

What's Hot & What's Not 2013-2014 U.S. Trends in the Aromatherapy Essential Oil Sector

Presented by
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Hot Topics

- What is Aromatherapy?
- Sources and Quality of Essential Oils
- Diluents and Extended Oils
- Environmental and Sustainability Concerns
- Essential Oil Labeling
- 2013 Aromatherapy Trends Survey and SPINS Retail Data
- Top Essential Oils Used By Professional Aromatherapists
- Factors That Influence Purchasing
- Notable Biological Activity
- 2013-2014 Market Trends and Growth of the Sector
- Conclusion



What is Aromatherapy?

All in an NP Day. . .

Joseph Farris



Aromatherapy Terms

Aromatherapy... the controlled use of essential oils to promote the health and vitality of the body, mind and spirit by inhalation, baths, compresses, topical application, and full-body massage. (Price, 2000)

Aromatology... [above and] selected area massage, plus external intensive use of undiluted oils and internal use via rectum, os, and vagina. (Price, 2000)

Aromachology... only olfactory effects that have been scientifically demonstrated to affect mood, physiology and behavior. (Herz, 2009)

How does it work?



How does it work?

Do you need to be able to smell?

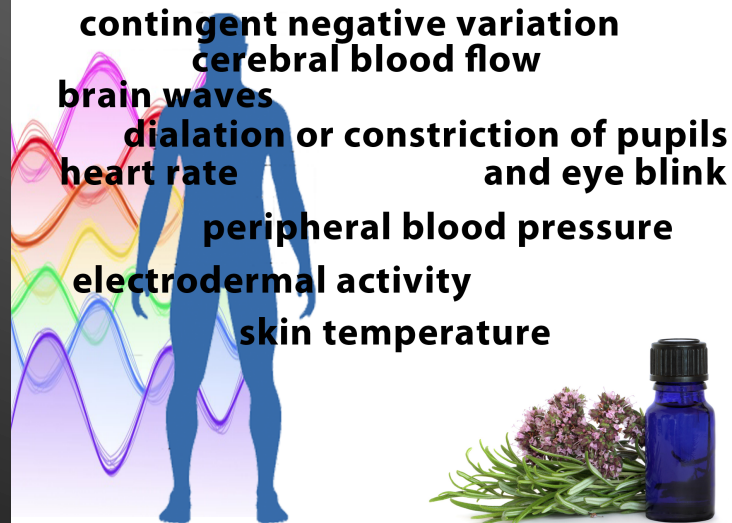
Aromatherapy does not depend on aromatic perception; psychological changes occur despite perception. (Hongratanaworakit, 2004)

Anosmics can benefit from aromatherapy. (Nasel et al., 1994)



How does it work?

PHYSIOLOGICAL & PSYCHOLOGICAL EFFECTS

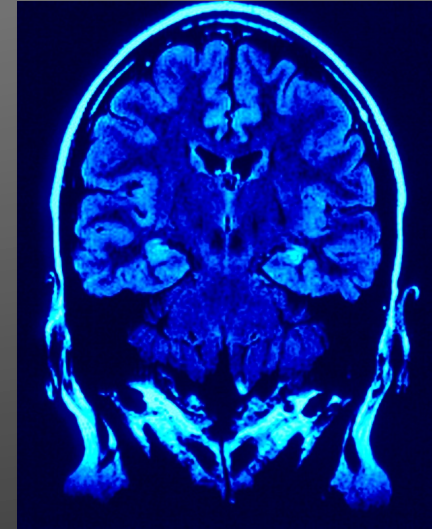


There are many measurements that can be used to quantify the physiological and psychological effects of essential oils on the body.

How does it work?

What are the health claims?

- Improve memory and increase alertness (Jellenik, 1997)
- Affect mood: sedate or stimulate (Kikuchi et al, 1991)
- Affect overall performance ability, such as memory tasks, sustained attention, and problem solving (Moss et al., 2003)
- Affect cognitive performance and attention speed (Moss et al., 2003)



How does it work?



How does it work?

Contemporary Aromatherapy Research

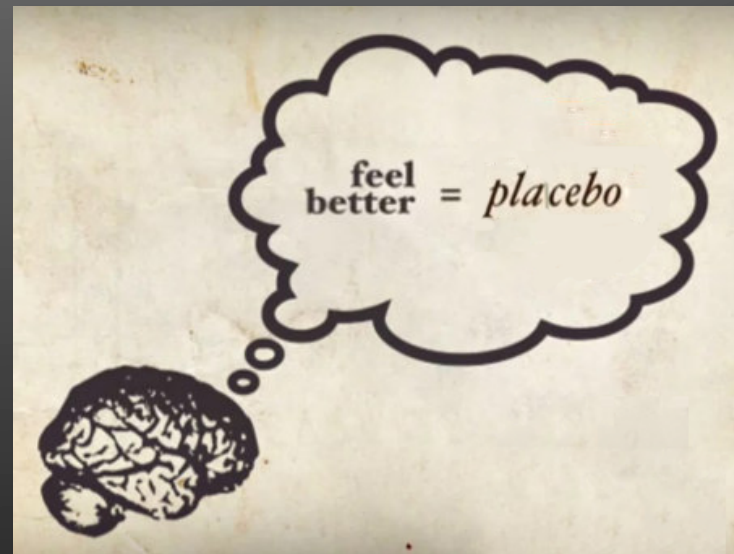
- Prior experiences and expectations associated with aroma affect the final outcome (Fox, 2009; Herz, 2009)
- Culture and learned social behavior affect the perception and effects of aromas (Herz, 2009)
- There is some evidence of gender-related differences; little evidence of age-related differences; but much evidence to suggest individual variance (Choudhury, 2004; Larsson et al., 2000)



Does Aromatherapy really work?

Aromatherapy is unique as a healing modality because it can produce physiological and psychological effects simultaneously. There are four methods of aroma action (Jellinek, 1997):

- Quasi-pharmacological
- Semantic
- Hedonic valence
- Placebo



Sources and Quality of Essential Oils

What does an Aromatherapist look for?

Just like a fine wine, a number of factors affect the quality of an essential oil:

- Origin of the plant
- Part of the plant used
- Growing techniques employed
- Climate where the plant was produced
- Harvest methodologies
- Time of harvest [Basil EO extracted in spring had the highest antioxidant levels (Al-Maskri et al., 2011)]
- Method of production
- Method of and length of storage after production



Why is Latin important?

Lavandula vs. Lavandin



Sources and Quality of Essential Oils

Lavandula vs. Lavandin

	Lavender	Lavandin
Source	<i>Lavandula angustifolia</i> (otherwise known as <i>Lavandula officinalis</i>)	<i>Lavandula intermedia</i> Hybrid: <i>L. latifolia</i> x <i>L. angustifolia</i>
Constituents	Linalool (25-28%), linalyl acetate (25-45%), 1,8 cineole (0%), and camphor (0%)	Linalyl acetate (28-28%), 1,8 cineole (6-20%), and camphor (7-40%)
Oil Characteristics (color and scent)	Colorless to pale yellow; sweet, floral herbaceous	Colorless to pale yellow, yellow-green; similar but with camphor tones and rose-like note due to "rhodinol"
Therapeutic Action	More sedating	Less sedating

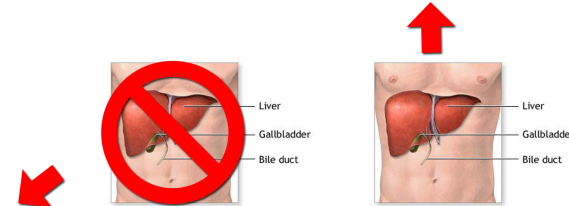
Sources and Quality of Essential Oils

Chemotypes

Chemotypes that provide a **specific constituent profile** are also important for clinical aromatherapy.

BASIL CHEMOTYPES

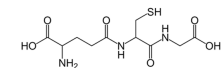
Ocimum basilicum ct. linalool



Ocimum basilicum ct. methyl chavicol
liver damage

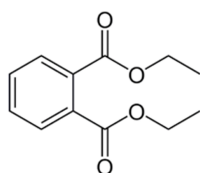


glutathione



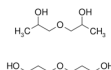
Diluents and Extended Oils

DILUENTS

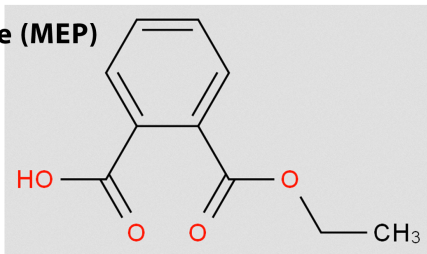


**diethyl phthalate
(DEP)**

dipropylene glycol



monoethyl phthalate (MEP)

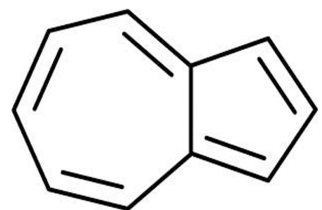


Diluents...substances that are usually odorless and are added to the products for commercial reasons.

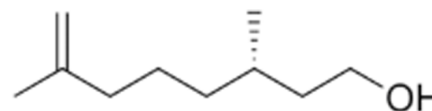
Diluents and Extended Oils

Extenders... inexpensive aroma materials that may or may not have an identical fragrance and are usually synthetic.

EXTENDERS

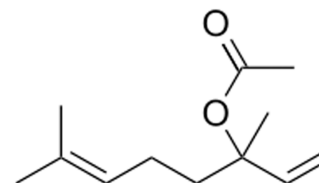


azulene



rhodinol

linalyl acetate



Diluents and Extended Oils

NATURAL IDENTICAL



Nature identical... usually refers to a chemically synthesized version of an essential oil.

Synergy... the whole is better than the sum of its parts, and it exists within each oil and within blends of specific oils.

A close-up photograph showing two hands holding two interlocking puzzle pieces. The hands are positioned on the left and right sides of the frame, with fingers gripping the edges of the pieces. The puzzle pieces are dark and silhouetted against a very bright, warm, yellowish-gold background that has a soft, out-of-focus glow. The lighting creates a strong rim light effect on the edges of the hands and the puzzle pieces, emphasizing their shapes. The overall mood is one of hope, completion, or teamwork.

nature



Environmental & Sustainability Concerns

Wildcrafted Plant... has been gathered in the wild, in its natural habitat, for manufacturing or personal use.
(organic.org, 2013)



- Convention on International Trade in Endangered Species (CITES) of Wild Flora and Fauna



- United Plant Savers (UpS) At-Risk and To-Watch



- International Union for Conservation of Nature Natural Resources (IUCN) Red List of Threatened Species

Environmental & Sustainability Concerns

Sandalwood *Santalum album* is now virtually extinct in India with no evidence of any real sustainability programs for regeneration.

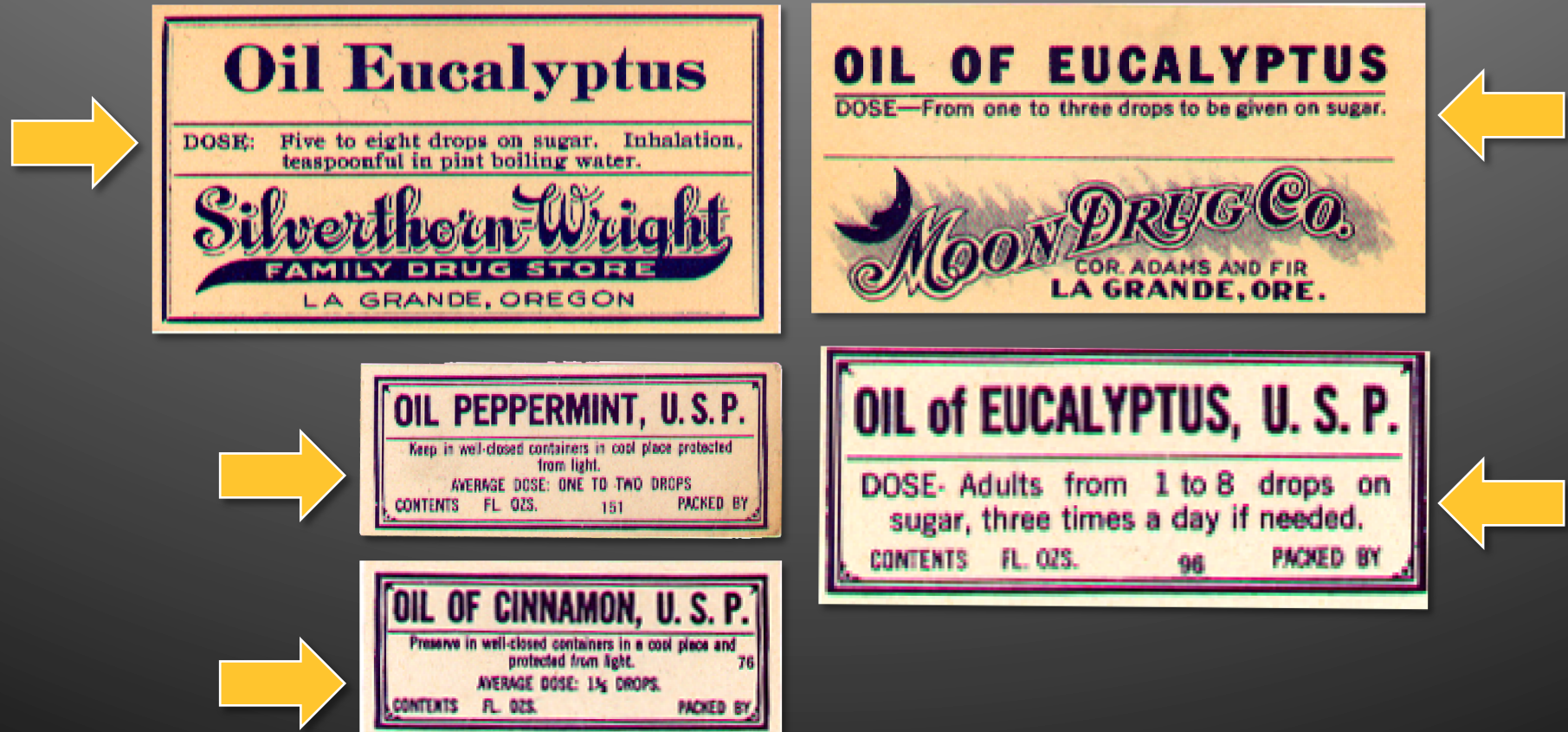


Environmental & Sustainability Concerns

At the Manoko experimental and research garden managed by the Indonesian Medicinal and Aromatic Crops Research Institute, they feed dairy cows spent material left from distilling *Citronella Cymbopogon nardus*, which produces raw milk with less bacteria.



Aromatherapy Essential Oil Labeling



Aromatherapy Essential Oil Labeling Federal Drug Administration (FDA)

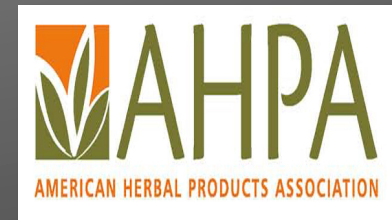
Essential oil labeling for retail sales generally falls under the jurisdiction of dietary supplement labeling requirements, which are defined and regulated in the U.S. by the Food and Drug Administration (FDA).



Aromatherapy Essential Oil Labeling American Herbal Products Association

American Herbal Products Association (AHPA):

- Keep out of reach of children or significantly similar cautionary language
- External Use Only, Not for Internal Use, Not for Ingestion or significantly similar cautionary language
- Keep away from eyes and mucous membranes or significantly similar cautionary language
- The Latin name of the plant from which the essential oil is derived
- Identification of the plant part from which the essential oil is derived



Aromatherapy Essential Oil Labeling Regulated Terms

The Agricultural Marketing Service of the U.S. Department of Agriculture (USDA) oversees the National Organic Program (NOP) and defines the term and certifies organic.



- Organic
- Certified organic



Aromatherapy Essential Oil Labeling Unregulated Terms

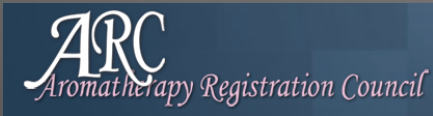
These are just a sampling of the many unregulated terms. Consumers should be especially cautious of these products as they may contain pesticides, synthetic adulterants, or diluents.

- All natural
- Spray free
- Therapeutic grade
- CPTG Certified Pure Therapeutic Grade®
- Pure and natural
- Genuine
- Certified naturally grown



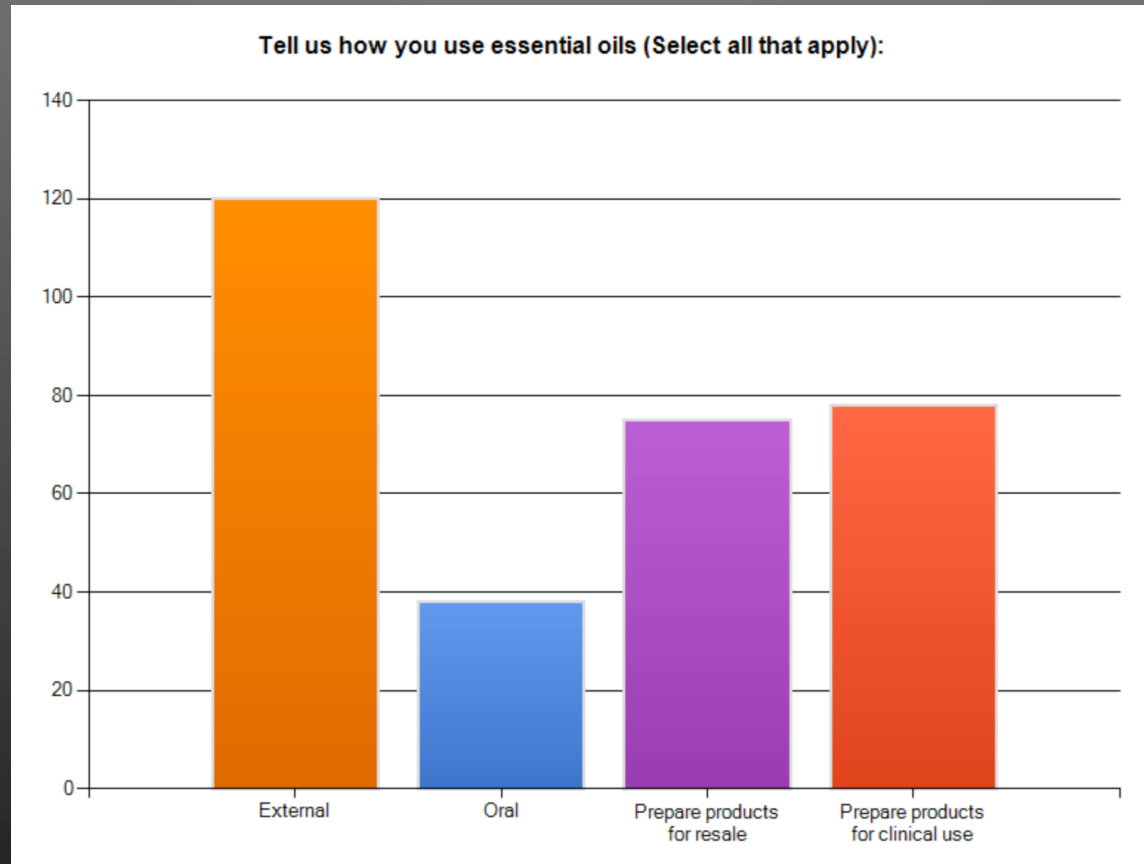
2013 Aromatherapy Trends Survey

Who did we survey? (APA's)



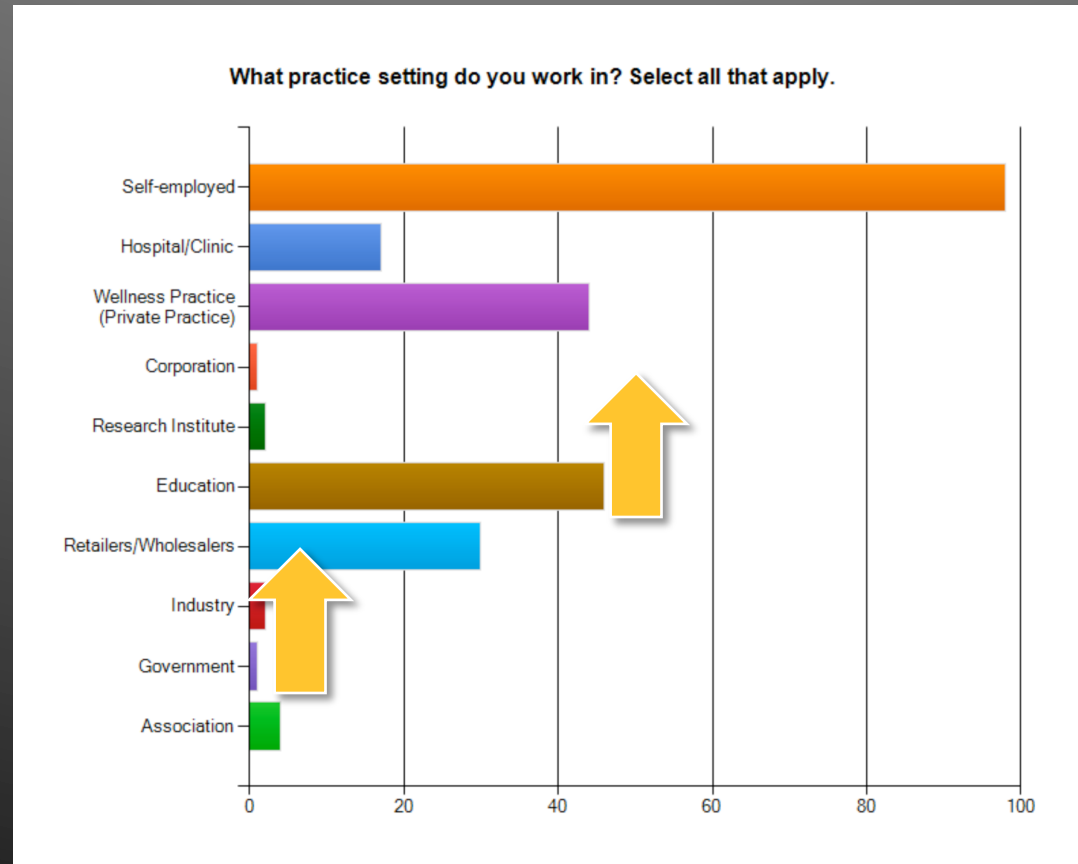
- Registered Aromatherapists: Aromatherapy Registration Council (ARC)
- National Association for Holistic Aromatherapists (NAHA)
- Alliance of International Aromatherapists (AIA)
- International Journal of Professional Holistic Aromatherapy

2013 Aromatherapy Research Methods of Administration



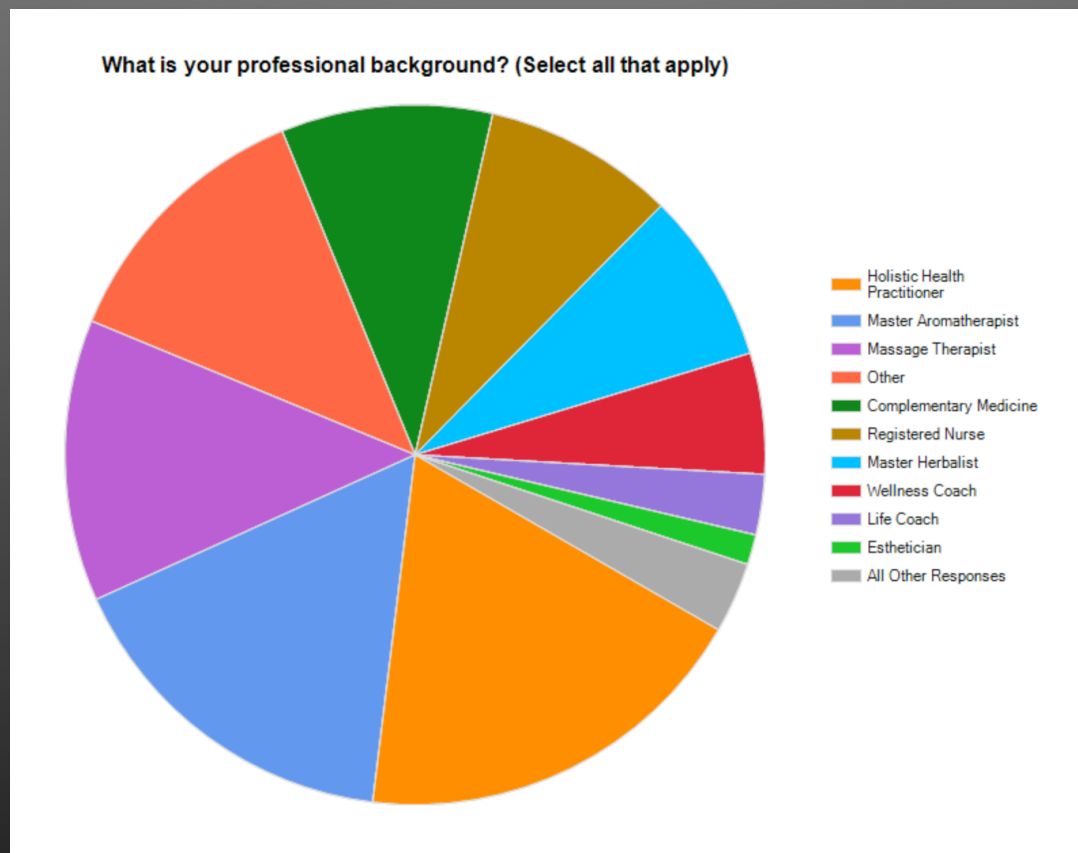
2013 Aromatherapy Trends Survey

Distribution of APAs Practice Settings



2013 Aromatherapy Trends Survey

Professional Backgrounds



Six Hot Essential Oils

APA's Use vs. Retail Sales

Rank	Essential Oil Common and Latin Name
1	LAVENDER <i>Lavandula angustifolia</i>
2	BERGAMOT <i>Citrus aurantium</i> var. <i>bergamia</i>
3	IMMORTELE <i>Helichrysum italicum</i>
4	CHAMOMILE <i>Chamaemelum nobile</i>
5	EUCALYPTUS <i>Eucalyptus globulus</i>
6	FRANKINCENSE <i>Boswellia carterii</i>
7	TEA TREE AUSTRALIA <i>Melaleuca alternifolia</i>
8	BLACK PEPPER <i>Piper nigrum</i>
9	PEPPERMINT <i>Metha piperita</i> var. <i>vulgaris</i>

Rank	Scent	\$ Sales
1	LAVENDER	\$3,574,157
2	PEPPERMINT	\$1,631,238
3	EUCALYPTUS	\$1,492,073
4	TEA TREE	\$1,291,079
5	ROSEMARY	\$490,129
6	PATCHOULI	\$447,150
7	BLEND — OTHER	\$385,959
8	LEMON	\$380,038
9	ROSE	\$372,131
10	FRANKINCENSE	\$371,444
11	BLEND — CALMING	\$332,382
12	CLOVE	\$331,972
13	ORANGE	\$321,681
14	SANDALWOOD	\$310,142
15	GERANIUM	\$265,400
16	GRAPEFRUIT	\$261,068
17	YLANG YLANG	\$255,223
18	BERGAMOT	\$237,048
19	BLEND — MEDICINAL	\$231,590
20	LEMONGRASS	\$231,586



Hot Stand Out!

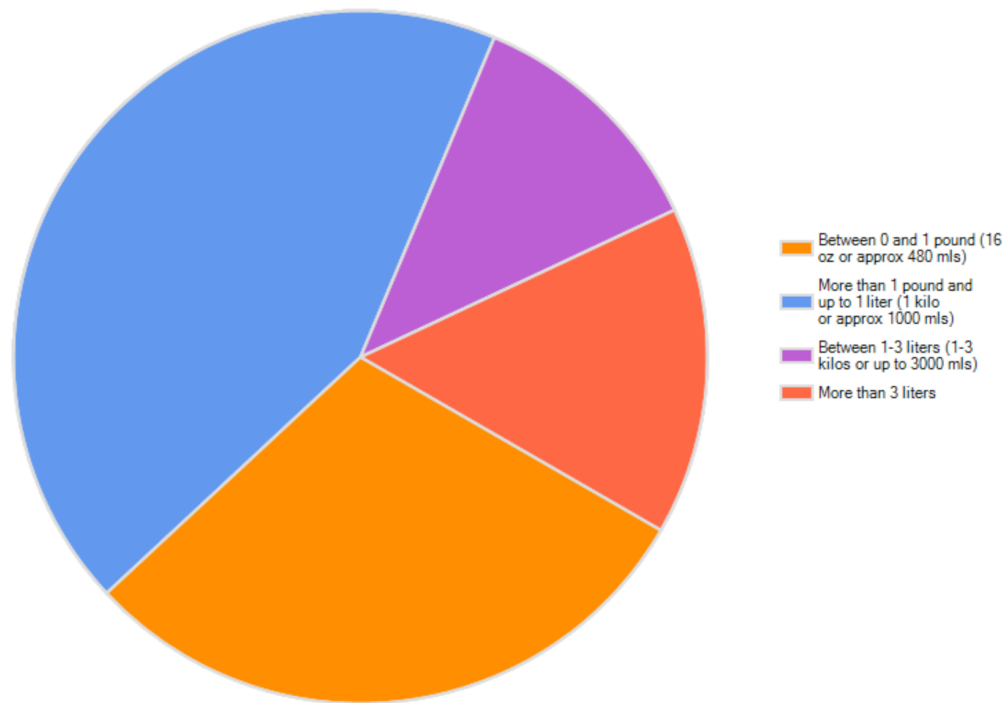
Cinnamon *Cinnamomum zeylanicum* grew at a 19.8% rate in 2012, well out-pacing the retail aromatherapy category growth rate of 14.9%.

Research confirms that it can lower blood sugar and LDL cholesterol with no harmful side effects.
(Sharma et al, 2012)



Volume of Essential Oils Used By APAs

On an annual basis, which of the following best describes the total volume of all essential oil you purchase for professional use?



Aromatherapy Research Review



Three of the most popular oils identified in both retail sales and clinical aromatherapy:

- Lavender *L. angustifolia*
- Peppermint *M. piperita* var. *vulgaris*
- Eucalyptus *E. globulus*

Notable Biological Activity

Lavender *L. angustifolia*

19 human studies, from January 1, 2012 until the beginning of September 2013, demonstrate significant biological activity:

- Antifungal (Zuzarte et al., 2011)
- Reduce perineal discomfort (Sheikhan et al., 2012)
- Reduce pain for primary dysmenorrhea (Ou, 2012)



Notable Biological Activity

Lavender *L. angustifolia*

- Reduce symptoms of colic in infants (Cetinkaya & Basbakkal, 2012)
- Reduce anxiety and depression in high-risk post partum women (Conrad & Adams, 2012)
- Provide support for post traumatic stress disorder and anxiety (Uehleke et al, 2012)
- Alleviate agitated behavior in patients with dementia (Holmes et al., 2002)



Lavender *L. angustifolia* Antimicrobial Blend

In a 2013 *in vitro* study, *Cinnamomum zeylanicum* and *Citrus sinensis* show the highest synergist antimicrobial effect at 1:1 ratios with lavender (de Rapper et al., 2013)



Lavender *L. angustifolia*

Antibacterial and Anti-Fungal Blend

In another study, lavender *L. angustifolia* oil, clary sage *Salvia sclarea* oil, and ylang ylang *Cananga odorata* var. *geniune* oil (volume ratio 3:4:3) showed significant antibacterial and anti-fungal activity *in vitro* against Gram-positive bacteria *Staphylococcus aureus* and *S. epidermidis*, and the Gram-negative bacterium *Escherichia coli* and *Candida albicans*. (Tadtong et al., 2010).



Lavender *L. angustifolia*

Hypertension & Prehypertension

A 2013 clinical trial on blood pressure levels and salivary cortisol concentration in patients with hypertension and prehypertension showed lavender *L. angustifolia* had both an immediate (within 10 minutes) and long-term hypotensive effect. (Kim et al., 2012)



Notable Biological Activity

Peppermint *Mentha piperita*

44 human studies (during the same time period) demonstrate significant biological activity:

- Anticarcinogenic (Jain et al., 2011)
- Antiemetic (Heimes et al., 2011)
- Reduce the perceived level of mental fatigue and burnout (Varney & Buckle, 2013)



Notable Biological Activity

Peppermint *Mentha piperita*

- Manage fungal infection (dEnfert et al., 2007)
- Extend the shelf life of food products (Saharkhiz et al., 2010)
- Reduce the intensity and number of chemotherapy-induced nausea and vomiting events (Tayarani-Najaran et al., 2013)



Notable Biological Activity

Eucalyptus globulus

6 human studies (during the same time period) demonstrate significant biological activity:

- Analgesic
- Antibacterial
- Antiseptic
- Pediculicide (Toloza et al., 2010; Choi et al., 2010)
- Anti-dandruff agent (Selvakumar et al., 2012)



Notable Biological Activity

Eucalyptus globulus

- Anthelmintic with potential support for parasitic infection (Taur et al., 2010; Macedo et al., 2010; Macedo et al., 2009)
- Absorption enhancer (Williams & Barry, 1989)
- Penetration enhancer to aid topical drug delivery (Williams & Barry, 1989)

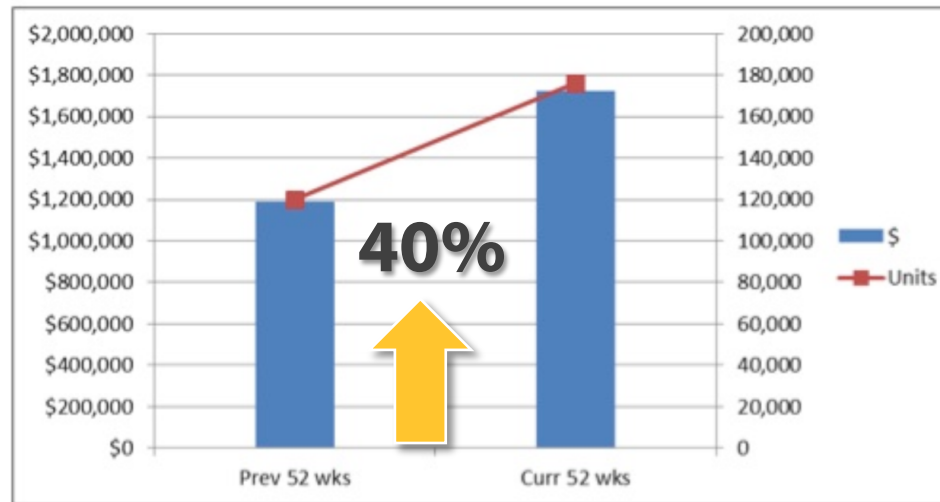


Factors That Influence Purchasing Professional Aromatherapy Users

These results identify a consumer who is savvy about the scientific testing of essential oils to determine quality and therapeutic viability, as well as the impact of environmental concerns and the continued importance of organic.

	Purchasing Influences
Factor #1	GC/MS Available
Factor #2	Certified Organic
Factor #3	Sustainably grown and harvested
Factor #4	Organic
Factor #5	Price
Factor #6	Country of Origin
Factor #7	At-Risk Status (Endangered Status)
Factor #8	Age of the oil
Factor #9	How was the oil stored
Factor #10	Wildcrafted
Factor #11	Fair Trade
Factor #12	Spray-free cultivated
Factor #13	Conventionally grown

Factors That Influence Purchasing Organic Performance



- Organic Oils are outpacing their non-organic counterparts, posting in excess of 40% growth in both units and \$ in the last 52 weeks, compared to 13% \$ growth for conventional oils.
- Aura Cacia, the top Organic Oil brand, top selling Patchouli Organic oil up 73% vs. last year.

Source:
SPINS Organic Market - H1
National Supermarket Column
2nd Half Ending 12/31/2012 unless otherwise noted

SPINS PROPRIETARY AND CONFIDENTIAL



Certificate of Analysis

Does “organic” really make a difference?

Sample & lot: neroli Date: 8/19/13		
RT	Component	Area %
12.59	tricyclene	<0.00
13.05	alpha-pinene	0.62
14.82	camphene	0.04
16.77	beta-pinene	7.69
17.18	sabinene	0.89
18.55	delta-3-carene	0.21
19.00	beta-myrcene	1.36
19.40	alpha-phellandrene	<0.00
20.15	alpha-terpinene	0.01
21.37	limonene	7.11
21.84	beta-phellandrene	0.19
22.85	(Z)-beta-ocimene	0.43
23.94	(E)-beta-ocimene	1.90
25.38	p-cymene	0.28
26.03	terpinolene	0.17
29.32	6-methyl-5-hepten-2-one	0.04
31.53	allo-ocimene	0.01
36.25	trans-linalool oxide (furanoid)	0.23
38.43	cis-linalool oxide (furanoid)	0.29
44.88	linalool	46.08
45.81	linalyl acetate	8.63
48.66	beta-elemene	0.04
49.65	beta-caryophyllene	1.09
50.45	allo-aromadendrene	0.01
54.87	(E)-beta-farnesene	0.06
56.02	alpha-humulene	0.08
58.56	alpha-terpineol	6.31
59.60	germacrene D	0.03
61.03	neryl acetate	1.38
62.98	(E,E)-alpha-farnesene	0.05
64.11	geranyl acetate	2.61
68.35	nerol	1.31
73.15	geraniol	2.56
73.61	p-cymen-8-ol	0.12
82.56	benzeneacetonitrile	0.06
83.75	(E)-jasnone	0.02
87.38	caryophyllene oxide	0.16
92.70	(E)-nerolidol	2.03
101.22	spathulenol	0.15
113.62	methyl anthranilate	0.09
123.97	(E,E)-farnesol	0.03
132.74	indole	0.08

Comments: Published papers on the neroli, *Citrus xaurantium* flowers, have reported 0-15% beta-pinene, 0-22% limonene, and 3-31% linalool. This oil falls within those expected ranges considering biological and seasonal variations, although the linalool is slightly higher than expected. No adulterants were detected.

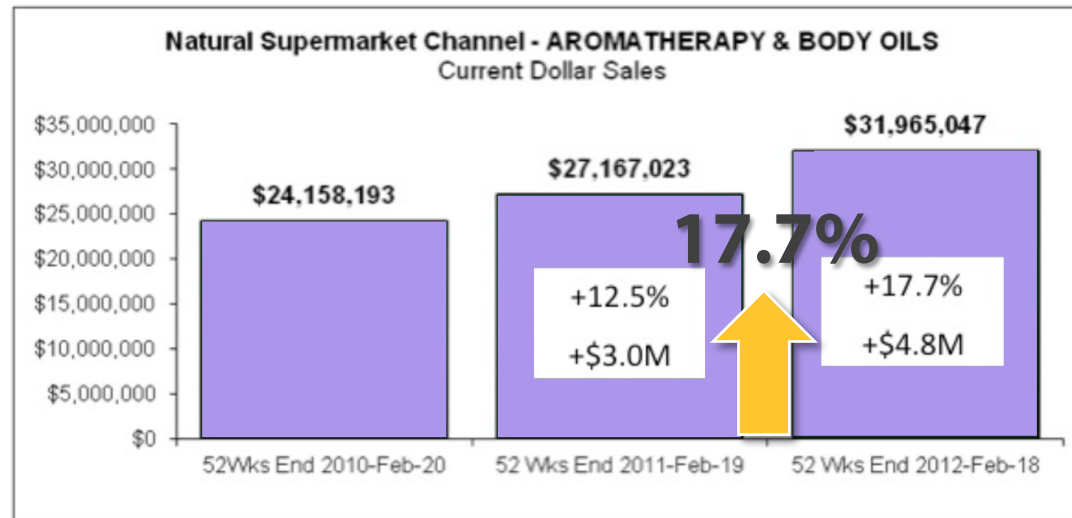
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14.84	camphene	0.06
16.87	beta-pinene	11.01
17.23	sabinene	1.07
18.58	delta-3-carene	0.01
19.03	beta-myrcene	1.36
19.44	alpha-phellandrene	0.02
20.19	alpha-terpinene	0.15
21.51	limonene	11.50
21.91	beta-phellandrene	0.29
22.85	(Z)-beta-ocimene	0.67
24.09	(E)-beta-ocimene	5.45
25.42	p-cymene	0.15
26.08	terpinolene	0.44
29.34	6-methyl-5-hepten-2-one	0.02
31.56	allo-ocimene	0.03
36.27	trans-linalool oxide (furanoid)	0.22
38.48	cis-linalool oxide (furanoid)	0.25
44.73	linalool	29.86
45.75	linalyl acetate	7.99
48.66	beta-elemene	0.07
49.66	beta-caryophyllene	1.59
50.43	allo-aromadendrene	<0.00
54.90	(E)-beta-farnesene	0.14
56.03	alpha-humulene	0.10
58.57	alpha-terpineol	5.43
59.93	germacrene D	0.13
61.09	neryl acetate	1.72
63.01	(E,E)-alpha-farnesene	0.08
64.19	geranyl acetate	3.26
68.35	nerol	0.92
73.18	geraniol	2.41
73.60	p-cymen-8-ol	0.02
82.58	benzeneacetonitrile	0.22
83.78	(E)-jasnone	0.03
87.39	caryophyllene oxide	0.02
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Growth of Retail Aromatherapy

Retail Sales 3-Years' Performance

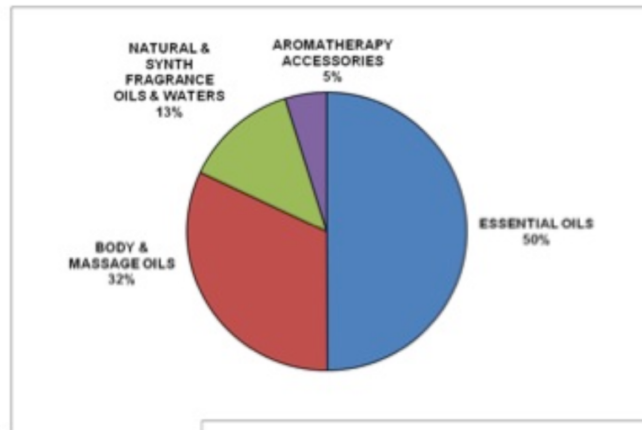


- The Aromatherapy & Body Oils category grew in Natural Supermarkets by +17.7% in the 52 weeks ending February 2012
- The category posted growth of +12.5% in the prior year - 2011

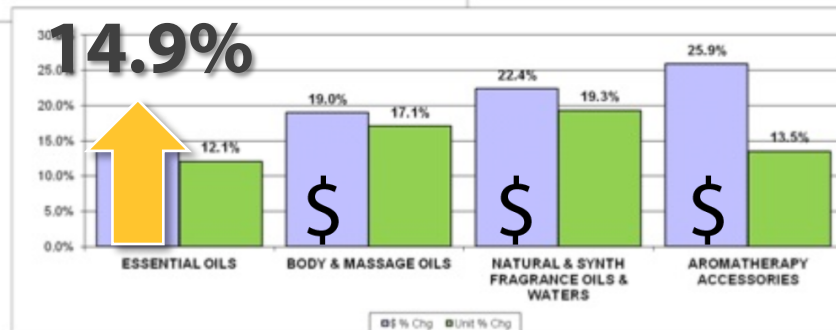
Source:
SPINS Natural & AY
Natural Supermarket Channel
52 Wks Ending 02/17/2012 unless otherwise noted

SPINS PROPRIETARY AND CONFIDENTIAL

Growth of Retail Aromatherapy Category Makeup



- All four of the subcategories grew by double digit rates
- However, the largest of them, Essential Oils, under-performed with growth of +14.9%



Source:
SPINS Natural & MS
Natural Supplement Sales
Q1 2014 ending 03/31/2014 unless otherwise noted

SPINS PROPRIETARY AND CONFIDENTIAL

Growth of Retail Aromatherapy Brand Performance

Current 52 Weeks									
Brand Dollar Rank	Total US - Natural Channel	Current Units	Unit % Change (Vs Year Ago)	% Units Sold On Promo	% Units Sold On Promo LY	% Units Sold On Promo % Change	Average Discount	Average Lift	Promo Elasticity
	AROMATHERAPY & BODY OILS	3,510,176	14.7%	23%	23%	(0.3%)	20%	21%	1.0
1	AURA CACIA	1,256,846	10.5%	34%	35%	(0.7%)	23%	24%	1.1
2	NOW	843,670	26.2%	13%	16%	(2.6%)	16%	21%	1.3
3	HERITAGE PRODUCTS	174,811	3.9%	12%	13%	(1.2%)	14%	8%	0.6
4	SIMPLERS	91,369	11.2%	19%	16%	3.2%	18%	11%	0.6
5	WYNDMERE	121,810	5.8%	14%	14%	(0.2%)	20%	15%	0.8
6	WELEDA	54,464	0.8%	23%	19%	3.6%	23%	26%	1.1
7	PACIFICA	57,107	74.9%	28%	32%	(3.9%)	20%	11%	0.6
8	DESERT ESSENCE	70,535	11.6%	32%	32%	(0.2%)	19%	23%	1.2
9	VERIDITAS BOTANICALS	59,221	48.5%	43%	33%	10.0%	19%	27%	1.4
10	KUUMBA MADE	78,881	12.7%	17%	12%	4.6%	14%	17%	1.2

- The category sells 23% of its total units with a promotional price discount. This is a -0.3% decrease over the prior year
- The average discount for the category is 20% resulting in a 21% item lift over baseline expectations. This is a 1.0% lift on average for every 1% of discount – low compared to other Body Care categories
- Veriditas Botanicals, which claims the fastest growth and sales velocity rates among the Top 10 brands, also had the most units sold on promo over the period

Source:
SPINScan Natural x-WF
Natural Supermarkets >\$2mm
52 Wks Ending 03/17/2012 unless otherwise noted

SPINS PROPRIETARY AND CONFIDENTIAL



Growth of Retail Aromatherapy Brand Performance

Stay Sharp & Focused
With NOW® Solutions Pure Essential Oils



Many people don't realize that aromatherapy is a great way to promote mental focus and clarity. With kids and adults alike heading back to school there's never been a better time to stock NOW® Solutions outstanding line of pure essential oils and essential oil blends. Combining a few drops of our refreshing oils, including Peppermint, Lavender, Chamomile and Eucalyptus, can help your customers stay sharp and focused, minimize stress, retain knowledge, and make homework and late-night study sessions a little more bearable. With NOW Solutions pure essential oils your customers will be better prepared for another year of learning and growth.

Mental Focus Eucalyptus Oil 3 drops Peppermint Oil 2 drops Tangerine Oil 2 drops	Daily Balance Geranium Oil 2 drops Rose Absolute Oil 2 drops Clary Sage Oil 2 drops	Headache Ease Lavender Oil 3 drops Peppermint Oil 3 drops Chamomile Oil 3 drops
--	---	---

Mix drops together in your favorite diffuser and enjoy!

Redefining natural beauty
now®
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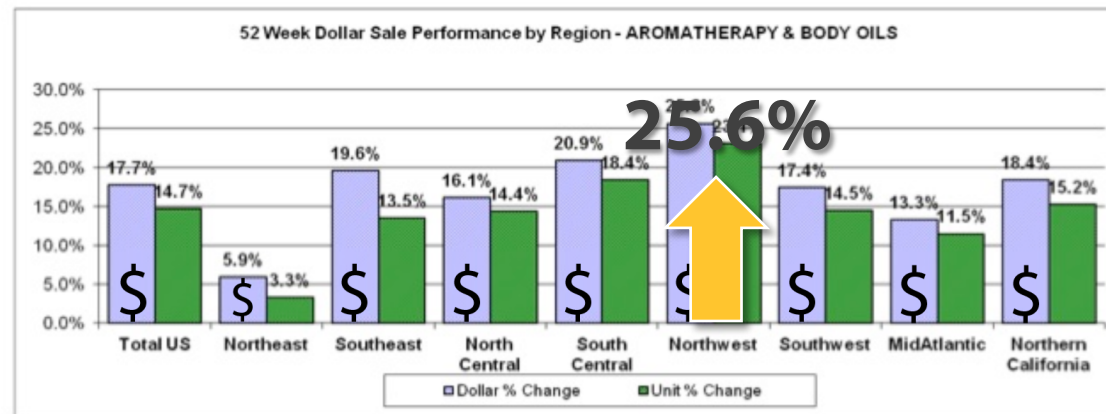
Consumers need to be educated on how to use essential oils.

This will also provide an opportunity to develop the accessories subcategory.



Growth of Retail Aromatherapy Sector

Regional Trend



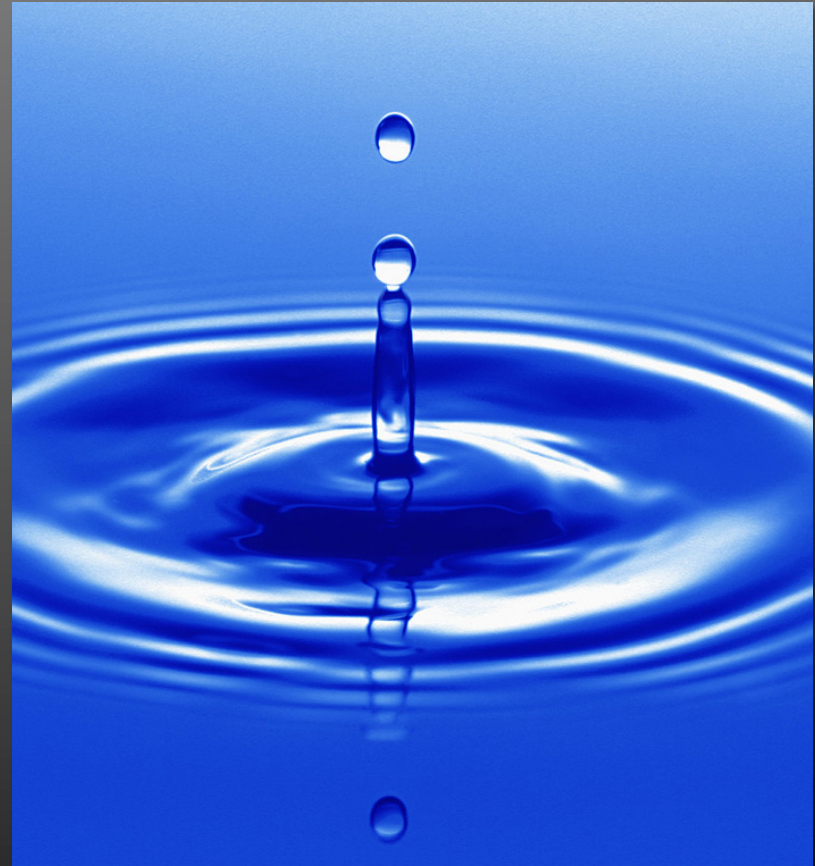
- All of the SPINSScan Natural regions saw dollar increases compared to year ago, although growth was minimal in the Northeast
- The Northwest was the fastest growing region for the category

Source:
SPINSScan Natural / NAC
Natural Supplement Sales of Summer
2014 Analysis Q3/T4/2014 unless otherwise noted


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Conclusion

The essential oil industry can have an impact on the growing professional clinical and retail aromatherapy markets in the U.S. by producing raw materials with a commitment to...



Conclusion

- Certified organic, or organic cultivated, or sustainably wildcrafted 
- GC/MS analyses to show constituent profile
- Pesticide-free, evidenced by a pesticide analysis

- Aromatherapy accessories
- Continued growth
- Increased education based on research

And, the story of the raw materials needs shared

Essential oils produced with care and concern for those who grow and gather...



...will be sought after, as key factors in a product's desirability.





An abiding love for the raw materials can unite us...



...as one industry where
sustaining our resources is
achieved with equal parts
heart and head.

Thank you,

Questions or comments:
dorenepetersen@achs.edu

References

A.F.N.O.R. Association Francaise de Normalisation Tour Europe Cedex 7 92049 Paris La Defense

Agency for Toxic Substances & Disease Registry (ATSDR). (2011). Toxic Substances Portal - Diethyl phthalate. ASTDR. Retrieved from <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=602&tid=112>

Al-Maskri, A.Y., Hanif, M.A., Al-Maskari, M.Y., Abraham, A.S., Al-sabahi, J.N., & Al-Mantheri, O. (2011) Essential oil from *Ocimum basilicum* (Omani Basil): a desert crop. *Nat Prod Commun.*, 6(10).

Altaei, D.T. (n.d.). Topical lavender oil for the treatment of recurrent aphthous ulceration. Department of Pharmacology and Toxicology, College of Pharmacy, Hawler Medical University.

Buren, B. (n.d.). Wildcrafting: A “simple” life fraught with a host of complex ethical and practical considerations. *Rodale Institute*. Retrieved from http://newfarm.rodaleinstitute.org/features/0304/wilds/wild_ethics.shtml

Çetinkaya, B. & Başbakkal, Z. (2012). The effectiveness of aromatherapy massage using lavender oil as a treatment for infantile colic. *Int J Nurs Pract.*, 18(2):164-9.

Choi, H-Y., Yang, Y-C., Lee, S., Clark, J.M., & Ahn, Y-J. (2010). Efficacy of Spray Formulations Containing Binary Mixtures of Clove and Eucalyptus Oils Against Susceptible and Pyrethroid/ Malathion-Resistant Head Lice (Anoplura: Pediculidae). *Journal of Medical Entomology*, 47(3):387-391. 2010.



References

Choudhury, E. S., Moberg, P., & Doty, R. L. (2003). Influences of Age and Sex on a Microencapsulated Odor Memory Test. *Chem Senses*, 28(9): 799-805. Accessed on 1/22/08 at: <http://chemse.oxfordjournals.org/cgi/content/full/28/9/799>.

Consumer Product Safety Commission <http://www.cpsc.gov/>

Cox, S.D., Mann, C.M., & Markham, J.L. (2001). Interactions between components of the essential oil of *Melaleuca alternifolia*. *Journal of Applied Microbiology*, 91(3): 492-497.

dEnfert, C. & Hube. B. (Eds.). (2007). *Candida: Comparative and Functional Genomics*. Caister Academic Press.

de Rapper, S., Kamatou, G., Viljoen, A., & van Vuuren, S. (2013). The In Vitro Antimicrobial Activity of *Lavandula angustifolia* Essential Oil in Combination with Other Aroma-Therapeutic Oils. *Evid Based Complement Alternat Med.*, 852049.

FDA Cosmetic Labeling (2000) <http://www.fda.gov/Cosmetics/ProductandIngredientSafety/ProductInformation/ucm127054.htm>

FDA Dietary Supplements Labeling Guidelines (2005)
<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/DietarySupplements/ucm070519.htm#1-6>



References

Federal Trade Commission. <http://www.ftc.gov/>

FDA. (2010, September 15). "Organic" Cosmetics. FDA. Retrieved from <http://www.fda.gov/Cosmetics/ProductandIngredientSafety/ProductInformation/ucm203078.htm>

Fox, K. (2009). The Smell Report. Social Issues Research Centre. Retrieved from http://www.sirc.org/publik/smell_culture.html

Geda, A.K. (1995). Antibacterial Activity of Essential Oils and their Compositions. *Fat Sci Technol.*, 97(12): 458-460

Ghasemi Pirbalouti, A., Mahdad, E., & Craker, L. (2013). Effects of drying methods on qualitative and quantitative properties of essential oil of two basil landraces. *Food Chem.*, 1;141(3):2440-9.

Heimes, K., Hauk, F., & Verspohl, E. (2011). Mode of action of peppermint oil and (-)-menthol with respect to 5-HT₃ receptor subtypes: binding studies, cation uptake by receptor channels and contraction of isolated rat ileum. *Phytother Res.*, 25(2), 702-8.

Herz, R. S. (2009) Aromatherapy Facts and Fictions: A Scientific Analysis of Olfactory Effects on Mood, Physiology and Behavior. *International Journal of Neuroscience*, 119:2, 263-290



References

Holmes, C., Hopkins, V., Hensford, C., MacLaughlin, V., Wilkinson, D., & Rosenvinge, H. (2002). Lavender oil as a treatment for agitated behaviour in severe dementia: a placebo controlled study. *Int J Geriatr Psychiatry*, 17(4):305-8. Access at PubMed at:<http://www.ncbi.nlm.nih.gov/pubmed/11994882>.

Hongratanaworakit, T. (2004). Physiological effects in aromatherapy. *Songklanakarin J. Sci. Technol.*, 26(1):117-125.

Hritcu, L., Cioanca, O., & Hancianu, M. (2012). Effects of lavender oil inhalation on improving scopolamine-induced spatial memory impairment in laboratory rats. *Phytomedicine*, 19(6):529-34.

International Standards Organization (ISO)

International Union for Conservation of Nature Natural Resources (IUCN)

<http://www.youtube.com/watch?v=k2LnoLD2ss0>

<http://www.iucnredlist.org>

Jain, D., et al. (2011). Evaluation of cytotoxicity and anticarcinogenic potential of mentha leaf extracts. *Int J Toxicol*, 30(2): 225-36.

Jellinek, J. (1997). Psychodynamic odor effects and their mechanisms. *Perfumer and Flavorist*, 22(5), 29-41.

Kikuchi, A., Tanida, M., Veboyama, S., Abe, T., & Yamaguchi, H. (1991). Effect of odors in cardiac response patterns in a reaction time task. *Chem. Senses*, 16:183.



References

- Kim, I., Kim, C., Seong, K., Hur, M., Lim, H., & Lee, M. (2012). Essential Oil Inhalation on Blood Pressure and Salivary Cortisol Levels in Prehypertensive and Hypertensive Subjects. *Evid Based Complement Alternat Med.*, 2012.
- Larsson, M., Finkel, D., & Pedersen, N. L. (2000). Odor Identification: Influences of Age, Gender, Cognition, and Personality. *J Gerontol. B. Psychol. Sci. Soc. Sci.*, 55(5): 304-310. Accessed on 1/22/08 at: <http://psychsoc.gerontologyjournals.org/cgi/content/abstract/55/5/P304>
- Lin, P.W., Chan, W.C., Ng, B.F., & Lam, L.C. (2007). Efficacy of aromatherapy (*Lavandula angustifolia*) as an intervention for agitated behaviours in Chinese older persons with dementia: a cross-over randomized trial. *Int J Geriatr Psychiatry*, 22(5):405-10. Full text access through PubMed at: <http://www.ncbi.nlm.nih.gov/pubmed/17342790>.
- López-Carrillo L, Hernández-Ramírez RU, Calafat AM, Torres-Sánchez L, Galván-Portillo M, Needham LL, Ruiz-Ramos R, Cebrián ME. (2010). Exposure to phthalates and breast cancer risk in northern Mexico. *Environ Health Perspect.* 2010 Apr;118(4):539-44.
- Low, D., Rawal, B.D., & Griffin, W. (1974). Antibacterial action of the essential oils of some Australian Myrtaceae with special references to the activity of chromatographic fractions of oils of *Eucalyptus citriodora*. *Planta Med.*, 26: 184-189



References

- Macedo, I., Bevilaqua, C., de Oliveira, L., Camurça-Vasconcelos, A., Vieira, L., Oliveira, F., et al. (2010). Anthelmintic effect of *Eucalyptus staigeriana* essential oil against goat gastrointestinal nematodes. *Veterinary Parasitology*, 173(1-2): 93-98.
- Macedo, L., Bevilaqua, C., de Oliveira, L., & Camurça-Vasconcelos, A. (2009). Ovicidal and larvicidal activity in vitro of *Eucalyptus globulus* essential oils on *Haemonchus contortus*. *Rev. Bras. Parasitol. Vet., Jaboticabal*, 18(3): 62-66.
- Malik, T., Singh, P., Pant, S., Chauhan, N., & Lohani, H. (2011). Potentiation of antimicrobial activity of ciprofloxacin by *Pelargonium graveolens* essential oil against selected uropathogens. *Phytother Res.*, 25(8): 1225-8.
- Moss, M., Cook, J., Wesnes, K., & Duckett, P. (2003). Aromas of rosemary and lavender essential oils differentially affect cognition and mood in healthy adults. *Intern. J. Neuroscience*, 133, 15-38.
- Nasel, C., Nasel, B., Samec, P., Schindler, E., & Buchbauer, G. (1994). Functional imaging of effects of fragrances on the human brain after prolonged inhalation. *Chem Senses*, 19(4), 359-364.
- Organic.org. (2013). Glossary. Retrieved from <http://www.organic.org/articles/showarticle/article-215>



References

- Ou, M.C., Hsu, T.F., Lai, A.C., Lin, Y.T., & Lin, C.C. (2012). Pain relief assessment by aromatic essential oil massage on outpatients with primary dysmenorrhea: a randomized, double-blind clinical trial. *J Obstet Gynaecol Res.*, 38(5):817-22.
- Panahi, Y., Akhavan, A., Sahebkar, A., Hosseini, S.M., Taghizadeh, M., Akbari, H., et al. (2012). Investigation of the effectiveness of *Syzygium aromaticum*, *Lavandula angustifolia* and *Geranium robertianum* essential oils in the treatment of acute external otitis: A comparative trial with ciprofloxacin. *J Microbiol Immunol Infect.*, pii: S1684-1182(12)00214-9.
- Petersen, D. (2013) 2013 Aromatherapy Trends Survey.
- Price, S., & Price, L. (2000). *Aromatherapy for Health Professionals* (2nd ed.). Philadelphia: Churchill Livingstone, 268.
- Saharkhiz, M., Motamedi, M., Zomorodian, K., Pakshir, K., Miri, R., & Hemyari, K. (2010). Chemical composition, antifungal and antibiofilm activities of the essential oil of *mentha piperita* l. *ISRN Pharm*, 718645.
- Sayorwan, W., Siripornpanich, V., Piriyaupunaporn, T., Hongratanaworakit, T., Kotchabhakdi, N., & Ruangrunsi, N. (2012). The effects of lavender oil inhalation on emotional states, autonomic nervous system, and brain electrical activity. *J Med Assoc Thai.*, 95(4):598-606.



References

- Selvakumar, P., Naveena, B., Prakash, S.D. (2012). Studies on the antidandruff activity of the essential oil of *coleus amboinicus* and *eucalyptus globulus*. *Asian Pacific Journal of Tropical Disease*, 2(2): S715–S719.
- Sheikhan, F., Jahdi, F., Khoei, E.M., Shamsalizadeh, N., Sheikhan, M., & Haghani, H. (2012). Episiotomy pain relief: Use of Lavender oil essence in primiparous Iranian women. *Complement Ther Clin Pract.*, 18(1):66-70.
- Singh, G., Upadhyay, R.K., Narayanan, C.S., Padmkumari, K.P., & Rao, G.P. (1993). Chemical and fungitoxic investigations on the essential oil of *Citrus sinensis* (L.) Pers. *J Plant Dis Protect*, 100(1):69-74.
- Tadtong, S., Suppawat, S., Tintawee, A., Saramas, P., Jareonvong, S., & Hongratanaworakit, T. (2010). Antimicrobial activity of blended essential oil preparation. *Nat Prod Commun.*, 7(10):1401-4.
- Taur, D.Y., Kulkarni, V.B., & Patil, R.Y. (2010). Chromatographic evaluation and anthelmintic activity of *Eucalyptus globulus* oil. *Pharmacognosy Res.*, 2(3): 125–127.
- Tayarani-Najaran, Z., Talasaz-Firoozi, E., Nasiri, R., Jalali, N., & Hassanzadeh, M. (2013). Antiemetic activity of volatile oil from *mentha spicata* and *mentha × piperita* in chemotherapy-induced nausea and vomiting. *Ecancermedicalscience*, 7.
- Theosophy. (1938). Great Theosophists: Paracelsus: Philosopher. *Theosophy*, 26(5). Retrieved from <http://www.wisdomworld.org/setting/paracelsusone.html>



References

- Tisserand, R., Balacs, T. (1996) *Essential Oil Safety: A Guide for Healthcare Professionals*. Churchill Livingstone: United Kingdom.
- Tolosa, A.C., Lucía, A., Zerba, E., Masuh, H., & Picollo, M.I. (2010). Eucalyptus essential oil toxicity against permethrin-resistant *Pediculus humanus capitis* (Phthiraptera: Pediculidae). *Parasitol Res.*, 106(2):409-14.
- Tucker, A. (January / February 1999). Research Reveals The Healing Powers of Aromatherapy. *Mother Earth Living*. Retrieved from <http://www.motherearthliving.com/natural-beauty/the-therapy-of-aroma.aspx?PageId=2#ArticleContent>
- Uehleke, B., Schaper, S., Dienel, A., Schlaefke, S., & Stange, R. (2012). Phase II trial on the effects of Silexan in patients with neurasthenia, post-traumatic stress disorder or somatization disorder. *Phytomedicine*, 15;19(8-9): 665-71.
- United Plant Savers <http://www.unitedplantsavers.org/content.php/121-species-at-risk>
- Varney, E., & Buckle, J. (2013). Effect of inhaled essential oils on mental exhaustion and moderate burnout: a small pilot study. *J Altern Complement Med.*, 19(1): 69-71.
- Williams, A.C. & Barry, B.W. (1989). Essential Oils as Novel Human Skin Penetration Enhancers. *Int J Pharmaceut.*, 57:R7-R9.
- Winter, R. A (2009). *Consumers Dictionary of Cosmetic Ingredients*. Harmony: 314.



References

- Tucker, A. (January/February 1999). Research Reveals The Healing Powers of Aromatherapy. *Mother Earth Living*. Retrieved from <http://www.motherearthliving.com/natural-beauty/the-therapy-of-aroma.aspx?PageId=2#ArticleContent>
- Uehleke, B., Schaper, S., Dienel, A., Schlaefke, S., & Stange, R. (2012). Phase II trial on the effects of Silexan in patients with neurasthenia, post-traumatic stress disorder or somatization disorder. *Phytomedicine*, 15;19(8-9): 665-71.
- Varney, E., & Buckle, J. (2013). Effect of inhaled essential oils on mental exhaustion and moderate burnout: a small pilot study. *J Altern Complement Med.*, 19(1): 69-71.
- Williams, A.C. & Barry, B.W. (1989). Essential Oils as Novel Human Skin Penetration Enhancers. *Int J Pharmaceut.*, 57:R7-R9.
- Winter, R. A (2009). *Consumers Dictionary of Cosmetic Ingredients*. Harmony: 314.



Visuals

Anderson, M. (n.d.) Animal Cartoon #2711[Cartoon]. Retrieved from
<http://www.andertoons.com/animal/cartoon/2711/i-prefer-term-aromatherapy>

Assad, P. (n.d.) Cutaneous Larva Migrans [Photograph]. Retrieved from
<http://www.the-travel-doctor.com/cutaneouslarvamigrans.htm>

Coverly, D. (2000) Normally, I Don't Like To Recommend This [Cartoon]. Retrieved from
<http://www.speedbump.com>

Farris, J. (n.d.) All in an NP Day... [Cartoon].

Hardin Library for the Health Sciences. (2010) Athletes Foot [Photograph]. Retrieved from
<http://hardinmd.lib.uiowa.edu/dermnet/athletesfoot6.html>

Institute for Sustainability. (2012) Global Sustainability Green Integration [Graphic]. Retrieved from
http://www.aiche.org/sites/default/files/styles/aiche_content/public/images/page/lead/global_sustainability-green-integration.png

Los Angeles Times (2010) PTSD [Photograph].
<http://latimesblogs.latimes.com/.a/6a00d8341c630a53ef0133f040ea61970b-300wi>



Visuals

Mercer Infection. (2013) What Is A Mercer Infection? [Photograph] Retrieved from <http://mercerinfection.net/tag/staph-infection/http://mercerinfection.net/tag/staph-infection/>

Parisi, M. (n.d.) Candle [Cartoon]. Retrieved from <http://www.philosophyofdog.com/blog/images/candle.jpg>

Pulsetoday.co.uk (2007) Mouth Problems [Photograph]. Retrieved from http://www.pulsetoday.co.uk/Pictures/web/i/v/v/Oral_Medicine_Quiz_oral_candida_Mike_Wyndham_single_use.jpg

Tumblr. (n.d.) Placebo Effect On Tumblr [Graphic]. Retrieved from <http://www.tumblr.com/tagged/placebo-effect>

Very Smart Brothas. (2013) Water Drop [Photograph]. Retrieved from <http://verysmartbrothas.com/images/water-drop.jpg?9fe95b>

