

## RESEARCH ARTICLE

## The effectiveness of eucalyptus globulus and thymus vulgaris in reducing COVID-19 symptoms among COVID-19 patients at Al- Nasiriya City

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### Abstract

**Objective:** To determine how *Thymus vulgaris* and *Eucalyptus globulus* affected the symptoms of coronavirus disease-2019 patients.

**Method:** The experimental case-control study was conducted in Al-Nasiriya city, Iraq, from December 15, 2020, to February 20, 2021, and comprised patients of either gender aged 20-50 years diagnosed with coronavirus disease-2019 infection. The patients' symptoms ranged from mild to severe. Half of the sample was exposed to the study's treatment protocol, while the other half acted as control. Thyme, orange and lemon were employed as sources of vitamin C, as well as eucalyptus leaves and oil. The cases were exposed to eucalyptus vapours for 5-10 minutes after thoroughly washing the plant leaves (7-10 leaves or 5 drops of oil) and boiling them in drinking water at 100°C for 10-15 minutes. Data was analysed using SPSS 23.

**Results:** Of the 48 patients, 24(50%) were in each of the two groups. Age and gender were not significantly different ( $p>0.05$ ), while body mass index and blood group distribution was significantly different between the groups ( $p<0.05$ ). Overall, 22(45.8%) subjects had mild symptoms, 20(41.7%) had moderate symptoms and 6(12.5%) had severe symptoms. The improvement in the symptoms among the cases was significantly more than the controls ( $p<0.05$ ) except nasal congestion ( $p>0.05$ ).

**Conclusion:** Using eucalyptus vapours in the form of dried leaves or oil could significantly lessen coronavirus disease-2019 symptoms.

**Keywords:** Eucalyptus, Thymus, Plant, Citrus, Cough, Smell, COVID-19, Leaves, Vaccines, Vitamins.

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### Introduction

Late in December 2019, the coronavirus diseases-2019 (COVID-19) outbreak, known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), started in Wuhan in the Hubei province of China. The virus spread quickly across China before reaching everywhere else. According to the Iraqi Ministry of Health, there were 661,477 instances overall as of February 19, 2021, and 13,232 people had died as a result.<sup>1,2</sup>

The COVID-19 symptoms, including fever, dry cough and dyspnoea, are comparable to those of other viral respiratory illnesses, like the flu.<sup>3</sup> Despite significant efforts to find a medication or vaccine, the relevant world bodies, like the World Health Organisation (WHO), the Centres for Disease Control and Prevention (CDC), and the Food and Drug Administration (FDA), stated that there were no

medications that had been proven to be completely effective for the management or prevention of COVID-19.<sup>4</sup>

Despite the lack of coronavirus-fighting medications, aromatic and medicinal herbs can be used to alleviate COVID-19 symptoms. The role of medicinal and aromatic plants is significant, especially for plants that are frequently used in traditional medicine because they contain bioactive compounds that could be used to create new, formal medications to treat COVID-19 symptoms in patients while having few to no side-effects.<sup>5</sup> Eucalyptus (E.), often known as the blue gum tree or E. globulus, is one such aromatic plant belonging to the myrtaceous family.<sup>6</sup>

Due to the presence of diverse phytochemicals and volatile components, numerous investigations on E. globulus have established its pharmacological as well as medicinal properties. Moreover, the phytochemicals present in eucalyptus leaves include antifungal, antiviral, antibacterial, anti-inflammatory, anti-nociceptive, analgesic and anti-diabetic properties. Also, these medications are frequently used to treat acute benign bronchial illness and to relieve cold-related nasal congestion. It has also been mentioned as a treatment for bronchitis and upper respiratory catarrh. Globulus oil contains eucalyptol, which is thought to have anti-inflammatory qualities. Inhaling the vapours from the hot water extract made from the dried leaves can also help

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to ease the symptoms of respiratory illnesses, such the common cold, the flu, and sinus congestion.<sup>4,7</sup> Food items with potential health advantages beyond basic nutrition, like herbs, are becoming more popular among consumers. They are a practical method of consumption and a useful vehicle for the evaporation of therapeutic ingredients.<sup>8</sup> Fresh thyme has one of the highest antioxidant levels of any herb. It contains significant amounts of healthy vitamins and minerals. Its leaves are rich in potassium, iron, calcium, manganese, magnesium and selenium.<sup>9</sup> Many vital vitamins, including B-complex, folic acid, beta carotene, vitamins A, K, E and C, are abundant in the thyme. It contains 0.35mg of vitamin B-6 (pyridoxine), which is roughly 27% of the daily required amount.<sup>10</sup>

The current study was planned to identify *E. globulus* and *thymus* (*T.*) *vulgaris* activity in reducing COVID-19 symptoms.

## Patients and Methods

The experimental case-control study was conducted in Al-Nasiriya city, Iraq, from December 15, 2020, to February 20, 2021, and comprised patients of either gender aged 20-50 years diagnosed with COVID-19 infection after taking informed consent from the patients and their families. A small sample was taken because of the experimental nature of the study, and, according to scientific reference, experimental studies are typically very well-planned and will typically ensure that all potential confounding factors have been sufficiently controlled (or corrected for) during the design stage, a smaller necessary sample size will typically be sufficient for all experimental research.<sup>11</sup> Informal ethical approval was obtained from the Thi-Qar Health office, Baghdad, Iraq.

The symptoms of the patients ranged from mild to severe. Half of the sample was exposed to the study's treatment protocol, while the other half acted as control.

The sample was raised using simple random sampling technique from among the COVID-19 patients who were available at the time of study and refused isolation at Al-Hussein Teaching Hospital/ Baghdad. Patients who had respiratory and allergy disorders, pregnant women, patients aged <20 years, those who refused to participate, and those admitted to the intensive care unit (ICU) were excluded.

Data was collected using a predesigned proforma, exploring age, gender, blood group and history of chronic diseases. Patients' body mass index (BMI) was assessed in line with the WHO standard, while the weight of the individuals was determined using a United Nations International Children's Emergency Fund (UNICEF)-

calibrated digital scale (Seca 890). The recorded weight was reduced by an average of 1kg to account for the weight of clothing. Using a portable tape measure mounted on the wall, the participants' heights were calculated in cm.<sup>12</sup>

*E. globulus* leaves or its essential oil was used. Traditionally, *E. globulus* leaves are used for asthma and bronchitis treatment as a herbal tea, but in recent times it has been used for antimicrobial, antifungal and anthelmintic purposes.

Plant leaves (7-10 leaves or 5 drops from oil) were washed thoroughly before boiling them at 100°C in drinking water in a well-closed pot for 10-15 minutes. The patient was exposed to the vapours with a semi-heavy cover for 5-10 minutes to let the vapour enter the respiratory system. The infusion temperature was about 75°C The exposure was given twice a day for one week; one in the morning and the second in the evening, with an 8-hour interval between the two exposures.

Besides, 1 tablespoon of *T. vulgaris* was added to the meal three time a day. Also, half an effervescent tablet of vitamin C and orange or lemon juice were added to the diet in the mornings and the evenings.

Data was analysed using SPSS 23. Data normality was tested. Descriptive statistics were used to express the participants' characteristics. Paired t-test and analysis of variance (ANOVA) were used to analyse the data at baseline and after using eucalyptus vapours. Two-tailed  $p < 0.05$  was considered significant.

## Results

Of the 48 patients, 24(50%) were in each of the two groups. Age and gender were not significantly different ( $p > 0.05$ ), while BMI and blood group distribution was significantly different between the groups ( $p < 0.05$ ) (Table 1). Overall, 22(45.8%) subjects had mild symptoms, 20(41.7%) had moderate symptoms and 6(12.5%) had severe symptoms.

Among the cases, the differences between baseline and post-intervention values for significantly different for all the symptoms ( $p < 0.05$ ) except nasal congestion and shortness of breath ( $p > 0.05$ ) (Table 2).

The improvement in the symptoms among the cases was significantly more than the controls ( $p < 0.05$ ) except nasal congestion ( $p > 0.05$ ) (Table 3).

The severity of symptoms reduced significantly more among the cases than the controls ( $p < 0.05$ ) (Table 4).

Apart for coughing and a loss of taste and smell, there were no significant variations in symptoms among the cases in relation to age groups ( $p > 0.05$ ) (Table 5)., Also, there were

**Table-1:** Sample characteristics.

	Classification	Case n (%)	Control n (%)	p-value
Age (years)	20-29	7 (29.2)	1 (4.2)	0.073
	30-39	8 (33.3)	11 (45.8)	
	40-49	9 (37.5)	12 (50.0)	
Gender	Male	13 (54.2)	13 (54.2)	1.000
	Female	11 (45.8)	11 (45.8)	
BMI	Under weight	0 (0.0)	9 (37.5)	0.024
	Normal weight	14 (58.3)	7 (29.2)	
	Over weight	10 (41.7)	8 (33.3)	
Blood Groups	A	2 (8.3)	7 (29.2)	0.020
	B	7 (29.2)	5 (20.8)	
	AB	3 (12.5)	8 (33.3)	
	O	12 (50.0)	4 (16.7)	

**Table-2:** Clinical symptoms for patients in the case group at baseline and post-treatment.

Symptoms	Before Treatment Mean $\pm$ SD	After Treatment Mean $\pm$ SD	p $\leq$ 0.05
Cough	1.50 $\pm$ 0.51	1.79 $\pm$ 0.41	0.032
Nasal congestion	1.54 $\pm$ 0.50	1.45 $\pm$ 0.50	0.426
Fever	1.29 $\pm$ 0.46	1.91 $\pm$ 0.28	<0.001
Shortness of breath	1.50 $\pm$ 0.51	1.62 $\pm$ 0.49	0.266
Muscle pain	1.46 $\pm$ 0.50	2.00 $\pm$ 0.00	<0.001
Loss appetite	1.42 $\pm$ 0.50	2.00 $\pm$ 0.00	<0.001
Loss of sense of taste and smell	1.13 $\pm$ 0.33	1.70 $\pm$ 0.46	<0.001
Sore throat	1.42 $\pm$ 0.50	2.00 $\pm$ 0.00	<0.001

SD: Standard deviation.

**Table-3:** Inter-group comparison of symptoms and response to intervention.

Symptoms	Groups	n	Mean $\pm$ SD	p-value
cough	Case	24	1.79 $\pm$ 0.41	<0.001
	Control	24	1.12 $\pm$ 0.33	
nasal congestion	Case	24	1.45 $\pm$ 0.50	0.777
	Control	24	1.41 $\pm$ 0.50	
Fever	Case	24	1.91 $\pm$ 0.28	0.001
	Control	24	1.50 $\pm$ 0.51	
shortness of breath	Case	24	1.62 $\pm$ 0.49	0.008
	Control	24	1.25 $\pm$ 0.44	
muscle pain	Case	24	2.00 $\pm$ 0.00	<0.001
	Control	24	1.45 $\pm$ 0.50	
loss appetite	Case	24	2.00 $\pm$ 0.00	<0.001
	Control	24	1.45 $\pm$ 0.50	
loss of sense of taste and smell	Case	24	1.70 $\pm$ 0.46	0.009
	Control	24	1.33 $\pm$ 0.48	
sore throat	Case	24	2.00 $\pm$ 0.00	<0.001
	Control	24	1.12 $\pm$ 0.33	

SD: Standard deviation.

**Table-4:** Severity of symptoms between the groups.

Symptoms	Groups	n	Mean $\pm$ SD	p-value
Severity	Case	24	1.91 $\pm$ 0.28	0.001
	Control	24	1.41 $\pm$ 0.50	

Sig.: significant

**Table-5:** Intra- and inter-group differences in symptoms post-treatment with regard to age groups.

Age Variables	Source of variance	Sum of Squares	Mean Square	n	p $\leq$ 0.05
Cough	Between Groups	1.069	0.535	3.887	0.037
	Within Groups	2.889	0.138		
nasal congestion	Between Groups	0.022	0.011	0.039	0.962
	Within Groups	5.937	0.283		
Fever	Between Groups	0.278	0.139	1.875	0.178
	Within Groups	1.556	0.074		
shortness of breath	Between Groups	1.268	0.634	3.055	0.068
	Within Groups	4.357	0.207		
muscle pain	Between Groups	0.069	0.035	0.820	0.454
	Within Groups	0.889	0.042		
loss appetite	Between Groups	0.101	0.051	1.240	0.310
	Within Groups	0.857	0.041		
loss of sense of taste and smell	Between Groups	1.369	0.685	4.005	0.034
	Within Groups	3.589	0.171		
Sore throat	Between Groups	0.101	0.051	1.240	0.310
	Within Groups	0.857	0.041		

no significant gender-related variations in symptoms and their severity ( $p>0.05$ ).

## Discussion

Eucalyptus oil, which has the potential to be used as a disinfectant, has recently been the subject of in vitro research on its antibacterial, antifungal and antiviral properties.<sup>12</sup> Patients with COVID-19 commonly experience symptoms like fever, exhaustion, shortness of breath, headache, muscular aches, sore throat, sputum, haemoptysis, diarrhoea, dyspnoea, rhinorrhoea, chest pain, nausea and vomiting.<sup>2,3</sup> Children with COVID-19 experience symptoms that are similar to those of adults and are typically mild.<sup>14,15</sup>

The higher percentage of the participants in the current study were aged 40-49 years, which is similar to literature.<sup>16</sup> Besides, 54.2% of the current subjects were males, which agrees with a study in the United States which found there has been unpredictable reporting of differences among males and females in COVID-19 cases, hospitalizations and even deaths, with more males than females.<sup>17</sup> The current results regarding symptoms were consistent with those of a 2020 study in the Congo, showing that the majority of study participants had most disease symptoms, such as fever, cough, loss of taste and smell, loss of appetite, and sore throat, that disappeared after exposure to eucalyptus vapours for an entire week twice a day.<sup>18</sup>

The majority of individuals in the current study reported the same findings on the second day of vapour exposure,

attesting to an astounding and quick effect of the fever disappearing. On the third day of the therapy, 17 patients' senses of taste and smell were restored. The current results concur with an earlier explanation that eucalyptus leaves and oil are indicated for respiratory disease symptoms, including cough and other related signs, such as antiseptic and expectorant, for the respiratory system as a result of their presence of 1-8-cineol.<sup>3</sup> Besides, 19 patients had a positive effect regarding cough on their fourth day of treatment. Following a week of therapy, the patients' overall health was excellent and the majority of their problems had vanished. The findings of other investigations are comparable to those of the current study.<sup>6,19-20</sup> Researchers discovered that eucalyptus has potent antiviral effect against coronavirus because it significantly inhibits the growth of several viruses, particularly the swine flu (H1N1) virus and the herpes simplex virus 1 (HSV1). The essential oil and component of eucalyptus, eugenol, is particularly efficient against the influenza virus when inhaled owing to the impact it has on innate cell-mediated immunity, which is also capable of provoking monocyte-derived macrophages (MDMs), which trigger phagocytic response.<sup>6,19-21</sup>

Thyme extracts have been used in traditional medicine to treat a variety of respiratory disorders, such as asthma and bronchitis, as well as other pathologies due to its qualities, such as antiseptic, antispasmodic, antitussive, antibacterial, antifungal, antioxidative and antiviral.<sup>22,23</sup> This treatment was applied with a focus on good nutrition, especially foods rich in vitamin C, like lemon, orange and thyme, to strengthen the immune system. Besides, the patient's psychological support is a key element in enhancing health.<sup>24</sup> The hot water and volatile eucalyptus oil components may be to blame for the nasal burns and irritation experienced by 2 patients in the current study.

The study has limitations as the sample size was not calculated which could have influenced the power of the study and the generalisability of its findings.

## Conclusion

According to the current study, it is possible to rely on medicinal herbs, particularly eucalyptus oil or dried leaves, which can significantly lessen sickness symptoms. Eucalyptus, or its oil, also has the benefit of being secure, accessible, and quite affordable.

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