Effects of Cedrol on the Autonomic Nervous System and Survey of Sleep and Stress in USA

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Abstract

We previously reported that cedrol, an odorous component derived from cedarwood oil extracted from conifers such as Himalayan cedar and pine, affects the autonomic nervous system and produces a sedative effect by shifting the autonomic balance to the parasympathetic side. We also performed surveys and comparative studies on the effect of cedrol in 3 countries with ethnic and environmental differences (Norway, Thailand, and Japan) and found that cedrol showed significant sedative effects in all 3 countries.

In this study, we first performed a questionnaire survey concerning the subjects’ perceptions about stress and sleep in northern and southern New Jersey, which is in the suburbs and within the commuting range of New York, and Colorado Springs, which is in a relatively remote area, in the United States, where people are reported to be highly stress-conscious. Then, we performed a comparative survey to clarify whether cedrol produces the same sedative effect as that observed in our previous studies, and found that it also acted on the autonomic nervous system and created a parasympathetic-dominant state at all 3 regions in the United States. Cedrol is expected to exert favorable effects on stress and sleep of Americans, and to be effective for controlling their high-stress lifestyle.

Key words: cedrol, cedarwood, autonomic nervous system, parasympathetic activities dominant, Pittsburgh Sleep Quality Index.

1. Introduction

The effects on humans of plant-derived aromatic components such as the active component of the forest bath, volatile phytontid, and the aromatic components of green, alcohol and aldehyde of green leaves, have been reported1). However, generally, preference and the intensity of sensation vary among individuals, and the physiological effects of scents vary depending on gender and age2). Thus, discovery of an aromatic component that exerts a physiological effect regardless of taste and the degree of perception may increase the importance of the physiological and psychological utilization of the component.

We have clarified that the aromatic component of cedarwood oil extracted from conifers such as Himalayan cedar and pine trees, cedrol, acts on the autonomic nervous system, and exhibits a sedative effect by inducing dominance of the parasympathetic nerve system using integral physiological techniques3). We have also confirmed the sedative effect of cedrol in 3 countries with living, environmental and ethnical differences (Norway, Thailand, and Japan). It is of interest that cedrol exhibited a sedative effect in all 3 countries3), and previous studies clarified its sleep-improving effect4). Since the scent of cedrol is faint, it makes the parasympathetic system dominant even in humans who do not perceive the scent.

In this study, we surveyed the action of cedrol aroma on the autonomic nervous system with regard to the sedative effect by measuring pupillary light reflex in the USA where the sense of stress is high, and compared the effects among 3 regions, the north and south parts of the State of New Jersey (NJ), located adjacent to New York within the commute belt, and Colorado Springs (CO), a relatively rural region. In addition, a questionnaire was used to investigate how the sense of stress and sleep affected the sedative effect, and we analyzed whether the sedative effect of cedrol increased with an increase in the sense of stress and sleep.

2. Methods

2-1. Subjects

The study enrolled 142 non-pregnant healthy adult women in their 20–40 s with no allergies or cigarette smoking habit who had lived in the regions since they were born and did not work until midnight or on shifts (NJ: south, 47 (20 s; 11, 30 s; 18, 40 s; 18); north, 44 (20 s; 12, 30 s; 16, 40 s; 16); CO: 51 (20 s; 19, 30 s; 15, 40 s; 17)). The objective, content of survey, and physiological evaluation method were sufficiently explained to subjects before the study, and the study was performed using subjects who consented.

2-2. Questionnaire inquiry

The 30-item stress checklist11) and the revised OSA sleep inventory12), 13) were used to survey senses of stress and sleep, respectively. These were translated, and the clarity and meaning of the questions were confirmed before the