

A Preliminary Report on the World Production of Some Selected Essential Oils and Countries

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Examination of the published literature reveals that data on the world production of essential oils is scarce and in some cases non-existent. In 1974, and again in 1986, reports on the market and production levels of oils and oleoresins were published by UNTAD/GATT.^{1,2} Lawrence reported on the commercial production of essential oils in the United States other than citrus oils.³ Lawrence published a survey on the world production of essential oils for the year 1984.⁴ Verlet also surveyed the production of oils worldwide, much of which supported the earlier published data.⁵⁻⁷ The data contained in this article was originally presented at a one-day meeting organized by Società Italiana delle Scienze e delle Tecniche Erboristiche (S.I.S.T.E.) on Sept. 12, 2008, in Bologna, Italy.

Argentinean Essential Oil Production (tonnes)

	Tonnes		kg
Lemon	5,500	Origanum*	500
Orange	200	<i>Pinus ponderosa</i>	500
Grapefruit	120	Coriander	300
Citronella	120	Laurel	300
Bergamot	10	Rosemary	200
Peppermint	10	Fennel (bitter)	100
Cornmint	10	Lemon verbena	50–100
Eucalyptus	5	Sage	50–100
Lavandin	2	Blue Chamomile	50–100
Lemongrass	1		
Tagetes	1		

*Three or four *Origanum* species or hybrids used for oil production

Top 20 Essential Oils: Approximate Volumes for 2007 (tonnes)

1. Orange	51,000
2. Cornmint	32,000
3. Lemon	9,200
4. Eucalyptus	4,000
5. Peppermint	3,300
6. Citronella	1,800
7. Clove leaf	1,800
8. Chinese sassafras	1,800
9. Lime distilled	1,800
10. Lavandin	1,300
11. Patchouli	1,200
12. Scotch spearmint	1,040
13. <i>Eucalyptus citriodora</i>	1,000
14. Chinese cedarwood	800
15. <i>Litsea cubeba</i>	760
16. Native spearmint	750
17. Texas cedarwood	550
18. Star anise	500
19. Mandarin	460
20. Virginia cedarwood	300

Australian Essential Oil and Concrete Production (tonnes)

Tea tree	540	Parsley herb	4	<i>Eucalyptus staigeriana</i>	0.1
<i>Eucalyptus polybractea</i>	110	<i>Eucalyptus olida</i>	4	Niaouli (linalool-type)	0.1
<i>Eucalyptus radiata</i>	30	Dillweed	2	Niaouli (nerolidol-type)	0.1
Orange	25	Lemon	2	Rosemary	0.05
Fennel (sweet)	15	Parsley seed	1		
Australian sandalwood	14	Tasmanian mountain pepper	1		
<i>Eucalyptus dives</i>	8	Lavender	1	Black currant bud concrete	100 kg
Peppermint	6	Mandarin	0.5	Boronia concrete	100 kg

Less Common Australian Essential Oils

Leptospermum petersoni F.M. Bailey (lemon-scented tea tree)

1,000 kg

Composition: geranial (45%), neral (31%)

Agonis fragrans J.R. Wheeler and N.G. Merchant (fragonia oil)

500 kg

Composition: 1,8-cineole (12.4–25.7%), α -pinene (11.6–18.0%), linalool (1.7–13.1%)

Kunzea ambigua (Smith) Druce. (*Kunzea ambigua* oil)

500 kg

Composition: α -pinene (40%), 1,8-cineole (16%), globulol (12%), viridiflorol (9%)

Backhousia citriodora F. Muell. (lemon myrtle oil)

200 kg

Composition: geranial (44–48%), neral (37–39%)

Brazilian Essential Oil Production (tonnes)

Orange	34,000	Cabreuva	10
<i>Eucalyptus citriodora</i>	500	Orange petitgrain	10
Persian lime	200	<i>Eucalyptus staigeriana</i>	5
Brazilian sassafras	50	Palmarosa	5
Copaiba balsam	50	Lemongrass	3
Eucalyptus	45	Ylang ylang	2
Bitter orange	40	Caboré	0.5
Mandarin	40	Carqueja	0.2
Lime distilled	40	<i>Cedrela odorata</i>	0.2
Citronella	30	Ayou	0.2
Bois-de-rose	30	Phoebe	0.2
Vetiver	15	<i>Lantana camara</i>	0.2
Peppermint	10		

Chinese Essential Oil Production (tonnes)

Eucalyptus (1,8-cineole-type)	3,000	Geranium	60
Cornmint	2,000	Tea tree	50
Citronella	1,000	Patchouli	40
Chinese sassafras	800	Tangerine	40
Chinese cedarwood	800	Garlic	40
<i>Litsea cubeba</i>	700	Clary sage	40
Cassia	700	Orange	30
Camphor	500	Vetiver	20
Star anise	400	Wintergreen	10
<i>Eucalyptus citriodora</i>	300	Lavender	5
Scotch spearmint	300	<i>Michelia alba</i>	1
Ho or shiu (leaf and wood)	100	Japanese valerian	1
Ginger	80	<i>Mentha citrata</i>	1
Lemongrass	80	Rose	0.8
Peppermint	70	<i>Aglaiia odorata</i>	0.05
Pine needle	80	Chinese prickly ash	0.05

Chinese Extract Production (kg)

Jasmin concrete	500
Osmanthus concrete	500
<i>Michelia alba</i> concrete	200

Egyptian Essential Oil Production (>1.0 tonnes)

Geranium	80
Mandarin petitgrain	20
Cumin	5.0
Fennel (bitter)	5.0
Caraway	5.0
Celery seed	5.0
Marjoram	3.5
Basil (linalool-type)	2.5
Dill seed	2.5
Coriander herb	2.0
Blue chamomile	1.7
Basil (estragole-type)	1.5
Garlic	1.5

Egyptian Essential Oil Production (<1100 kg)

Bitter orange petitgrain	1,000
Anise	1,000
Dill weed	1,000
Parsley herb	900
Tagetes	700
Neroli	500
Coriander seed	500
Celery leaf	500
Parsley seed	300

Egyptian Extract Production (kg)

	Concrete	Absolute
Jasmin	3,500	1,000
Cassie	800	150
Violet leaf	500	100
Carnation	200	100
Geranium	200	50
Bitter orange flower	100	100
Rose	50	30

Estimated Minor Essential Oil Production in France (kg)

Celery herb	500	Sweet fennel	150
Flouve/Foin	250	Dillweed	150
Melissa	200	Coriander herb	150
Garlic	200	Monarda	100
Horseradish	200	Rue	100
Marjoram	150	Myrtle	100

Estimated French Essential Oil Production (tonnes)

Lavandin	1,200	Thyme	1.5
Lavender	50	Sage	1.5
Cypress	15	Rosemary	1.5
Spearmint	10	Roman chamomile	1.0
Clary sage	7(70)*	Tarragon	1.0
Peppermint	5	Parsley herb	1.0
Parsley seed	3	Savory	0.5
Carrot seed	3	Hyssop	0.5
Onion	3	Angelica seed	0.5
Helichrysum	2.5	Basil (linalool-type)	0.1
Celery seed	2.5		

*Concrete

Indian Essential Oil Production (>20 tonnes)

Cornmint	30,000	Sandalwood	30
Peppermint	400	<i>Mentha citrata</i>	30
Eucalyptus	400	Lime distilled	25
Citronella	200	Celery seed	25
Himalayan cedarwood	200	Clove leaf	25
Native spearmint	150	Ajowan	20
Lemongrass	100	Cardamom	20
Scotch spearmint	100	Patchouli	20
Basil	100	Dill seed	20
Pepper	90	Geranium	20
Palmarosa	80	Vetiver	20
<i>Eucalyptus citriodora</i>	60	Ginger	20
Nutmeg	40		

Floral Products: Absolutes

Jasmin: ca.	25 kg
Violet leaf: ca.	15 kg
Orange flower: ca.	10 kg
Narcissus: ca.	50 kg
Jonquil: ca.	50 kg
Cistus: ca.	880 kg
Genet: ca.	10 kg
Mimosa: ca.	400 kg
Rose-de-mai: ca.	30 kg oil, ca. 79 kg

Hungarian Essential Oil Production (kg)

Garlic	500	Angelica seed	200
<i>Pinus nigra</i>	500	Angelica root	200
Roman chamomile	400	Clary sage	200
Lovage herb	300	Lovage root	200
Basil	300	Yarrow	200
Onion	300	Hop	100
Marjoram	300	Parsnip	100

Hungarian Essential Oil Production (tonnes)

Origanum	50	Rosemary	3
Dillweed	15	<i>Pinus sylvestris</i>	2
Fennel	15	Blue chamomile	2
Caraway	8	Hyssop	2
Juniperberry	5	Parsley seed	2
Coriander seed	5	Peppermint	2
Tarragon	4	Sage	2
Savory	4	Lavender	1
Dill seed	3	Coriander herb	1
Anise	3	Carrot seed	1
Parsley herb	3	Thyme	1

Indian Essential Oil Production (<20 tonnes)

Mustard seed	15	Gingergrass	1.5
Cinnamon leaf	10	<i>Artemisia annua</i>	1.0
Nagar motha	10	Parsley seed	1.0
Coriander seed	5	Tejpat	1.0
Juniper leaf	5	Lavender/lavandin	1.0
Garlic	4	Greater galangal	0.5
Rosemary	4	Agarwood	0.5
Jamrosa	3	Indian valerian	0.5
Fennel (bitter)	3	Ambrette seed	0.5
Cumin	3	Calamus	0.5
Davana	2.5	Jammu lemongrass	0.2
Jatamansi	2	Rose	0.2
Turmeric	2	Curry leaf	0.1
Tagetes	1.5	Kewda	0.1
Tomar seed	1.5		

Jasmin concrete	3,500 kg
Sambac concrete	1,200 kg
Tuberose concrete	750 kg
Rose concrete	150 kg
Mimosa concrete	100 kg

Estimated Indian Oleoresin Production (tonnes)

Paprika	2,050	Cumin	12
Black Pepper	1,150	Clove bud	10
Capsicum/chilies	950	Coriander seed	10
Turmeric	280	Fennel	4
Celery seed	180	Rosemary	4
Nutmeg	120	Cardamom	4
Ginger	120	Mustard	3
Garlic	40	Tamarind	3
Mace	35	Vanilla	1
Fenugreek	21	White pepper	0.5
Cassia/cinnamon	20		

Indonesian Essential Oil Production (tonnes)

Patchouli	1,100	Gurjun balsam	50
Clove leaf	1,000	Cananga	30
Nutmeg	350	Cubeb	5
Citronella	250	Sandalwood	5
Cajeput	100	Massoia	1.5
Vetiver	80	Agarwood	0.2

Iranian Essential Oil Production (kg)

Tarragon	3,000
Cumin	1,000
Asafoetida	400
Rose	300
Galbanum	200

Moroccan Essential Oil Production (tonnes)

Rosemary	40	Blue tansy	1.0
Orange	30	Thyme	0.8
Armoise	35	Neroli	0.65
Atlas cedarwood	15	Origanum	0.5
Pennyroyal	10	Bitter orange petitgrain	0.5
Fennel (bitter)	5	Peppermint	0.5
Laurel leaf	3	Geranium	0.2
Myrtle	2	Rue	0.1
Moroccan chamomile	1.6	Cistus	0.1
Cumin	1.5	Lemon verbena	0.1

Moroccan Extract Production (tonnes)

Mimosa concrete.....	2.2
Rose concrete	1.4
Rose-de-Mai concrete.....	0.4
Jasmin concrete	0.4
Neroli concrete	0.3
Lentisque concrete.....	0.2

- Large production (ca. 100 tonnes) of orris roots mainly for export for orris butter and other extracts.
- Large collection (300–400 tonnes) of tree moss and oak moss for processing into concrete both inside Morocco and for export.

Estimated Nepalese Essential Oil Production (kg)

Citronella	12,000	Basil	500
Wintergreen	10,000	<i>Rhododendron anthopogon</i>	300
Palmarosa	9,500	Indian valerian	300
Lemongrass	6,500	Tagetes	250
Eucalyptus	5,000	Sote grass	100
Jatamansi	5,000	Vetiver	50
Sugandha kokila	4,000	Patchouli	50
Calamus	2,000	Blue chamomile	40
<i>Cinnamomum tamala</i>	1,500	<i>Artemisia vulgaris</i>	25
Cornmint	1,500	Zedoary	25
<i>Zanthoxylum alatum</i>	1,200	<i>Hedychium spicatum</i>	10
Juniper leaf	500		

Estimated South African Essential Oil Production

	Conventional (tonnes)	Organic (kg)	Total (tonnes)
Orange	370	-	370
Lemon	350	-	350
Eucalyptus*	140	-	140
<i>Eucalyptus dives</i>	180	-	180
Lime	140	-	140
Tagetes	3.5	-	3.5
Buchu	2.2	80	3.0
Geranium	1.3	1,700	3.0
Lavandin	1.4	500	1.9
Rosemary	0.9	300	1.2
<i>Artemisia afra</i>	0.5	500	1.0

**Eucalyptus smithii* R. Baker and *Eucalyptus radiata* Sieb. ex DC.

Estimated Essential Oil Produced in South Africa (kg)

<i>Lippia javanica</i>	900	<i>Erecephalus albus</i>	30
<i>Erecephalus punctulatus</i>	500	Blue chamomile	25 (5)
Tea tree	300 (300)*	<i>Lantana camara</i>	20 (20)
<i>Salvia stenophylla</i>	80	Cape May	20 (20)
Thyme	70 (20)	<i>Helichrysum splendidum</i>	20 (20)
Native spearmint	46 (6)	Roman chamomile	12 (5)

*organic amount

Vietnamese Essential Oil Production (tonnes)

Cajeput	150	Pemou	5
Citronella	150	<i>Litsea cubeba</i>	5
Star anise	100	Palmarosa	5
Chinese sassafras	50*	Tea tree	4
Cornmint	40	Vetiver	3
Basil (estragole-type)	40	Lemongrass	2
<i>Eucalyptus citriodora</i>	25	Camphor	1
Cinnamon/cassia	15	<i>Artemisia annua</i>	0.5
Chinese cedarwood	10	Agarwood	0.25
Ginger	5		

*No legal Vietnamese production since 2000 because of government controls on tree harvest.

Blue Chamomile Oil Production (kg)

Hungary	2,000	United Kingdom	30
Egypt	1,700	South Africa	25
Bulgaria	1,000	Croatia	20
Czech Republic	100	Serbia	20
Nepal	80	Slovakia	15
Argentina	75		

Current worldwide production: < 6 tonnes.

Bois-de-Rose

Origin: *Ariba rosaeodora* Ducke

Found where: Brazil (Amazonas), Peru, Paraguay, the Guianas, Venezuela, Colombia

Main oil producer: Brazil (tonnes); 450 (1950), 250 (1965), 140 (1985), 36 (1993), 38.5 (2006)

Value: source of natural linalool

Substitutes: synthetic linalool, Brazilian government control

Current worldwide production: < 40 tonnes

Brazilian Bois-de-Rose

Brazilian National Institute for the Environment and Natural Resources (IBAMA); May 1998 IBAMA regulations issued as follows:

- Rosewood harvest not permissible in certain areas.
- No trees less than 20 cm diameter can be harvested.
- Amount of wood distilled annually under control.
- Re-forestation must be proportionate to tree harvest.
- Limit of 2,000 trees can be harvested annually.
- Possession of an IBAMA certificate mandatory for oil export.

Current estimate: 1,700 trees or 5,000 tonnes of wood distilled annually.

Sources of Cedarwood Oil and Estimated Production Quantities (tonnes)

1. US sources:
 - (a) *Juniperus virginiana* (L.) var. *virginiana* Virginia cedarwood (300)
 - (b) *Juniperus ashei* Buchholz Texas cedarwood (550)
2. Chinese source: *Cupressus funebris* (Endl.) Franco (800)
3. Vietnamese source: *C. funebris* (10)
4. Himalayan source: *Cedrus deodara* (Roxb.) Loud. (200)
5. Atlas source: *Cedrus atlantica* Manetti (15)
6. Port Orford source: *Chamaecyparis lawsoniana* (Andr. Murray) Parl. (<1)
7. Kenyan source: *Juniperus procera* Hochst. ex. Endl. (<1)
8. Mlange cedar source: *Widdingtonia cupressoides* (L.) Endl. (<1)
9. Eastern white cedar source: *Thuja occidentalis* L. (<1)
10. Western red cedar source: *Thuja plicata* Donn ex D. Don. (<1)

Dill Weed Oil Production (tonnes)

Canada	30 (63.5)*	Romania	1.5
United States	54.5	Egypt	1.0
Bulgaria	30.0	France	0.15
Hungary	15.0	Finland	0.1
Russia	8.0	Lithuania	0.1
Ukraine	5.0	Turkey	0.1
Australia	2.0		

Current worldwide production: ca. 155 tonnes; *original estimate prior to hailstorm in July 2008.

Worldwide 1,8-Cineole-Rich Eucalyptus Oil Production (tonnes)

	1984	1990	2007
China	ca. 500	1,500	3,000
Portugal	400	300	30
South Africa	300	250	140
Spain	250	500	1
Vietnam	ca. 100	250	*
India	60	250	400
Swaziland	20	60	0
Brazil	70	60	60
Australia	60	60	260
Bolivia	5	20	*
Paraguay	25	25	*
Uruguay	5	20	30
Chile	30	80	*
Colombia	5	20	*
Argentina	*	*	5
Zimbabwe	*	*	1.5
Nepal	*	*	5
Approximate total:	1,850	3,500	4,000

Worldwide Production of *Eucalyptus citriodora* Oil (tonnes)

	1984	1990	2007
China	180	1,000	300
Brazil	220	1,000	500
India	10	80	60
Vietnam	*	*	25
Paraguay	*	*	25
Zanzibar	*	*	3.2

Geranium Oil Production (tonnes)

China	80	Madagascar	0.8
Egypt	80	Malawi	0.3
India	20	Morocco	0.2
Reunion	3	Zambia	0.15
South Africa	3	Rwanda	0.04
Turkey	1.3		

Current worldwide production: <200 tonnes.

Rose Oil and Extract Sources

1. *Rosa damascena* Mill. "Triginipetala"
Bulgaria, Turkey, Russia, Ukraine, India, Iran, Egypt, Morocco
2. *Rosa centifolia* L.
France, Morocco
3. *Rosa bourbonica* Desf.
India (minor)
4. *Rosa rugosa* Thunb. var. *plena* Rehd.
China
5. *Rosa chinensis* Jacq.
China
6. *Rosa sertata* Yu et Ku x *Rosa rugosa* Thunb.
China

Rose Oil/Concrete Plus Absolute Production (kg)

Turkey	2,400/4,100
Bulgaria	1,500/2,500
Morocco	0/1,400
China	800
Iran	300/0
Russia	200
Ukraine	200
Egypt	0/80
India	200/0

Total worldwide production:

Oil: ca. 5,000 kg

Concrete plus absolute: ca. 9,000 kg

Rosemary Oil Productions (tonnes)

Tunisia	80	Portugal	1.0
Spain	50	Turkey	0.9
Morocco	40	Argentina	0.2
India	4	Croatia	0.1
Hungary	3	Uganda	0.1
South Africa	3	Australia	0.05
France	1.5	United Kingdom	0.05

Current worldwide production: ca. 200 tonnes.

Sandalwood Oil

Oil production from the heartwood and roots of *Santalum* species which are partial root parasitic trees. Eighty-five percent of world production of sandalwood is in Karnataka and Tamil Nadu (India). Oil yield: 4–6.5%. In India, there are four qualities of oil:

- Unbranded—used exclusively in India
- Branded—mainly domestic, but some export
- Agmarked—exclusively exported
- Mysore—produced by Karnataka Soap and Detergent Ltd.

New plantations are being established in Australia, China and Papua New Guinea.

Main Sandalwood Oil Sources

Santalum album L.

35 tonnes

East Indian sandalwood oil: India and Indonesia

Composition: *cis*- α -santalol (50%), *cis*- β -santatol (21%)

Santalum spicatum R. Br. A. DC.

14 tonnes

Australian sandalwood oil: Western Australia

Composition: *cis*- α -santalol (22%), (E,E)-farnesol (11%)

Santalum austrocaledonicum Vieill.

1.5 tonnes

New Caledonian sandalwood oil: New Caledonia and Venuatu

Composition: *cis*- α -santalol (46%), *cis*- β -santalol (21%)

Amyris balsamifera L.

60 tonnes

West Indian sandalwood oil

Composition: valerianol (22%), 7-epi- α -eudesmol (11%), 10-epi- γ -eudesmol

Average Annual Sandalwood Oil Production (tonnes)

Year	India	Indonesia	Australia	Pacific Island Countries	Haiti
1960s	104	20	<1	-	135
1970s	112/34	30	<1	-	70
1980s	31	40	<1	0.5	4.0
1990s	45	30	10	1.0	30
2000s	30	5	14	1.5	60

Vetiver Oil Production (tonnes)

Haiti	100	Vietnam	3
Indonesia	80	El Salvador	2
China	20	Madagascar	2
India	20	Nepal	0.5
Brazil	15	Reunion	0.5
Dominican Republic	12	Ghana	0.4

Current worldwide production: < 250 tonnes.

Ylang Ylang Oil

Cananga odorata (Lam.) J. D. Hook. et T. Thompson
f. *odorata*. Oil production: water, steam/water and steam.

		Comoros/ Mayotte	Madagascar
Grades:	Extra	17–30%	3–4%
	First	10–14%	17–20%
	Second	7–8%	15–17%
	Third	58–60%	55–60%

Oil yield: 2.0–2.3%
Concrete yield: 6.8–0.95%
Absolute yield: 75–80%
(from concrete)

Average Ylang Ylang Production (tonnes)

Country	1970s	1980s	1990s	2000s
Brazil	1	2	2	2
China	-	0.5	1	3
Comoros	74	55	45	94(75) ¹
Madagascar	20	13	9	22(15) ¹
Mayotte	22	23	20	-*

¹Included with Comoros; ²2006 production level. It is estimated that 2.0 tonnes were also produced in Ghana in 2007. In the 1980s, Reunion produced ca. 1 tonne/annum—now stopped.

North American Spearmint Oils—2007 Crop Year

	Native <i>Mentha spicata</i> L.	Scotch <i>Mentha gracilis</i> Sole
Total production:	570 metric tonnes	635 metric tonnes
Midwest	495.0	53.3
Far West	72.0	371.5
South Dakota	-	83.2
Canada	-	127.0

North American Peppermint Oil—2007 Crop Year

Total production: 2,744 metric tonnes

	Amount	Percentage
Midwest	192.3	7.0
Willamette	135.2	4.9
La Grande	121.1	4.4
Montana	16.8	0.6
Northern California	152.4	5.6
Nevada	88.6	3.2
Madras	60.2	2.2
Idaho	785.2	28.6
Kennewick	519.7	19.0
Yakima	672.3	24.6
Total	2,743.8	

Cornmint

Mentha canadensis L. [syn. *M. arvensis*. L. f. *piperascens* Malinv. ex Holmes; *M. arvensis* L. var. *glabrata*, *M. haplo-calyx* Briq.; *M. sachalinensis* (Briq.) Kudo]

2007 Oil Production (tonnes)

India	30,000	Nepal	1
China	2,000	United States	1
Argentina	10		

Current worldwide production: ca 32,000 tonnes

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