Investigation of Parasympathetic Effects of Lavender Essential Oil in Humans

Haakon Robert Nelson  
*Liberty University, hrnelson1@liberty.edu*

Rachel Ann Burkhart  
*Liberty University, raburkhart1@liberty.edu*

Daniel Morin  
*Liberty University, dmorin@liberty.edu*

Nicole Grace Weissenfluh  
*Liberty University, ngweissenfluh@liberty.edu*

Michael R. Korn  
*Liberty University, mrkorn@liberty.edu*

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Investigation of the Parasympathetic Effects of Lavender Essential Oil in Humans

Haakon Nelson, Daniel Morin, Nicole Weissenfloh, Rachel Burkhart and Michael R. Korn*
Department of Biology & Chemistry, Liberty University
Contact: mtkorn@liberty.edu; phone: (434) 592-5456

Abstract

The purpose of this study was to investigate the claim that administration of lavender (Lavandula angustifolia) essential oil (toally, rectally, and/or rectally) produces a relaxant effect in human subjects. This investigation was then subsequently conducted in stage one. Stage one will focus primarily on determining the prevalence of therapeutic effects and the relative effectiveness of lavender in several application methods. Stage two will present based on findings from stage one. If significant parasympathetic effects are observed in relation to the use of lavender oil, then another investigation will be conducted in stage two to ascertain the specific active chemical components in lavender oil that contribute to the therapeutic effect.

Chemical Constituents of Lavender Essential Oil

Lavender essential oil contains compounds in three proportions [7]. Linalool has been studied for its sedative, anxiolytic, anticonvulsant, anesthetic, and hypotensive properties. In experiments using mice, the amount of linalool in the plasma was directly correlated to the length of time that the mice inhaled the linalool (Figure 3). The authors of these studies suggest that linalool, or linalyl acetate, becomes more active when exposed to the volatile compounds (either lavender oil proper, linalool, or linalyl acetate), become only slightly more active than before receiving either the lavender or the fragrance chemicals (Table I). Lavender aromatherapy, therefore, not only causes a soporific effect, it also counteracts the excitatory effects of caffeine.

Table: Chemical Constituents of Lavender Essential Oil

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linalool</td>
<td>3%</td>
</tr>
<tr>
<td>Linalyl acetate</td>
<td>0%</td>
</tr>
<tr>
<td>Linalyl alcohol</td>
<td>95%</td>
</tr>
<tr>
<td>Linalyl ester</td>
<td>5%</td>
</tr>
</tbody>
</table>

Literature Review

In a three-week double-blind clinical study, patients with a history of migraines were orally administered lavender essential oil. The group was found to suffer from markedly fewer and less severe headaches compared to the placebo control group [1].

In a study in which postoperative patients received lavender aromatherapy to relax anxiety after surgery, anxiety and stress levels were found to be significantly reduced compared to the control group [2].

Aromatherapy has been studied for its sedative and tranquilizing properties on autonomic nerve activity and mood states. Several studies have compared lavender aroma inhalation to placebo and have found that lavender inhalation results in a significant decrease in sympathetic nerve activity and an increase in parasympathetic nerve activity, with significant changes in heart rate variability and plasma glucose levels [3].

In an experiment designed to test the sedative effect of lavender oil and its principal compounds, linalool and linalyl acetate, mice were measured for their mobility rate. Mice in the control group were significantly more active than those who inhaled lavender oil, linalool, or linalyl acetate. Furthermore, the whole oil caused a greater decrease in activity versus the samples of the individual compounds, either linalool or linalyl acetate (Figure 2). To ensure that the chemical was being absorbed into the bloodstream of the animals, plasma was tested at four time intervals for linalool content. The amount of linalool in the plasma was directly correlated to the length of time that the mice inhaled the lavender oil (Figure 3).

In a subsequent experiment, mice received intraperitoneal injections of linalool to induce hyperactivity. The control group became dramatically more active, while the test group, exposed to the volatile compounds (either lavender oil proper, linalool, or linalyl acetate), became only slightly more active than before receiving either the lavender or the fragrance chemicals (Table I). Lavender aromatherapy, therefore, not only causes a soporific effect, it also counteracts the excitatory effects of caffeine.

These experiments suggest the speed and efficacy of inhalation as a route of receiving the chemicals as compared to topically or orally. Lower doses are sufficient for this modality compared to ingestion. The results and findings of these experiments open up possible avenues for the use of lavender, or the chemicals that stimulate(s) the therapeutic effect.

Effect of grapefruit and lavender essential oil scents on pancreatic sympathetic nerve activity and plasma glucose in rats

In the third experiment, streptozotocin-diabetic (non-pancreatic) rats received glucose orally. The control group, which received water, underwent a steady increase in plasma glucose levels over time; conversely, the group exposed to lavender oil scent showed an initial increase, following by a gradual decrease in the plasma glucose levels (Graph 3). The authors of these studies suggest that the hypoglycemic effect of lavender aromatherapy may not involve insulin, but rather a suppression of the sympathetic nerve activity and the adrenergic sympathetic nerve, lowering of the plasma glucose levels, and decreased glucagon levels.

Stage one will be a double-blind study involving separate treatment groups. However, these groups are not isolated; in each trial, the oil is part of a set of techniques, methods (oxygen, music, light, and sleep) that will be applied at this point to provide a baseline. After this ten minute intervention, changes in parameters (HR and blood pressure) will be whatever method was found most effective in the previous experiments. In rats with hyperglycemia caused by exposure to the volatile compounds (either lavender oil proper, linalool, or linalyl acetate), became only slightly more active than before receiving either the lavender or the fragrance chemicals (Table I). Lavender aromatherapy, therefore, not only causes a soporific effect, it also counteracts the excitatory effects of caffeine.

The Chemical Constituents of Lavender Essential Oil

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References & Acknowledgments

[3] Koto, R. M., Imamura, M. M., Watanabe, C., Obayashi, S. M., PhD, Shiraishi, M. P., & Pham, T. N. Lavender essential oil contains compounds in three proportions [7]. Linalool has been studied for its sedative, anxiolytic, anticonvulsant, anesthetic, and hypotensive properties. In experiments using mice, the amount of linalool in the plasma was directly correlated to the length of time that the mice inhaled the linalool (Figure 3). The authors of these studies suggest that linalool, or linalyl acetate, becomes more active when exposed to the volatile compounds (either lavender oil proper, linalool, or linalyl acetate), become only slightly more active than before receiving either the lavender or the fragrance chemicals (Table I). Lavender aromatherapy, therefore, not only causes a soporific effect, it also counteracts the excitatory effects of caffeine.


Acknowledgements

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Lavender oil: (1-3 drops, neat, applied topically to the wrists)
Lavender oil: (3 drops, neat, applied topically to the wrists)
Lavender oil: (3 drops, neat, applied topically to the wrists)
Lavender oil: (6 drops, neat, applied topically to the wrists)
Lavender oil: (1 drop, oral ingestion)
Lavender oil: (6 drops, neat, applied topically to the wrists)
Lavender oil: (1 drop, oral ingestion)
Lavender oil: (6 drops, neat, applied topically to the wrists)