

Inhalation of *Protium heptaphyllum* (Aubl.) Marchand (BREU-BRANCO) essential oil as an analgesic and anxiolytic in fibromyalgia. Case reports

Inalação do óleo essencial de Protium heptaphyllum (Aubl.) Marchand (BREU-BRANCO) como analgésico e ansiolítico na fibromialgia. Relato de casos

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ABSTRACT

BACKGROUND AND OBJECTIVES: Fibromyalgia (FM) refers to a chronic pain condition with a multifactorial etiology, which negatively impacts the lives of its sufferers and is often refractory to conventional treatment. The aim of this study is to report a series of cases using *Protium heptaphyllum* (OEBB) essential oil to control pain and anxiety in FM sufferers.

CASE REPORTS: This is a case series of an experimental, open and self-controlled study aimed at proving the efficacy and relevance of using aromatherapy via inhalation to improve the quality of life of women with fibromyalgia (FM). For this purpose, the essential oil obtained by steam distillation of resin OEBB was used. Five women over the age of 50 with a confirmed medical

diagnosis and insufficient treatment with traditional therapies were selected to verify the efficacy of inhaling OEBB essential oil. The patients were assessed using the Fibromyalgia Impact Questionnaire (FIQ) and the visual analog scale (VAS) before and after aromatherapy and the results were compared using the T-test for two related samples. The evidence showed that OEBB inhalation was not effective in reducing the intensity of pain crises ($p>0.05$). However, there was evidence of benefits in relation to improvements in quality of life, such as an increase in disposition, improvement in mood, restorative sleep and a reduction in anxiety in 46.78% ($p<0.01$), as demonstrated by the score obtained on the FIQ.

CONCLUSION: It can be concluded that aromatherapy via inhalation has a positive effect on controlling the comorbidities caused by fibromyalgia. Furthermore, aromatherapy is a complementary practice that should be considered a powerful adjunct to traditional therapies, and its indication should be encouraged by public and private health services.

Keywords: Aromatherapy, Chronic pain, Fibromyalgia, Smell sense.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A fibromialgia (FM) refere-se a uma condição dolorosa crônica com etiologia multifatorial, que impacta negativamente na vida de seus portadores e muitas vezes é refratária ao tratamento convencional. O objetivo do presente estudo foi relatar uma série de casos com uso de óleo essencial de *Protium heptaphyllum* (OEBB) para controle da dor e ansiedade de fibromiálgicos.

RELATO DOS CASOS: Trata-se de uma série de casos pertencentes a um estudo experimental, aberto e autocontrolado, objetivando comprovar a eficácia e relevância do uso da aromaterapia via inalatória para a melhoria da qualidade de vida de mulheres portadoras de FM. Para isso, foi utilizado o óleo essencial obtido pela destilação por arraste a vapor da resina de OEBB. Foram selecionadas 5 mulheres acima de 50 anos com diagnóstico médico confirmado e em tratamento insuficiente com as terapêuticas tradicionais para verificar a eficácia da inalação do óleo essencial de OEBB. As pacientes foram avaliadas através do Questionário de Impactos da Fibromialgia (QIF) e da Escala Analógica Visual

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HIGHLIGHTS

- Fibromyalgia is a public health problem that prevents sufferers from working and has a negative impact on society
- Emotional factors such as anxiety and depression are involved in the development of chronic pain related to fibromyalgia.
- Drugs used to treat fibromyalgia cause significant adverse effects and the search for complementary treatment methods is essential, such as the use of essential oils.

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(EAV) antes e após a aromaterapia e os resultados foram comparados por meio do Teste T para duas amostras relacionadas. As evidências demonstraram que a inalação de OEGB não foi eficaz para diminuir a intensidade das crises algicas ($p > 0,05$). No entanto, ficaram comprovados benefícios em relação a melhorias na qualidade de vida como aumento da disposição, melhora do ânimo e do humor, sono reparador e diminuição da ansiedade em 46,78% ($p < 0,01$), conforme demonstrado na pontuação obtida no QIF.

CONCLUSÃO: Conclui-se que a aromaterapia via inalatória apresenta um efeito positivo para controle das comorbidades causadas pela fibromialgia. No mais, a aromaterapia é uma prática complementar que deve ser considerada uma potente adjuvante às terapias tradicionais, devendo sua indicação ser estimulada pelos serviços de saúde públicos e privados.

Descritores: Aromaterapia, Dor crônica, Fibromialgia, Olfacção.

INTRODUCTION

Fibromyalgia (FM) is a chronic pain syndrome with a multifactorial etiology and a disorder in the processing of painful stimuli^{1,2} characterized by chronic, diffuse musculoskeletal pain that is, to date, incurable³. It is associated with other chronic conditions such as fatigue, sleep disorders, cognitive disorders, mood swings and various somatic symptoms^{4,5}. The estimation is that the average prevalence of the population affected by chronic pain (CP) is 45.6%⁶, with official data published in the literature showing that FM affects around 2%-2.5% of the Brazilian population⁷, translating into a universe of 4.1-6.2 million people affected⁸, most of them women of working age⁹. Due to its complexity and multiplicity of causes, no standard treatment has been described, justifying the investigation of complementary methods to traditional therapy¹⁰. In this world, the use of essential oils (EOs) is a promising option, as their medicinal effects have been proven to help physical and psychological well-being¹¹. Among those studied is the one extracted from the distillation of the resin of *Protium heptaphyllum* (Aubl.) Marchand, also known as almecegueira or breu-branco (OEGB)¹².

The literature shows various biological activities of *P. heptaphyllum* resin, mainly as a potential anti-inflammatory drugs, muscle relaxant, anxiolytic and antidepressant, with therapeutic effects for pain and mood control¹³⁻¹⁸. Despite the traditional recognition of its properties, the biological activities of OEGB are still being studied¹⁹. Given the physical, emotional, social and economic impact that FM has, the search for new treatment methods is imperative, underpinning the reported scientific interest. The present study analyzed the effect of inhaling OEGB on pain control and improving the quality of life of FM sufferers, justifying the encouragement and training of aromatherapy in public health services.

CASE REPORT

Five women over the age of 50 (58.4 ± 2.8 years) were selected who had FM with a confirmed medical diagnosis and were being treated insufficiently with traditional therapies (analgesics, ste-

roidal or non-steroidal anti-inflammatory drugs, antidepressants, anticonvulsants, opioids, herbal medicines and anesthetic procedures)³.

After an introductory pre-screening meeting and presentation to the OEGB, they were informed that they could leave the experiment at any time. At the time, a WhatsApp group was created for monitoring and prompt guidance.

The inclusion criteria considered were a previous diagnosis of FM, the presence of active CD and the absence of exclusion criteria - pregnant or breastfeeding women, patients with decompensated comorbidities (diabetes mellitus, hypertension, heart failure and kidney failure, for example), hemophilic patients, patients taking platelet antiaggregants or other drugs for coagulation disorders, patients with neurological diseases (personal history of epilepsy or other types of seizures), patients with chronic migraines, as well as those who showed intolerance to the odor of OEGB at presentation or systemic changes in the dose-supervised

The research was authorized by the Research Ethics Committee of the University of Paraná (UNIPAR), CAAE no. 69147823.9.0000.0109. Screening took place at the headquarters of the Fibromyalgia Association of Paraná (APAFIBRO) in the municipality of Umuarama/PR. Virtual meetings were held to clarify matters for those who were unable to attend. All the participants signed an Informed Consent Form for their participation in the research and anonymous disclosure of the results.

Treatment intervention

The intervention protocol, adapted from reference authors²⁰, consists of inhaling 10 drops of OEGB into a personal inhalation device commercially known as an "aromastick" (Figure 1). The participants were instructed to do 10-minute sessions four times a day: the first in the morning, right after waking up; the second, around lunch break (12-14h); the third, in the late afternoon (around 6pm); and finally, before bed, for 14 days. At the end of the agreed period, the participants had to return for a scheduled clinical reassessment and reapplication of the questionnaires. This more informal form of recommendation was designed to: 1) not impact so much on individual routines; 2) ensure better patient adherence to the proposed treatment. At the doctor's appointment, three standardized forms²² were applied, two of which were generic for investigating and classifying CD, namely: the numerical and colorimetric visual analogue scale (VAS)²³ and the LANSS pain scale²⁴ and one specific to FM, the Fibromyalgia Impact Questionnaire (QIF)²⁵ with scores adapted by Azevedo²⁶.

Afterwards, the volunteers were given a personal "aromastick" inhaler already prepared with 10 drops of OEGB and instructions on how to use it correctly, clearing up any doubts. All the participants were instructed on the signs and symptoms which, in case they appeared, they should contact the doctor-researcher and return for an immediate clinical assessment. In order to minimize possible adverse effects, the first dose-supervised inhalation was carried out in the assessment room, where the participants waited for at least 30 minutes to observe and recheck their blood pressure. The data obtained was subjected to descriptive

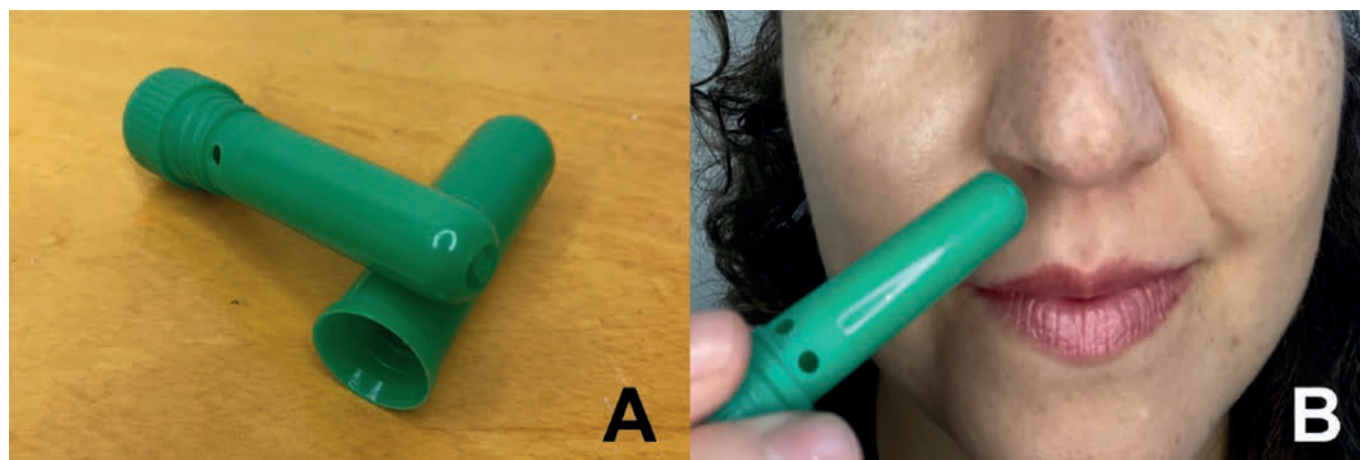


Figure 1 - "Aromastick" personal inhaler. **A** - "Aromastick" personal inhaler. **B** - Demonstration of the proposed form of use.

Source: Digitally created by the BioRender.com platform²¹

statistics by determining the mean, standard error of the mean and coefficient of variation of the QIF and EAV before and after the intervention with OEBB inhalation. The results were first analyzed for normality (Lilliefors). As the data was normally distributed, the results were compared using Student's t-test for two related samples, considering a significance level of 5%. In addition, descriptive statistics were carried out on age and the percentage reduction in the QIF score using the Bioestat 5.327 program. No statistical analysis was carried out on the LANNIS scale due to the maintenance of the initial and final values found.

Follow-up and outcomes

Regarding the reduction in the intensity and/or duration of pain crises, there were no statistically significant differences in the VAS before and after the intervention with OEBB inhalation ($p > 0.05$) (Table 1).

Table 1. Mean \pm standard error of the Visual Analog Scale before and after the intervention with the inhalation of breu-branco essential oil (OEBB).

Descriptive statistics	VAS before	VAS after
Mean \pm EP	7.2 \pm 0.90	5.7 \pm 0.37
CV%	26.72	14.68
P value	0.104	

As for the improvement in quality of life, the results were more positive. Before starting the inhalations, the participants scored an average of 82.23 \pm 7.22 on the QIF, with an average reduction of 46.78% after the intervention, with an average score of 49.91 \pm 7.01 ($p < 0.01$), bringing more spirit and disposition to carry out daily activities, reducing anxiety and insomnia (Table 2). It should be noted that the participants reported a cumulative effect, with improvements felt mainly after the 10th day of use. The results showed that inhaling OEBB proved to be a practical and effective solution for medium-term use to control mood and improve quality of life in FM patients, justifying interest, further research and training for public and private health professionals in aromatherapy.

Table 2. Mean \pm standard error of the Fibromyalgia Impact Questionnaire before and after the intervention with the inhalation of breu-branco essential oil (OEBB).

Descriptive statistics	QIF before	QIF after
Mean \pm EP	82.23 \pm 7.22 ^a	49.91 \pm 7.01 ^b
CV%	19.63	31.39
P value	0.0073	

^{a-b} Means followed by different letters in the row differ according to the Student's t-test.

Patients perspectives

In the final feedback, one participant reported a significant worsening after stopping the inhalations, feeling constant headaches, depressed mood and body aches. Another reported extreme well-being and relaxation with the aroma, which brought back good memories and a sense of tranquility, and reported improved sleep quality. After the test period, the participants were instructed to stop inhaling for a 7-day break and about the safety and possibility of sporadic use while the personal inhaler was aromatizing.

DISCUSSION

CP is a debilitating condition characterized by generalized musculoskeletal pain, persistent for more than three months and without an explainable cause, such as inflammation⁵. This condition has a poor prognosis, negatively affecting patients' quality of life by impairing sleep, daily activities, mood and social and family relationships²⁸. CP can lead to absence from productive activities, resulting in sick pay or early retirement, which has a significant economic impact²⁹.

Within the context of CP, FM stands out, a chronic rheumatological disease characterized by diffuse musculoskeletal pain whose cure is still a challenge³. FM involves a disorder in the processing of painful stimuli and is often associated with fatigue, sleep disorders, cognitive disorders and mood swings⁷. Various therapies are used for treatment, including analgesics, anti-inflammatory and antidepressants³, as well as integrative practices such as the use of herbal medicines and medicinal plants³⁰. Among

these practices, aromatherapy with EOs has gained popularity and scientific notoriety³¹⁻³⁶. Among these, OEGB has recognized anti-inflammatory, muscle relaxant and anxiolytic potential³⁷⁻³⁹, justifying the investigation of its effect on pain control and improving the quality of life of women with FM⁴⁰.

The efficacy of inhaling EOs is possible due to the volatile nature of their compounds, which are both absorbed systematically and through the activation of nasal olfactory chemoreceptors and subsequent signaling, altering the neurophysiological activity of the brain and the neuroendocrine system, providing positive sensations such as emotional well-being, tranquility and relaxation through the release of neurotransmitters such as serotonin, dopamine and gamma-aminobutyric acid (GABA)⁴¹.

The aromatherapeutic route chosen was olfactory therapy, a treatment modality that has not yet been officially explored and is advantageous for the treatment of mental and behavioral disorders and mood disorders such as anxiety, depression and sleep disorders due to the biological activities of the chemical components found in EOs⁴².

No studies evaluating the efficacy of OEGB inhalation for any pathology or comorbidity in humans were found in the medical literature searched in the Virtual Health Library, Google Scholar, Pubmed and Scielo databases, which corroborates the importance of this pilot study. In the end, it was proven that olfactory treatment with OEGB had a non-statistically significant influence on reducing pain sensation ($p > 0.05$); however, it was able to improve the quality of life of patients with FM ($p < 0.01$). Despite widespread availability and easy commercial access, it is important to note that the use of EOs is not without risk and should be monitored by a trained professional aromatherapist.

CONCLUSION

OEGB showed hypertensive potential and should be used with caution in patients with heart disease and/or hypertension; thus, the present study suggests caution in the use of OEGB in patients with nephropathy and/or any other vasculopathies. As this is a small sample involving a restricted target audience (women over 50), the suggestion is for further more extensive and detailed studies to prove the clinical findings and demonstrate the safety of long-term use of OEGB.

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AUTHORS' CONTRIBUTIONS

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Statistical analysis, Funding acquisition, Data collection, Conceptualization, Resource management, Project management, Research, Methodology, Writing - Preparation of the original, Writing - Review and editing

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Acquisition of the donation of the material by the Curumin da Amazônia company, Data Collection, Research, Methodology, Writing - Preparation of the original, Writing - Review and Editing, Visualization

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