Investigation of Parasympathetic Effects of Lavender Essential Oil in Humans

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Investigation of the Parasympathetic Effects of Lavender Essential Oil in Humans

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Abstract

The purpose of this study was to investigate the effects of lavender (Lavandula angustifolia) essential oil (topically, orally, and/or intranasally) on respiratory rate and cutaneous temperature in adults. The test group was found to have a significantly lower respiratory rate and a significantly lower cutaneous temperature than the control group (Graph A). In a second experiment, intranasal lavender oil was found to significantly reduce activity of the efferent parasympathetic nervous system compared to the control group (Graph B). Other experiments demonstrated that lavender oil, linalool, and linalyl acetate reduce heart rate and increase plasma glucose levels in rats when compared to the control group (Graph C). Therefore, it can be concluded that lavender oil has parasympathetic effects on the animal nervous system.

Literature Review


Chemical Constituents of Lavender Essential Oil

Lavender essential oil contains a large number of chemical constituents, including linalool, linalyl acetate, and 1,8-cineole. These constituents are known to have a variety of biological activities, including sedative, anti-inflammatory, and antimicrobial effects.

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

In the first set of experiments exploring the effects on the ANS of grapefruit and lavender essential oil scents, rats exposed to grapefruit oil scent demonstrated increased stimulation of the efferent sympathetic nerve of the pancreas, while the scent of lavender oil induced a decrease in activity of the nerve (Graph A and B above).

In rats with hyperglycemia caused by intracranial injection of 2-deoxy-D-glucose (2DG), the scent of grapefruit oil resulted in a greater increase in blood plasma glucose levels when compared to the control group (Graph A). By contrast, the lavender oil scent resulted in a decrease in blood plasma glucose levels (Graph B). These observations suggest that lavender essential oil may have therapeutic potential for the treatment of diabetes.

Physiological Effects of Lavender Oil

Lavender essential oil is a rapid acting nervine, useful for its sedative, anti-inflammatory, and analgesic properties. The primary active component of lavender essential oil is linalool, which is a volatile terpene alcohol. The scent of lavender oil is associated with a decrease in respiratory rate and cutaneous temperature, suggesting a parasympathetic effect on the animal nervous system.

Aromatherapy: Evidence for sedative effects of the essential oil of lavender after inhalation

In an experiment designed to test the sedative effect of lavender oil in rats, linalool and linalyl acetate were measured for their respiratory rate. Group A of the control group was found to have a significantly lower respiratory rate than the test group, indicating a parasympathetic effect of lavender oil on the respiratory system.

Stage one will be a double-blind study involving seven separate trial groups. All subjects, regardless of group, will be allowed to sit in a position of comfort for ten minutes to allow the body to acclimate to a resting state. The pre-intervention set of vitals (i.e., heart rate, respiratory rate) will be taken at this point to provide a baseline. After this ten minute pre-intervention time has been completed, all of the groups will receive lavender oil.

- Group 1: Lavender oil (3 drops, neat, applied topically to the wrists)
- Group 2: Lavender oil (1 drop, neat, oral ingestion)
- Group 3: Lavender oil (6 deep breaths through the nose, direct inhalation)

In order to prevent subjects in Group 1 from simultaneously inhaling the lavender scent, Group 3 will inhale the lavender scent through a nebulizer. For comparison, Groups 4-6 will be given a placebo (a non-essential oil solution).

- Group 4: Placebo oil (3 drops applied topically to the wrists)
- Group 5: Placebo oil (1 drop, oral ingestion)
- Group 6: Placebo oil (6 deep breaths through the nose, direct inhalation)

Group 7 will receive no intervention and will function as a control. Four sets of vital signs (blood pressure, respiratory rate, and heart rate) will be taken in the duration of the experiment: an initial baseline measurement, recorded prior to the intervention, followed by three response measurements, recorded post-intervention in 10 minute intervals. Data from the intervention groups will be compared to data from the control group to ascertain whether or not any parasympathetic responses were associated with each of the intervention modalities, and the data from these modalities that are found to produce a response will be further compared to assess their relative effectiveness in comparison to each other.

In stage two of the experiment, isolated samples of each major constituent compound will be procured and administered to the subjects in the same concentrations found in the lavender oil. For obtaining valid signs will be identical to stage one. The method of administration will contrast, the control group will receive an identical substance to the previous condition. Data will be analyzed following the trials to determine which of the above individuals produced a parasympathetic nerve response, and the extent of these responses will be compared quantitatively to determine which constituents contribute most to the overall parasympathetic effect of the complete lavender oil.

References & Acknowledgments


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Chemical Structure Images: http://www.wikipedia.org