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EFFECT OF LED LIGHTING ON GROWTH AND PHENOLIC CONTENT ON *IN VITRO* SEEDLINGS OF *OCIMUM BASILICUM* L. CULTIVAR AROMAT DE BUZAU

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Outlines

- Introduction
- *Ocimum basilicum* (basil)
- Plant tissue culture
- Material and methods
- Results
- Conclussions

*Ocimum basili*cum L. cv. ,,Aromat de Buzau"

- It is recently created in 2010 by the reserchers from Research Station for Vegetable Growing Buzau (hence the name);
- It is well adapted to the enviromental conditions in our country and thus can be cultivated in an ecological system because of its resistence to specific diseases and pests;
- It is a cultivar with a specific flavor and aroma due the high content of linalol that is present in its essential oil;



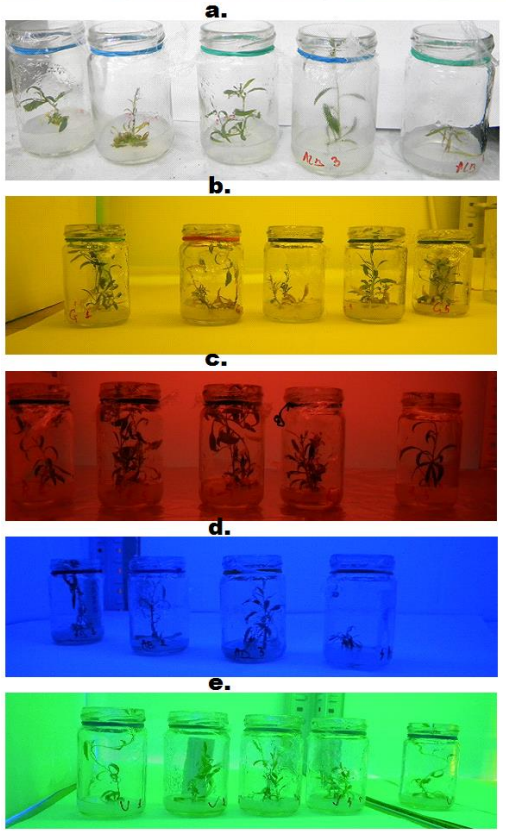

It is strogly branched, the flower are white and leaves are light green.

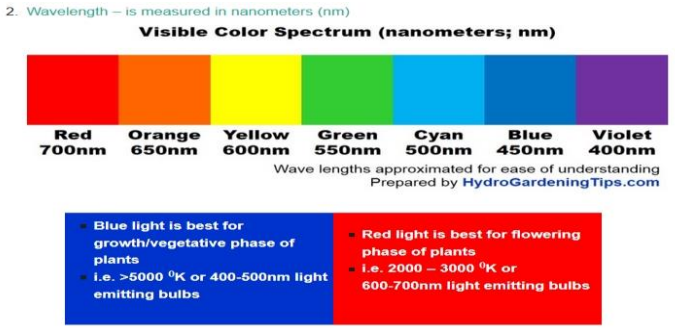
Benefits of *O. basilicum*

- Anti bacterial (gram positive & gram negative bacteria).
- Anti-inflammatory
- Strong antioxidant activity
- Anti proliferative effect
- Anti cancer
- Antiviral
- Antifungal activity
- In cuisine, it has become the symbol of ligurian cuisine as the main ingredient of "pesto" as well as campanian cuisine, added to spaghetti with tomato.

Plant Tissue Culture

- Eliminates the posibility of transmitting viruses to offsprings
- Or allows the obtaining of healthy early plants;
- It is a method of obtaining a very large number of healthy plants in very short time;
- It is a modern method of multiplication that preservs the fidelity or the variety, but the costs for the equipement and consumables are very high;
- The illumination of plant growth chambers is typically based on conventional light sources as fluorescent light but these light sources have limitation due to their short life time, high electrical consumption and heat emission;
- Leds are particularly suitable for plant gowth chambers, because of their light weight, small volume and long life.





Aim of The work

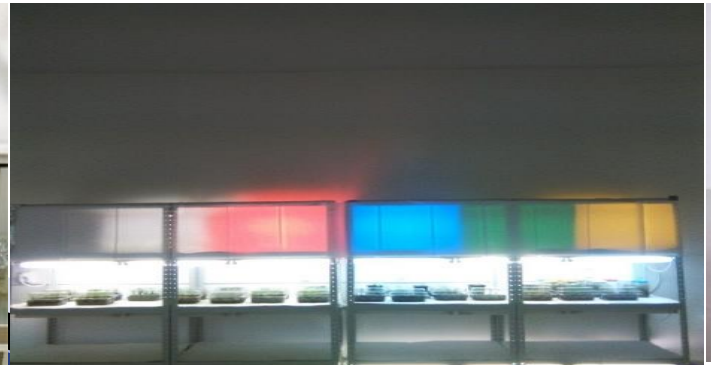
To study the efficiency of using plant tissue culture techniques for the production of phenolics compounds in basil

The objectives of this research were:

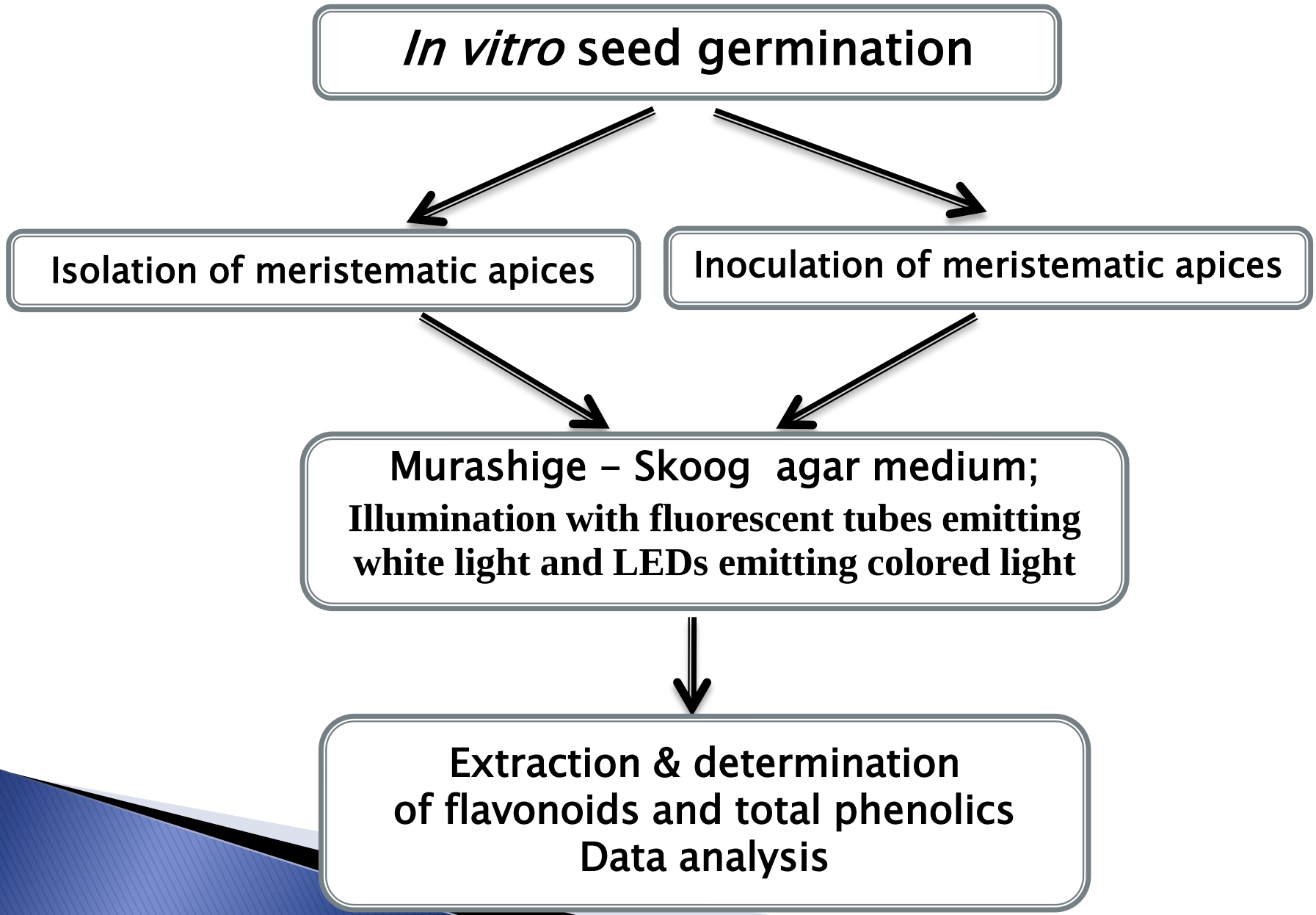
(1) to investigate the effect of LED lighting on morphological characteristics of „ Aromat de Buzau„ basil cultivar in vitro;

(2) to determine the best light quality treatment for increase phenolics production in basil.






Materials and Methods



Results

Results

Morphological aspects

blue-LED

red-LED

Figure 1. Morphological aspects of in vitro seedlings basil illuminated with FL (control) and LED after 60 days of culture

Results

Morphological measurements

Table 1. Morphological indices of *Ocimum basilicum* L. grown at different LED colors after 60 days (Average of 5 measurements ± standard error, different letters between rows represent significant statistical differences)

Indices	Control	Blue light	Red light	Yellow light	Green light
Stem height (cm)	$5.92^{b}\pm0.05$	$4.08^{a}\pm0.08$	$6.06^{b}\pm0.07$	$5.08^{b}\pm0.09$	$5.82^{b}\pm0.06$
Root length (cm)	$6.94^{b}\pm0.06$	$5.1^{a}\pm0.02$	$7.2^{b}\pm0.08$	$5.4^{a}\pm0.04$	$7.12^{b}\pm0.06$
Number of leaves	$4.6^{b}\pm0.21$	$4.2^{b}\pm0.21$	$5.4^{b}\pm0.17$	$3.4^{a}\pm0.21$	$3.6^{b}\pm0.21$

Results

Phytochemical characteristics

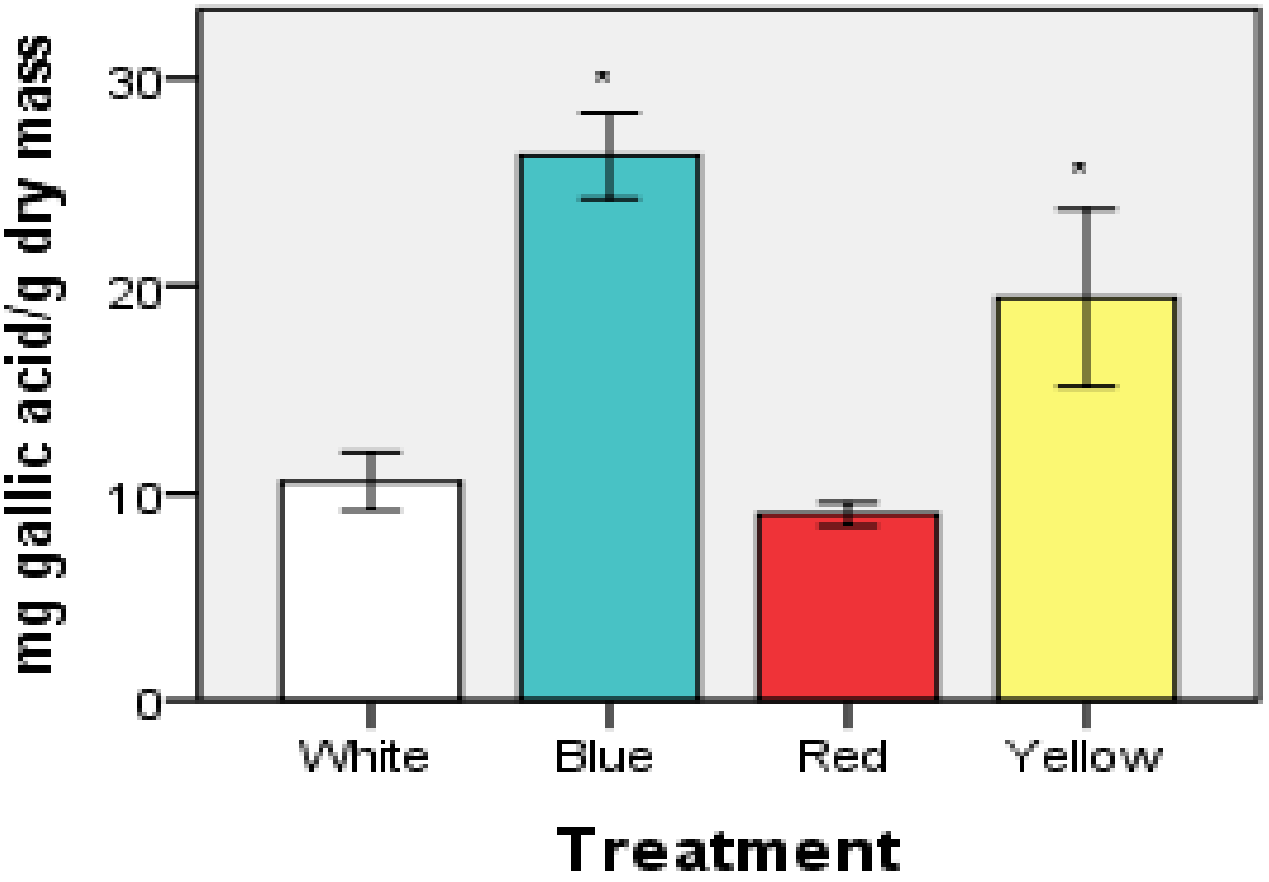


Figure 2. Total **phenolic** content of basil extracts ‘Aromat de Buzau’ cultivated under different color LED lights. The mean difference is significant at the 0.05 level compared to control.

Results

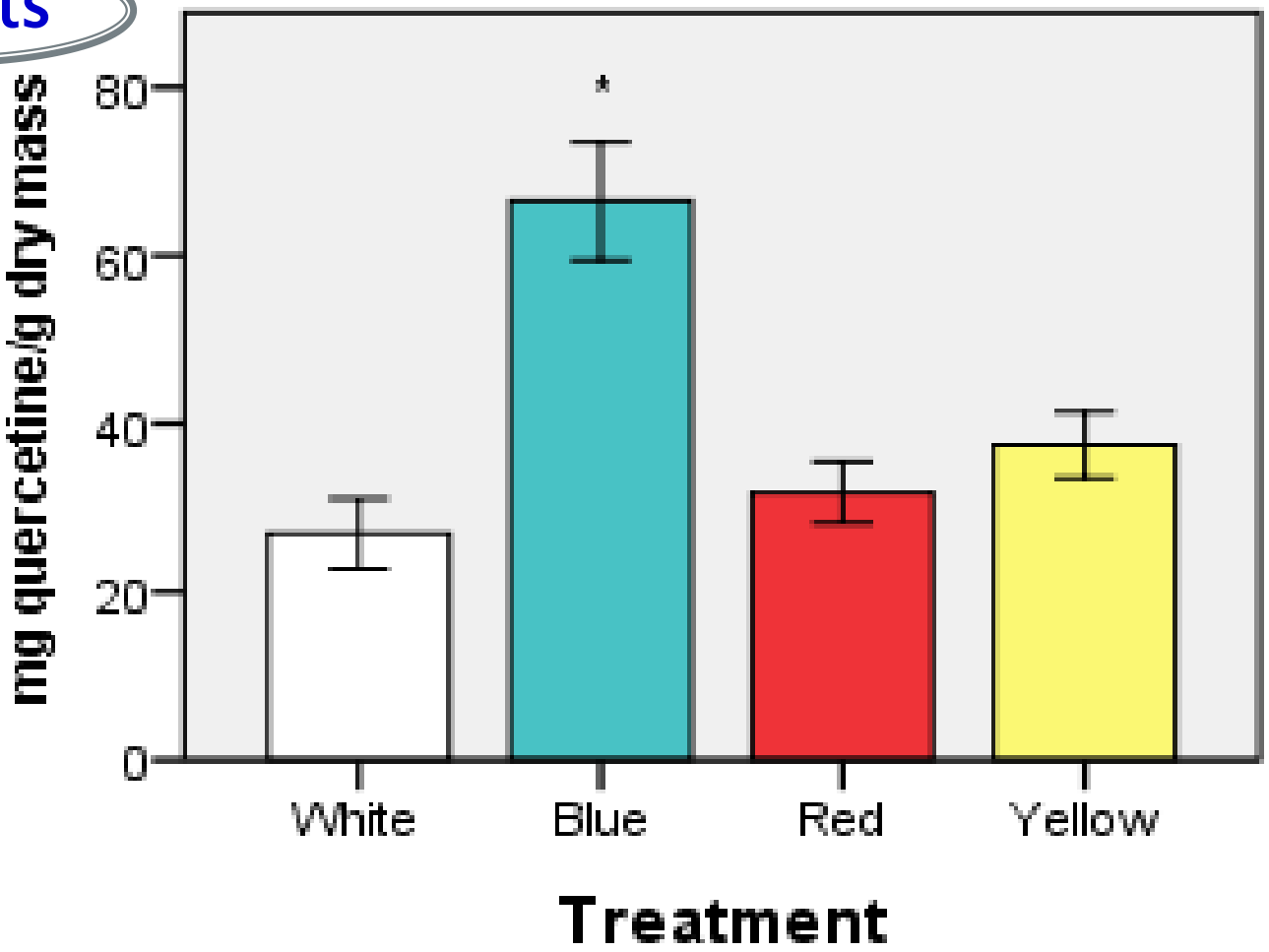


Figure 3. Total **flavonoid** content of basil extracts 'Aromat de Buzau' cultivated under different color LED lights. The mean difference is significant at the 0.05 level compared to control.

Results

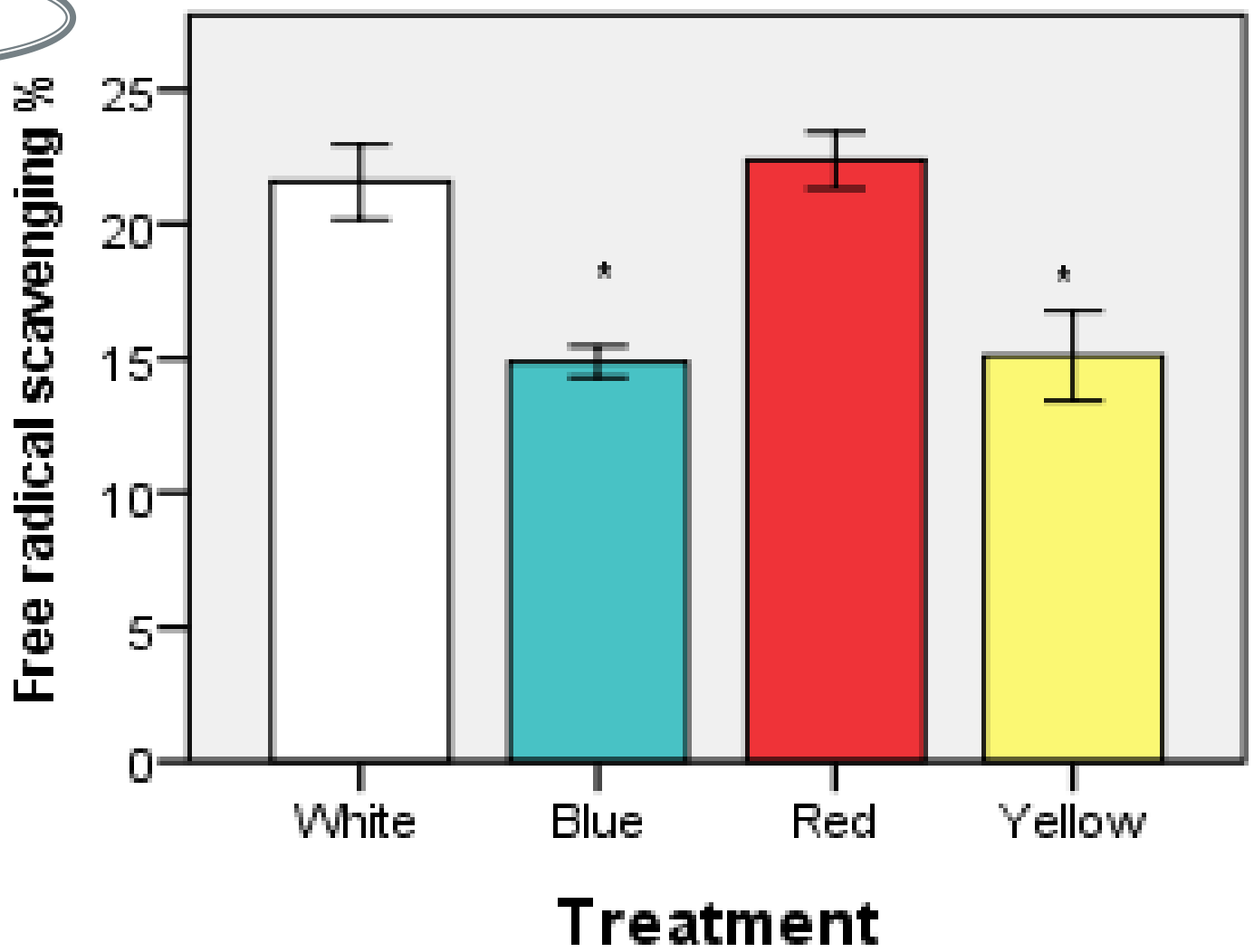


Figure 4. **Free radical scavenging capacity** of basil extracts 'Aromat de Buzau' cultivated under different color LED lights. The mean difference is significant at the 0.05 level compared to control.

Conclusions

Total phenolic content of basil plants was significantly higher under blue LED illumination compared to the rest of the treatments.

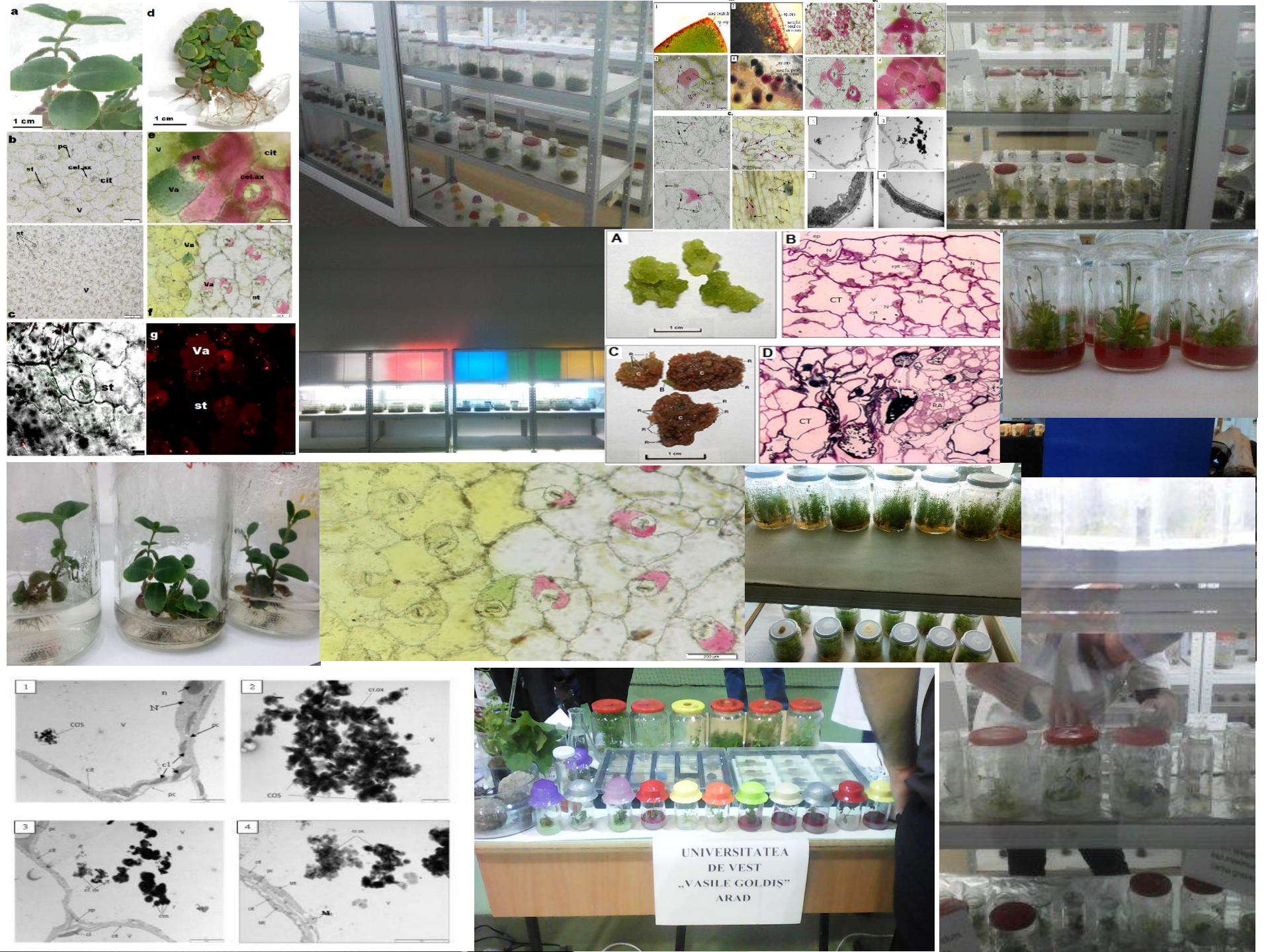
LEDs increased the amount of flavonoids compared to FL light.

Blue light determine a reduction in stem hight and root length compared to conventional fluorescent. Red light is stimulated growth of basil plants.

These findings are also beneficial in providing a useful benchmark in determining the optimum colour of light from this species at its best, most promising antioxidative effects.

It may serve as a basis for even more extensive researches to be done on this species with the focus of interest directed towards its phytomedicinal values.

Further investigations will establish the effect of different light combinations and intensities to determine the optimum treatment for obtaining optimum growth and phenolic compounds synthesis.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