0.62
Arthole	11.70	3.84	-
Beta-pinene	11.73	-	2.21
Dehydro-1,8-cineole	12.22	0.30	0.25
Alpha-terpinene	13.25	0.19	0.33
Para-cymene	13.58	0.38	0.25
Limonene	13.71	-	0.37
Eucalyptol	13.99	13.62	21.18
Cis-arbusculone	14.64	0.25	-
Gamma-terpinene	14.92	0.53	0.67
Artemisia ketone	14.99	0.52	-
Cis-sabinene hydrate	15.25	0.39	0.26
Cis-thujone	16.77	0.77	-
Chrysanthenone	17.53	11.27	1.11
Trans-pinocarveol	17.70	-	0.18
Camphor	18.57	43.15	41.33
Chrysanthemyl alcohol	18.89	0.33	-
Pinocarvone	19.04	1.13	0.97
Borneol	19.16	1.97	0.93
4-terpineol	19.53	0.81	0.92
Alpha-terpineol	19.97	0.23	-
Myrtenal / Myrtenol	20.21	0.59	0.78
Bornyl acetate	23.38	0.47	-
Beta -caryophyllene	26.69	0.54	0.38
Gamma-curcumene	27.64	0.37	-
Germacrene D	27.77	0.33	-

Table S3. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation *A. tridentata* Nutt. var. *wyomingensis* (Beetle & Young) Welsh accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT (mins)	Accession	Range
		#223	
2-acetylfuran	8.71	3.23	0.48-3.23
Santolina triene	8.96	6.02	4.53-6.02
Tricyclene	9.50	3.39	0.33-3.39
Alpha-pinene	9.97	4.04	1.06-4.04
Camphene	10.63	7.98	6.64-7.98
5,5-dimethylfuran-2-one	10.77	3.93	0.50-3.93
Arthole	11.82	17.36	17.36-20.15
Yomogi alcohol	12.62	4.50	0.44-4.50
Para-cymene	13.59	4.98	0.68-4.98
Eucalyptol	13.97	12.99	12.41-12.99
Cis-arbusculone	14.67	5.58	1.01-5.58
Gamma-terpinene	14.93	5.43	0.67-5.43
Trans-arbusculone	15.51	8.55	5.06-8.55
Chrysanthenone	17.23	6.42	1.01-6.42
Alpha-santoline alcohol	18.34	14.81	13.01-14.81
Camphor	18.43	20.55	20.55-21.67
Chrysanthemyl alcohol	18.89	7.05	1.13-7.05
Borneol	19.16	7.19	1.20-7.19

Table S4. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. cana* Pursh var. *cana* accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT (mins)	Accessions	
		#219	#220
Santolina triene	8.96	3.54	3.69
Tricyclene	9.50	0.41	0.39
Alpha-pinene	10.01	2.72	3.18
Camphene	10.64	7.37	6.55
Arthole	11.76	9.03	6.24
Dehydro-1,8-cineole	12.23	0.17	0.21
Yomogi alcohol	12.75	-	0.18
Alpha-terpinene	13.27	0.33	0.48
Para-cymene	13.61	0.63	0.72
Limonene	13.66	0.27	0.85
Eucalyptol	14.11	15.26	20.53
Santonia epoxide	14.73	0.67	0.62
Gamma-terpinene	14.97	1.77	1.66
Cis-sabinene hydrate	15.26	0.35	0.40
Artemisia alcohol	15.90	0.20	0.20
Terpinolene	16.08	-	0.22
Trans-sabinene hydrate	16.57	0.19	0.24
Chrysanthenone	17.28	0.37	-
Alpha-campholenal	17.59	0.31	0.50
Alpha-santoline alcohol	18.34	11.33	4.78

Camphor	18.48	35.25	40.59
Chrysanthemyl alcohol	18.95	0.76	0.60
Pinocarvone	19.00	0.64	0.60
Borneol	19.18	2.34	2.64
4-terpineol	19.58	1.47	2.13
Alpha-terpineol	20.02	0.44	0.86
Myrtenal / Myrtenol	20.21	0.55	0.45
Bornyl acetate	23.39	0.45	0.45

Table S5. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. longifolia* Nutt. accessions biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT (mins)	Accessions		
		#216	#217	#218
Santolina triene	8.96	2.66	6.79	3.10
Tricyclene	9.50	0.34	0.36	0.37
Alpha-pinene	10.01	2.78	2.82	3.23
Camphene	10.64	5.82	7.01	6.86
Arthole	11.76	9.7	6.76	3.22
Dehydro-1,8-cineole	12.23	0.24	0.36	0.33
Yomogi alcohol	12.75	0.25	0.19	-
Alpha-terpinene	13.27	0.58	0.32	0.47
Para-cymene	13.61	0.35	0.92	0.52
Limonene	13.66	0.51	1.33	0.80
Eucalyptol	14.11	30.79	24.57	25.48
Santonia epoxide	14.73	0.65	1.22	0.38
Gamma-terpinene	14.97	1.54	2.55	1.49
Cis-sabinene hydrate	15.26	0.18	0.28	0.60
Artemisia alcohol	15.90	0.22	0.17	0.14
Terpinolene	16.08	0.25	-	0.22
Trans-sabinene hydrate	16.57	0.22	0.33	-
Chrysanthenone	17.28	0.42	0.25	-
Alpha-campholenal	17.59	0.46	0.43	0.37
Alpha-santoline alcohol	18.34	7.60	6.05	-
Camphor	18.48	24.18	27.67	43.36
Chrysanthemyl alcohol	18.95	1.03	0.40	0.26
Pinocarvone	19.00	0.43	0.33	0.89
Borneol	19.18	2.29	2.42	2.44
4-terpineol	19.58	2.55	1.72	2.17
Alpha-terpineol	20.02	0.96	0.80	0.75
Myrtenal / Myrtenol	20.21	0.52	0.46	0.51
Bornyl acetate	23.39	0.42	0.64	0.39
Germacrene D	27.76	-	0.33	-
Davana ether isomer	28.12	-	0.33	-

Table S6. Mean (using n = 3) content (%) of constituents in essential oil obtained by steam distillation of *A. ludoviciana* Nutt. *ssp. ludoviciana* accession biomass collected from Bighorn Mountains in Wyoming.

Constituent	RT (mins)	Accession #213
Santolina triene	8.96	2.16
Tricyclene	9.51	0.68
Alpha-pinene	10.07	1.89
Camphene	10.72	13.3
Sabinene	11.56	0.57
Beta-pinene	11.71	1.43
1-octen-3-ol	11.83	0.15
Dehydro-1,8-cineole	12.21	0.20
Alpha-terpinene	13.26	0.42
Para-cymene	13.68	0.71
Eucalyptol	14.04	17.93
Gamma-terpinene	14.94	0.81
Artemisia ketone	15.02	1.27
Cis-sabinene hydrate	15.28	0.80
Atemisia alcohol	15.88	0.23
Terpinolene	16.07	0.19
Trans-sabinene hydrate	16.51	0.47
Linalool	16.63	0.19
Chrysanthenone / Alpha-campholenal	17.54	0.28
Camphor	18.60	46.18
Pinocarvone	19.02	0.45
Cis-chrysanthemol	19.10	0.71
Borneol	19.24	4.55
4-terpineol	19.57	1.29
Alpha-terpineol	19.99	0.44
Myrtenal	20.21	0.50
Verbenone	20.66	0.21
Cis-carveol	21.36	0.23
Bornyl acetate	23.38	0.29
Artedouglasia oxide C	28.37	0.38
Artedouglasia oxide A	28.55	0.49
Artedouglasia oxide D	29.22	0.25
Artedouglasia oxide B	30.08	0.19

Table S7. Mean (using n = 3) content (%) of constituents in essential oil obtained by hydrodistillation of *A. tridentata* var. *vaseyana* accessions biomass (leaves) collected from Bighorn Mountains in Wyoming.

Constituent (in essential oil obtained from leaves)	RT (mins)	Accessions		
		#259	#261	#262
Santolina triene	6.67	6.08	2.18	-
Tricyclene	7.10	-	0.46	-
Alpha-pinene	7.53	0.42	2.27	-
Camphene	8.06	3.30	12.27	-
Beta-pinene	9.08	-	1.07	-
Atemiseole	9.13	-	13.82	-
Artemiseole	9.26	42.75	-	-
Yomogi alcohol	10.02	0.57	0.18	0.35
Ortho-cymene / Para-cymene	10.85	-	0.54	-
Eucalyptol	11.11	-	6.77	-
4,8-dimethyl-trans-nona-1,3,7-triene	11.15	1.23	-	-
Santolina alcohol	11.17	0.26	0.36	-
Santolina epoxide	11.81	0.11	-	-
Unknown 1	13.96	4.12	-	-
Chrysanthenone	14.14	-	1.52	-
Alpa-santoline alcohol	14.70	3.34	-	-
Camphor	14.79	15.54	-	-
Unknown 2	14.89	3.23	-	-
Camphor	14.95	-	53.62	-
Borneol	15.33	-	0.93	-
Trans-chrysanthemol	15.34	-	-	3.27
Pinocarvone	15.73	-	1.46	-
Unknown 3	15.78	2.37	-	-
4-terpineol	15.82	-	1.57	-
Myrtenol / Myrtenal	16.33	-	0.78	-
Fragranol	17.16	-	-	25.5
Unknown 4	17.82	1.50	-	-
Unknown 5	18.07	1.45	-	-
Unknown 6	18.17	2.20	-	-
Bornyl acetate	18.89	-	0.60	-
Trans-alpha-necrodol acetate	18.89	-	-	9.99
Cyclooctadiene	20.47	-	-	38.32
Unknown 7	21.61	-	-	9.22
Unknown 8	21.82	-	-	3.67
Intermedeol	25.32	2.73	-	-
Unknown 9	27.88	-	-	4.96
Unknown 10	27.89	5.05	-	-
Unknown 11	28.32	-	-	3.64
Unknown 12	28.33	4.74	-	-
Chrysanthenone/Alpha-campholenal	-	-	0.58	-

Table S8. Mean (using n = 3) content (%) of constituents in essential oil obtained by hydrodistillation of *A. tri-dentata* var. *wyomingensis* accessions biomass (leaves or inflorescences) collected from Bighorn Mountains in Wyoming.

Constituents (in essential oil obtained from leaves)	RT (mins)	Accessions	
		#251	#260
Cis-salveve	4.73	-	0.31
Santolina triene	6.68	9.64	-
Alpha-pinene	7.53	0.54	0.24
Camphene	8.06	2.39	2.82
5,5-dimethyl-2(5H)-furanone	8.23	0.22	-
Sabinene	8.98	-	0.35
Artemiseole / Beta-pinene	9.11	-	0.20
Artemiseole	9.24	32.59	-
Yomogi alcohol	10.06	0.71	-
Ortho-cymene / Para-cymene	10.79	-	0.33
Para-cymene	10.82	0.82	-
Eucalyptol	10.99	10.75	1.53
4,8-dimethyl-trans-nona-1,3,7-triene	11.19	2.33	-
Santolina alcohol	11.27	0.37	-
Santolina epoxide	11.83	0.24	-
Unknown 1 isomer A	12.07	1.79	-
Unknown 1 isomer B	12.49	3.40	-
Unknown 2 isomer A	12.61	1.36	-
Unknown 2 isomer B	12.69	1.24	-
Cis-thujone	13.84	-	71.00
Trans-thujone	14.09	-	4.54
Methyl -santolate	14.76	8.64	-
Camphor	14.84	11.03	17.17
Borneol	15.31	0.94	0.58
Pinocarvone	15.69	-	0.52
4-terpineol	15.77	1.24	0.77
Unknown 3	17.54	0.36	-
Unknown 4 isomer A	17.83	1.65	-
Unknown 4 isomer B	18.08	1.26	-
Unknown 5	18.58	1.34	-
Constituents (in essential oil obtained from inflorescences)			
Santolina triene	6.68	7.29	-
Tricyclene	7.10	0.09	-
Alpha-pinene	7.54	0.55	-
Camphene	8.08	3.24	-
5,5-dimethyl-2(5H)-furanone	8.23	0.22	-
Artemiseole	9.24	26.34	-
Yomogi alcohol	10.06	0.68	-
Para-cymene	10.82	0.74	-
Eucalyptol	11.08	14.01	-
4,8-dimethyl-trans-nona-1,3,7-triene	11.19	2.47	-
Santolina alcohol	11.27	0.28	-
Santolina epoxide	11.83	0.26	-
Gamma-terpinene	11.98	0.26	-
Unknown 1 isomer A	12.07	2.92	-
Unknown 1 isomer B	12.49	5.89	-

Unknown 2 isomer A	12.61	0.80	-
Unknown 2 isomer B	12.69	0.90	-
Chrysanthenone	14.13	0.33	-
Methyl -santolinate	14.76	10.13	-
Camphor	14.85	13.70	-
Borneol	15.31	0.78	-
4-terpineol	15.79	1.59	-
Unknown 3	16.52	1.20	-
Unknown 4	17.54	0.81	-
Unknown 5 isomer A	17.83	1.27	-
Unknown 5 isomer B	18.08	0.33	-
Unknown 6	18.58	0.93	-

Table S9. Mean (using n = 3) content (%) of constituents in essential oil obtained by hydrodistillation of *A. cana* var. *cana* accessions biomass (leaves or inflorescences) collected from Bighorn Mountains in Wyoming.

Constituents (in essential oil obtained from leaves)	RT (mins)	Accessions						
		#252	#253	#254	#255	#256	#257	#258
Santolina triene	6.67	2.20	0.48	-	1.61	2.76	4.65	-
Tricyclene	7.10	0.35	2.95	0.39	0.28	0.32	0.35	0.43
Alpha-pinene	7.55	2.07	-	2.48	2.47	3.12	2.28	3.30
Camphene	8.10	7.48	0.92	7.66	6.92	6.74	5.48	11.34
Sabinene	8.98	-	16.23	0.18	-	-	-	-
Beta-pinene	9.08	1.32	-	2.00	1.35	1.83	1.23	2.07
Atemiseole	9.13	5.39	1.30	-	4.19	3.97	9.83	-
Yomogi alcohol	10.07	0.32	5.05	-	0.23	0.56	0.42	-
Alpha-phellandrene	10.08	-	17.11	0.39	-	-	-	-
Alpha-terpinene	10.51	-	-	0.31	-	0.22	-	0.29
Ortho-cymene / Para-cymene	10.85	2.16	31.20	4.85	2.00	2.77	2.44	4.04
Eucalyptol	11.11	30.47	0.63	20.64	25.37	22.26	25.45	24.32
Santolina alcohol	11.17	0.32	9.03	-	-	0.20	0.66	-
Trans-ocimene	11.65	-	2.48	-	-	-	-	-
Santolina epoxide	11.82	0.42	0.18	-	0.21	0.44	0.42	-
Prenyl isobutanoate	11.92	-	0.33	-	-	-	-	-
Gamma-terpinene	11.98	0.50	5.83	0.68	0.33	0.64	0.35	0.67
Alpha-campholenal	13.96	-	0.23	-	0.30	-	-	0.65
Chrysanthenone	14.14	-	-	0.47	-	-	-	-
Camphor	14.95	40.57	-	48.55	47.64	45.16	37.16	42.95
Borneol	15.33	1.32	-	1.59	0.98	1.01	1.19	1.50
Pinocarvone	15.73	-	-	2.04	0.60	2.09	2.33	1.67
4-terpineol	15.82	3.22	-	2.63	2.89	3.25	3.30	3.09
Alpha-terpineol	16.22	-	-	0.79	0.76	0.99	0.92	-
Myrtenol / Myrtenal	16.33	0.76	-	0.85	-	0.66	-	0.77
Bornyl acetate	18.89	-	0.68	2.18	0.80	0.98	0.73	2.97
Alpha-terpinyl acetate	20.43	-	-	-	-	-	-	-
Chrysanthenone/Alpha-campholenal	-	0.67	0.35	1.53	0.60	-	0.63	-
Constituents (in essential oil obtained from inflorescences)								
Santolina triene	6.67	2.21	0.41	-	1.43	3.10	9.05	-
Tricyclene	7.10	0.39	2.56	0.49	0.38	0.38	0.30	0.61
Alpha-pinene	7.55	1.71	-	3.03	3.39	3.04	2.75	5.37

Camphene	8.10	8.46	0.87	9.72	8.17	8.31	6.19	14.68
Sabinene	8.98	-	15.84	0.18	-	0.18	-	0.24
Beta-pinene	9.08	1.02	-	2.13	1.58	1.63	1.31	2.88
Atemiseole	9.13	7.53	1.11	-	3.11	4.14	8.48	-
Yomogi alcohol	10.07	0.27	5.25	-	0.28	0.24	0.39	-
Alpha-phellandrene	10.08	-	16.28	0.99	-	-	-	-
Alpha-terpinene	10.51	-	-	0.26	-	-	-	0.25
Ortho-cymene / Para-cymene	10.85	2.33	28.39	6.35	1.90	3.32	2.01	4.57
Eucalyptol	11.11	29.79	-	21.67	23.56	21.4	24.66	21.02
Santolina alcohol	11.17	0.35	8.72	-	-	0.27	0.57	-
Trans-ocimene	11.65	-	3.60	-	-	-	-	-
Santolina epoxide	11.82	0.84	0.20	-	0.47	0.24	0.73	-
Prenyl isobutanoate	11.92	-	0.88	-	-	-	0.16	-
Gamma-terpinene	11.98	1.00	10.90	0.77	0.53	0.52	0.88	0.89
Alpha-campholenal	13.96	-	0.25	-	-	-	-	-
Chrysanthenone	14.14	-	1.20	0.42	0.26	0.36	-	-
Camphor	14.95	38.7	-	45.36	47.76	43.68	36.13	40.49
Borneol	15.33	1.18	-	1.20	0.89	0.94	0.74	1.09
Pinocarvone	15.73	0.86	-	1.19	-	1.35	1.58	1.57
4-terpineol	15.82	2.58	-	2.13	3.06	2.84	2.99	2.54
Alpha-terpineol	16.22	-	-	0.67	0.85	0.91	0.86	-
Myrtenol / Myrtenal	16.33	0.77	-	0.62	0.59	0.67	-	0.58
Bornyl acetate	18.89	-	0.80	1.25	0.79	0.85	-	3.20
Alpha-terpinyl acetate	20.43	-	-	-	-	1.16	-	-
Chrysanthenone/Alpha-campholenal		-	0.38	0.87	0.64	0.59	-	-

Table S10. Mean (using n = 3) content (%) and range of EO obtained by hydrodistillation for accessions from Bighorn Mountains in Wyoming in the Fall of 2014.

Species	Accession	Leaves		Inflorescences	
		Mean	Range	Mean	Range
<i>Artemisia</i> spp.	250	0.79	0.69 - 0.90	1.08	1.00 - 1.14
<i>A. tridentata</i> var. <i>wyomingensis</i>	251	0.71	0.53 - 1.06	1.15	1.06 - 1.22
<i>A. cana</i> var. <i>cana</i>	252	0.49	0.45 - 0.52	0.56	0.43 - 0.64
<i>A. cana</i> var. <i>cana</i>	253	0.51	0.48 - 0.58	0.28	0.17 - 0.34
<i>A. cana</i> var. <i>cana</i>	254	0.08	0.04 - 0.11	0.30	0.28 - 0.34
<i>A. cana</i> var. <i>cana</i>	255	0.63	0.59 - 0.67	0.86	0.73 - 1.00
<i>A. cana</i> var. <i>cana</i>	256	0.90	0.81 - 0.96	0.96	0.84 - 1.10
<i>A. cana</i> var. <i>cana</i>	257	0.50	0.42 - 0.60	0.91	0.77 - 1.02
<i>A. cana</i> var. <i>cana</i>	258	0.15	0.13 - 0.17	0.40	0.30 - 0.53
<i>A. tridentata</i> var. <i>vaseyana</i>	259	0.16	0.12 - 0.18	-	-
<i>A. tridentata</i> var. <i>wyomingensis</i>	260	1.06	1.00 - 1.16	-	-
<i>A. tridentata</i> var. <i>vaseyana</i>	261	0.31	0.24 - 0.36	-	-
<i>A. tridentata</i> var. <i>vaseyana</i>	262	0.22	0.06 - 0.42	-	-

Table S11. Evaluation of select essential oils against *Leishmania donovani* and *Plasmodium falciparum* D6. Data is percent inhibition. Primary evaluations performed at 80 ug/mL for *L. donovani* and 15,867 ng/mL for *P. falciparum* D6.

Species	<i>L. donovani</i>	<i>P. falciparum</i> D6
<i>A. cana</i> var. <i>cana</i>	0	0
<i>A. longifolia</i>	0	34
<i>A. tridentata</i> var. <i>tridentata</i>	3	0
<i>A. tridentata</i> var. <i>vaseyana</i>	4	16
<i>A. tridentata</i> var. <i>wyomingensis</i>	13	14

Table S12. Evaluation of select essential oils against opportunistic infection pathogens. Primary evaluations performed at 50 ug/mL and data is percent inhibition.

Species	<i>Aspergillus fumigatus</i>	<i>Candida albicans</i>	<i>Candida glabrata</i>	<i>Candida krusei</i>	<i>Cryptococcus neoformans</i>	<i>E. coli</i>	<i>M. intracellulare</i>	MRS	<i>Pseudomonas aeruginosa</i>	<i>Staphylococcus aureus</i>
<i>A. cana</i> var. <i>cana</i>	8	0	6	1	13	2	0	3	2	4
<i>A. longifolia</i>	9	0	5	0	9	2	0	1	0	1
<i>A. tridentata</i> var. <i>tridentata</i>	11	0	6	3	18	2	0	3	4	5
<i>A. tridentata</i> var. <i>vaseyana</i>	4	0	3	2	4	0	4	0	3	0
<i>A. tridentata</i> var. <i>wyomingensis</i>	12	0	5	8	21	3	0	0	6	7