

# Pilot Study on the Affect of Aromatherapy on Relaxation in Yoga Practice

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## *Abstract*

Yoga is viewed as a healthy and stress reducing activity. The aim of the current study was to measure the affect of aromatherapy on relaxation levels during yoga practice. Over the course of a 12 week yoga class, either one of two different aromas or a control (no aroma) was dispersed within the yoga class. Using a self-reported questionnaire, the yoga practitioners provided subjective ratings of their relaxation levels both before and after class. The results of the study indicate that the presence of an aroma increased the relaxation level of the yoga practitioner.

## *Background*

Since ancient times cultures have recorded the practice of using of scented ointments and oils for physical and psychological benefits. India's Ayurveda medicine is well known for its use of botanical remedies for the maintenance of physical and mental health. Chinese medicine also incorporates the use of aromatics and essential oils as a practice for a long and healthy life. Europe contributed a host of writings in the area of distillation and healing properties of a variety of plants. After a lull in use, the 20th century is experiencing resurgence in the awareness and benefits of essential oils. Today's studies not only focus on physical healing properties but also emotional and psychotherapeutic effects of essential oils. Essential oil research in complementary and alternative medicinal (CAM) practices investigate efficacy to improve states of depression, anxiety, sleep deprivation and relaxation. (Dong and Jacob, 2016) (Rashidi Fakari F, Tabatabaeichehr M, Kamali H, et al 2015).

Yoga is traditionally described as a group of physical, mental, and spiritual practices or disciplines which originated in ancient India. It is broadly seen to promote physical and mental health. North America first adopted yoga practice generally as a physical activity. (Hammond, H, 2007). With the continuing growth trend in the number of people participating in yoga activities (Yoga Journal & Yoga Alliance 2016), practitioners are expanding its perception to include the brain/body interaction with the potential to harness the healing effects of the mind on the body.

Stress levels in North America continue to climb and with it stress-related symptoms and poor health (American Psychological Association, 2016). Few studies to date have focused on the efficacy of aromatherapy use coupled with yoga practice to further the relaxation enhancements for the general yoga practitioner. Therefore, the aim of this pilot study was to test the affect of two different aromatherapy blends on relaxation states for yoga practitioners in a class environment. The hypothesis is that aromatherapy use during yoga practice will increase the practitioners' relaxation levels. This may offer a dynamic element to better cope with increased levels of stress.

## *Methods and Materials*

### **Subjects**

The class practitioners consisted of 8 females aged between 25 and 68. Mean age of practitioners was  $54.5 \pm 15.5$ . Attendance per class ranged from 1 individual to maximum of 6. Average attendance throughout the test period was 4.1 students per class. Attendance averaged 3.25 students for the Control classes; an average of 4.5 students for Aroma1 classes and an average of 4.3 students in Aroma2 classes. Yoga practitioners completed a questionnaire used to measure personal states of relaxation before and after each group yoga session.

### **Setting**

The trial period was conducted over a 12 week period. There was a schedule of 18 yoga classes held 2 days per week with a varying number of attendees in each class. The classes were 90 minutes in duration.

### **Yoga**

The general style of the yoga class consisted of pranayama and breathing techniques, hand mudras, and restorative asanas. Every class ended with Shavasana, for integration of the class practice, inward reflection and a pause before the return to daily life.

### **Venue**

The primary venue was a large rectangular space of approximately 30 feet by 20 feet. The study was held over the winter months and several oscillating portable heaters were used to warm the room. The diffuser was placed approximately at the midpoint of the room next to a fan to assist with dispersion of the aroma. Fifteen of the total eighteen classes were held at this location.

A second venue was used for three classes when the primary venue experienced a water leak. The second space was considerably smaller with a size of about 20 feet by 10 feet. The concentration of the diffused aroma was reduced to 1% to compensate for the smaller class area.

### **Aromatherapy**

An ultrasonic aromatherapy nebulizer was used to disperse two different aromas or a control (no aroma) into the class environment. The use of Aroma1, Aroma2, or the Control was determined by randomization using a Latin Square design. Each blend was to be diffused within six classes; 6 cases of control (no scent) blend, 6 cases using Aroma1; 6 cases using Aroma2. However over the course of the trial, two classes were cancelled; and both were Control (no scent). This left the Control class count to 4, while the Aromas class counts remained at 6 for each aroma (table 1). Each blend was diffused into the class prior to the start of class using the diffuser which remained on for the entire duration of the class (table 2).

Each Aroma blend was mixed to provide a 2.0 % concentration level in the diffuser.

**Table 1. Randomization by Latin Square Design for Diffusion of Aromas**

Thursday class		
Control - no scent	Aroma1	Aroma2
Class 1	Class 3	Class 5
CANCELLED	Class 9	Class 11
Class 17	Class 13	Class 15
Tuesday class		
Control - no scent	Aroma1	Aroma2
Class 2	Class 4	Class 6
Class 10	Class 12	Class 8
CANCELLED	Class 14	Class 16

**Table 2: Diffusion time of aromas prior to start of class (in minutes)**

Thursday class		
Control - no scent	Aroma1	Aroma2
8	8	12
CANCELLED	9	10
12	8	10
Tuesday class		
Control - no scent	Aroma1	Aroma2
7	8	11
14	12	9
CANCELLED	9	13

Both Aroma1 and Aroma2 contain essential oils with emotional index markers for general stress reduction and calming. Aroma1 is targeted towards balancing the energy state of the chakras in the body (table 3) while Aroma2 is targeted towards balancing the mental aspect of the mind (table 4). Aroma1 had a composition that was 30% top notes, 30% middle notes and 40% base notes. Aroma2 had a composition of 20% middle notes, and 80% base notes.

**Table 3. Aroma1 essential oil components**

Essential Oil	Note	Emotional Index	Chakra
<i>Cypressus sempervirens</i> (cypress)	Middle	Stress reducer	Root
<i>Santalum spicatum</i> (sandalwood)	Base	Calming	Sacral
<i>Citrus limonum</i> (lemon)	Top	Anxiety reducer	Solar Plexus
<i>Rosa damasca</i> (rose)	Base	Calming	Heart
<i>Ocimum basilicum</i> (basil)	Top	Anxiety reducer	Throat
<i>Lavendula angustifolium</i> (Lavender)	Middle	Stress reducer	Third Eye
<i>Boswellia carterii</i> (frankincense)	Base	Calming	Crown

**Table 4. Aroma2 essential oil components**

Essential Oil	Note	Emotional Index
<i>Santalum spicatum</i> (sandalwood)	Base	Calming
<i>Ariba roseodara</i> (rosewood)	Middle	Stress reducer
<i>Styrax benzoin</i> (benzoin)	Base	Stress reducer
<i>Commiphora myrrha</i> (myrrh)	Base	Calming
<i>Boswellia carterii</i> (frankincense)	Base	Calming

Control (No Scent): The diffuser was also used for the Control (using only distilled water) to address the physiological component and the visual reinforcement of vapor dissemination within the room.

### Questionnaire

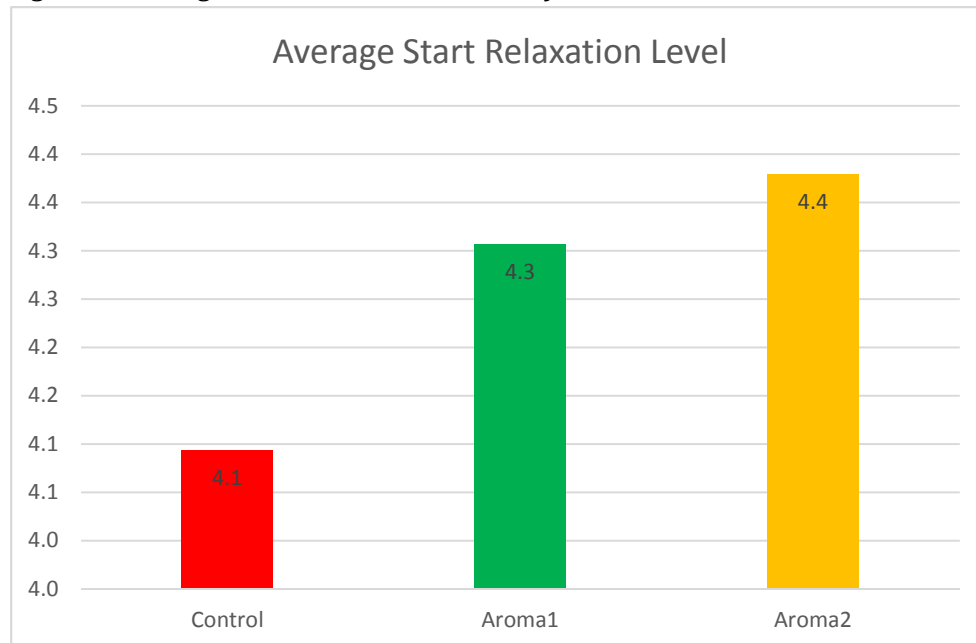
A questionnaire was developed for the practitioners to fill out every yoga class (Appendix 1). The questionnaire used self-reported rating scales for the participants to determine their own affected relaxation state both before and immediately after yoga class. Respondents were asked to mark their relaxation state response on a 10 point Likert based scale. A verbal grade scale of ; Not at All Relaxed; Moderately Relaxed; Extremely Relaxed, was used in conjunction with the number based scaled.

Students were also asked whether or not they perceived an aroma during class. If they responded yes, additional questions were listed to answer. Respondents were to rate whether the aroma was pleasant or not; and whether or not the aroma affected their relaxation level. A final Yes/No question was posed to the student as to whether or not they would like to practice yoga again with the aroma.

### Results

The data suggests an increased level of relaxation with Aroma2 (average= 4.4) and Aroma1 (average= 4.3) at the beginning of class when compared to Control (average= 4.1) (Figure 1).

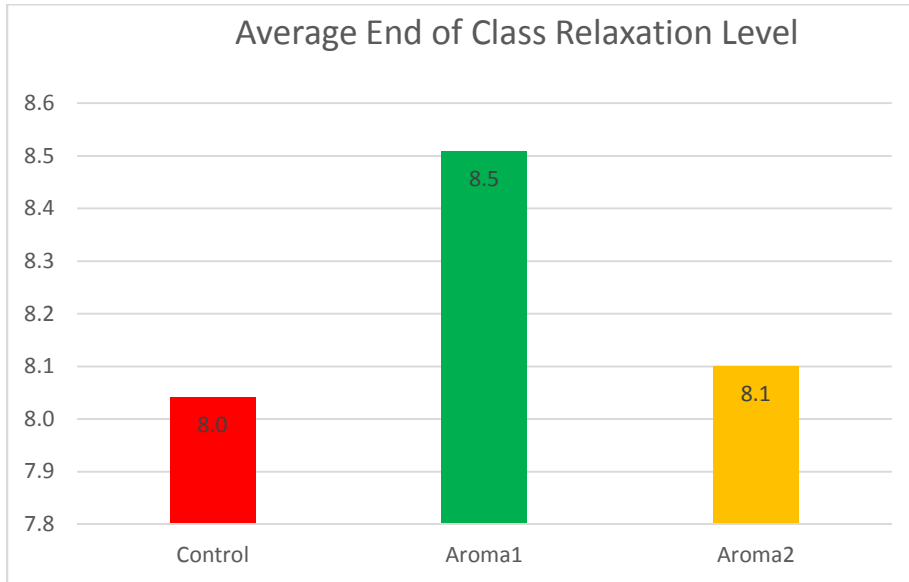
**Figure 1: Average relaxation levels at start of class**



Both Aroma1 and Aroma2 demonstrated highly variable Start Relaxation levels in comparison to the Control. Control had an average Start Relaxation value of  $4.1 \pm .28$ ; Aroma1 was  $4.3 \pm .87$ ; Aroma2 was  $4.4 \pm .92$ .

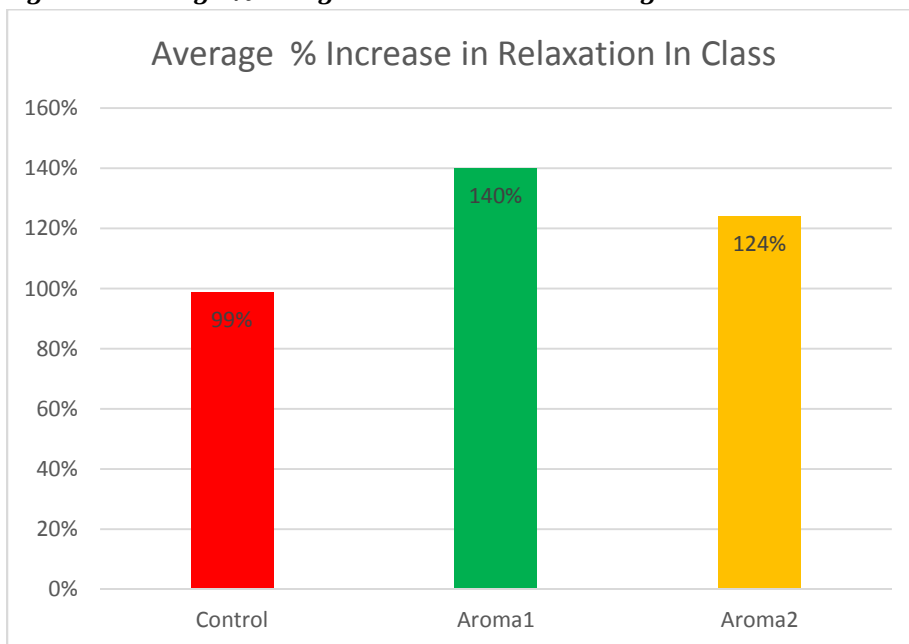
Aroma1 had the highest average End Relaxation level (average= 8.5) compared to Aroma2 (average=8.1) and Control (average=8.0) (Figure2).

**Figure 2: Average relaxation levels at end of class**



Aroma1 demonstrated the greatest change in relaxation level during the classes with an average relaxation increase of 140% compared to Aroma2 at 124% and Control at 99%. (Figure 3).

**Figure 3: Average % change in relaxation level during class**



Students recorded Aroma1 as the most pleasant aroma. Aroma1 was also rated the highest when asked whether the aroma affected their relaxation level; average rate for Aroma1 was 7.8; Aroma2 was 6.9 and Control was 6.0. Practitioners did also note that in some cases the aroma was difficult to discern.

## *Discussion*

Both Aroma1 and Aroma2 scored higher Average Start Relaxation levels than the Control. Aroma2 scored the highest single class Start Relaxation level of 5.8 followed by Aroma1 at 5.4 and Control at 4.4. It is interesting to note however that both Aromas had the single lowest Start Relaxation levels of 3.0, where the minimum single Start Relaxation level for Control was 4.0. The high variability in the Start Relaxation levels for Aroma1 and Aroma2 might be explained by a memory response to the aroma (Vilaplana, A., Yamanaka, T. 2014), but is beyond the scope of this particular study.

The improvements in Start Relaxation Level when an aroma was present is possibly the most striking finding of the study. This suggests that even upon starting the yoga class, presence of an aroma marginally assisted the practitioner's relaxation level.

Both aromas also provided higher average End Relaxation levels compared to the Control. Aroma1 achieved the highest Average End Relaxation level and attained the highest single End Relaxation score over the entire trial period of 9.5. Aroma1 also had the highest frequency of End Relaxation levels of 8.0 or higher.

Of special note; the first class of the trial used a Control sample but was perceived by the class to have a scent. This was the only class where the Control scored an End Relaxation level above 8.0. This one placebo effect may have artificially increased the value of End Relaxation states for the purposes of Control monitoring. It does however suggest that even the perceived presence of aroma improved the practitioner's subjective ratings of relaxation.

Aroma1 recorded an average 41% higher change in relaxation level compared to Control, while Aroma2 recorded an average 25% higher change in relaxation level Control.

In most cases the practitioners indicated that they believed the aromatherapy enhanced their relaxation states. There were however, subjective comments including "I wasn't not aware of any affect", "I'd like to use the aroma again to increase my awareness of it"; "didn't know whether it did or not".

Aroma1 was indicated as the most pleasant aroma, and also rated the highest in affecting the practitioners relaxation level. One possible reason for the preference of Aroma1 over Aroma2 could be the presence of two Top Notes in Aroma1; *Citrus limonum* (lemon) and *Ocimum basilicum* (basil). Top Notes tend to be refreshing and uplifting in nature, are fairly penetrating and are generally the first component to register in the olfactory senses. Base notes are heavier and tend to evolve more slowly, gather body over time. In some instances, practitioners did indicate that the aroma was not apparent until they approached the diffuser, or that they would experience "whiffs" throughout the class. It is most likely that the top notes of Aroma1 "carried" the best within the large venue and were more prevalent to the practitioner.

### **Limitations:** *(factors that would limit interpretation of data)*

The Control group had two less data sets available for analysis than both Aroma1 and Aroma2. This reduction in data points to calculate averages over the trial period could have artificially skewed the Control averages in comparison to the Aroma averages.

Aroma as a control variable is difficult to isolate. Although the Control classes used only distilled water within the diffuser, it is impossible to isolate other aromas from the environment. A fragrance free environment was not a condition addressed within the parameters of the study. Aromas may have been introduced through different media like perfume, deodorant or even cleaning materials. Beverages like herbal tea were also present within the classroom. Although these random aroma variables would have been present in all classes, it is likely they would have been more pronounced in the No Aroma condition classes and would be most probable to have the greatest influence on ratings within the Control group.

The size of the room and the distance from the diffuser influenced the olfactory stimulation of the practitioner. For some classes in the larger venue, comments by some participants included; “couldn’t smell it at first”, “just small whiffs”, “I was not able to notice the aroma until I was closer”. This suggests that either the practitioner was too far away from the diffuser for the concentration dose, or that more time was needed before class to diffuse the aroma within the space.

These observations of limitations may have influenced the results obtained.

### **Conclusion**

It is acknowledged that this study was performed on a small number of participants, and control conditions were not optimal. Findings do suggest that the use of aromatherapy during yoga practice may offer enhanced relaxation levels to the practitioner. The study captured an increased relaxation level at both the start and end of class when aroma was present in room.

Stress is recognized as a contributor to serious health problems and yoga is recognized as a stress reducing activity (National Institute of Mental Health). The outcomes of this study indicate that aroma may be an adjunct to yoga practice for increasing relaxation states. Though the affect of aromatherapy on relaxation during yoga practice may be marginal, any cost effective means of assisting the general population in mitigating their own stress levels should be encouraged.

### **Acknowledgements**

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## Appendix 1

### Questionnaire

Please answer the following questions.

Date: \_\_\_\_\_

1. I am: \_\_Female \_\_Male Age: \_\_\_\_\_

2. Before attending yoga class today my general state of relaxation was: (place a mark on the line)

1-----+-----+-----+-----+-----10  
Not at all                      Moderately                      Extremely  
relaxed                              relaxed                              relaxed

3. After completing yoga class today my general state of relaxation was: (place a mark on the line)

1-----+-----+-----+-----+-----10  
Not at all                      Moderately                      Extremely  
relaxed                              relaxed                              relaxed

4. Did you notice a distinct aroma in the room? \_\_\_\_Yes \_\_\_\_No

If Yes.....

a. Did you find the aroma: (place a mark on the line)

1-----+-----+-----+-----+-----10  
Unpleasant                      Neutral                      Pleasant

b. Did the aroma in the room affect your relaxation level? (place a mark on the line)

1-----+-----+-----+-----+-----10  
Not at all                      Moderately                      Extremely  
affected                              affected                              affected

c. Would you like to practice yoga with this aroma again? \_\_\_\_Yes \_\_\_\_No



## References

American Psychological Association (2016). *Stress in America: The impact of discrimination*. Stress in America™ Survey.

Dong S, Jacob TJ. Combined non-adaptive light and smell stimuli lowered blood pressure, reduced heart rate and reduced negative affect. *Physiol Behav*. 2016;156:94-105.

Hammond, Holly “Yoga Pioneers: How Yoga Came to America” *Yoga Journal*. August 2007. Web version

Knasko 1992, Ambient odor’s effect on creativity, mood and perceived health. *Chem Senses* 1992;17:27-35

National Institute of Mental Health, Stress Factsheet. Retrieved from [http://www.nimh.nih.gov/health/publications/stress/stress\\_factsheet\\_In\\_142898.pdf](http://www.nimh.nih.gov/health/publications/stress/stress_factsheet_In_142898.pdf)

Rashidi Fakari F, Tabatabaeichehr M, Kamali H, et al. Effect of Inhalation of Aroma of Geranium Essence on Anxiety and Physiological Parameters during First Stage of Labor in Nulliparous Women: a Randomized Clinical Trial. *J Caring Sci*. 2015;4(2):135-141.

Vilaplana, A, Yamanaka, T. The Waiting Room. Improving Space Through Smell. International Conference Kansei Engineering and Emotion Research, Linkoping University, Sweden June 11-13 2014.

Yoga Journal & Yoga Alliance. 2016 Yoga in America Study. Retrieved from <https://www.yogaalliance.org/Portals/0/2016%20Yoga%20in%20America%20Study%20RESULTS.pdf>

## Bibliography

B. Ali, N.A. Al-Wabel, S. Shams, A. Ahamad, S.A. Khan, F. Anwar, Essential oils used in aromatherapy: a systemic review *Asian Pac J Trop Biomed*, 5 (2015), pp. 601–611

Chebat, J., Michon, R. (2003). Impact of ambient odors on mall shoppers’ emotions, cognition, and spendin. A test of competitive causal theories. *Journal of Business Research* 56: 529-539.

Cohen, S., Kamarck, T., and Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 386-396.

Hawkins, Beverly (1999) *Aromatherapy 101* West Coast Institute of Aromatherapy Inc. 1999

Hongratanaworakit, T. and Buchbauer, G. (2006), Relaxing effect of ylang ylang oil on humans after transdermal absorption. *Phytother. Res.*, 20: 758–763. doi: 10.1002/ptr.1950

Imanishi, Jiro et al. “Anxiolytic Effect of Aromatherapy Massage in Patients with Breast Cancer.” Evidence-based Complementary and Alternative Medicine : *eCAM* 6.1 (2009): 123–128. *PMC. Web*. 4 July 2016.

Jones, D, Dechmerowski, S., Oden, R., Pike, W. (2014). *Reducing Boredom Using Scent to Improve Constructs Critical to Learning. Proceedings of the Human Factors and Ergonomics Society 58<sup>th</sup> Annual Meeting 2014* 447-451.

Lawless, Julia, *The Encyclopedia of Essential Oils*, Conari Press, 2013, ISBN 978-1-57324-614-9

Redstone, L (2015) Mindfulness Meditation and Aromatherapy to Reduce Stress and Anxiety. *Archives of Psychiatric Nursing* 29 (2105) 192-193.

Ret, J. (2006), *Effects of Pleasant Ambient Odor and Verbal Priming on Memory Recall. Thesis Faculty of Miami University, Oxford Ohio*

Raudenbush, B., Corley, N. & Eppich, W. (2001). Enhancing athletic performance through the administration of peppermint odor. *Journal of Sport and Exercise Psychology*, 23,156-160.

Tildesley, N.T.J.et al. (2005). Positive modulation of mood and cognitive performance following administration of acute doses of *Salvia lavandulaefolia* essential oil to healthy young volunteers. *Physiology & Behavior* 83: 699-709.

Warrenburg, S (2005), Effects of Fragrance on Emotions: Moods and Physiology. *Chem Senses* 30: i248-i249.

Weber ST, Heuberger E, 2008 The Impact of Odors on Affective States in Humans. *Chem. Senses* (2008) 33 (5): 441-447.

Worwood, Valerie Ann, *The Complete Book of Essential Oils and Aromatherapy*, San Rafael, Calif. :New World Library, 1991, ISBN 0-931432-82-0