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CYTO-LYCIUM: CYTOPROTECTIVE EFFECT OF ETHANOLIC EXTRACT OF LYCIUM BARBARUM LEAVES AGAINST HYDROGEN PEROXIDE INDUCED OXIDATIVE DAMAGE IN L-929 CELLS

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Introduction:

Lycium barbarum (fam. Solanaceae) known as wolfberry or goji, is widely grown in the subtropical areas of the world, in Japan and Coreea, in countries from South-East of Asia and in Europe as well.

Goji berries play an important role in the traditional Chinese medicine and it has attracted much attention due to their diverse biological activities, such as: liver and kidney protector and eyesight enhancer.

The aim of this paper was to investigate the cytoprotective effect of an ethanolic extract of wolfberry leaves (Lycium barbarum) against H_2O_2 induced oxidative damage in L-929 cells.

Material and Methods:

Raw plant material and extract preparation - Leaves of spontaneously growing L. barbarum were harvested from Dambovita County, Romania, Europe (45° 18'15.4" N; 25° 23'28.4" E).

❑ L. barbarum was shade dried at room temperature and grounded to a powder. The raw vegetal material was extracted with 50% (v/v) ethanol, 1/10 plant material/solvent ratio (m/v), at reflux temperature for 1 h under continuous stirring.. The spiss residue was further solved in 50% ethanol (v/v) using a 1:5 plant material/solvent ratio (m/v).

❑ L. barbarum extract was characterized concerning its qualitative chemical composition, total phenol content and antioxidant activity by high performance liquid chromatography, Folin-Ciocalteu method and DPPH assay.

❑ Also, it was investigated whether pretreatment (one hour or 24 hours) with L. barbarum leaves extract had an effect on L-929 mouse fibroblasts cells cytotoxicity induced by H_2O_2.

Results:

L. barbarum leaves extract – characterisation.

Polyphenols content	18.30 ± 0.010 mg GAE/g dry material
Composition	1 – Gallic acid: c = 0.231 ± 0.001 mg/g extract; 2 – Chlorogenic acid: c = 18.740 ± 0.031 mg/g extract; 3 – Caffeic acid: c = 1.773 ± 0.002 mg/g extract; 4 – Rosmarinic acid: c = 0.108 ± 0.001 mg/g extract;
Antioxidant activity	EC50 = 11.33 ± 0.056 µg/mL
Cytotoxic effect *on* L929 cell line	IC_{50} = 91.91 ± 0.292 µg/mL

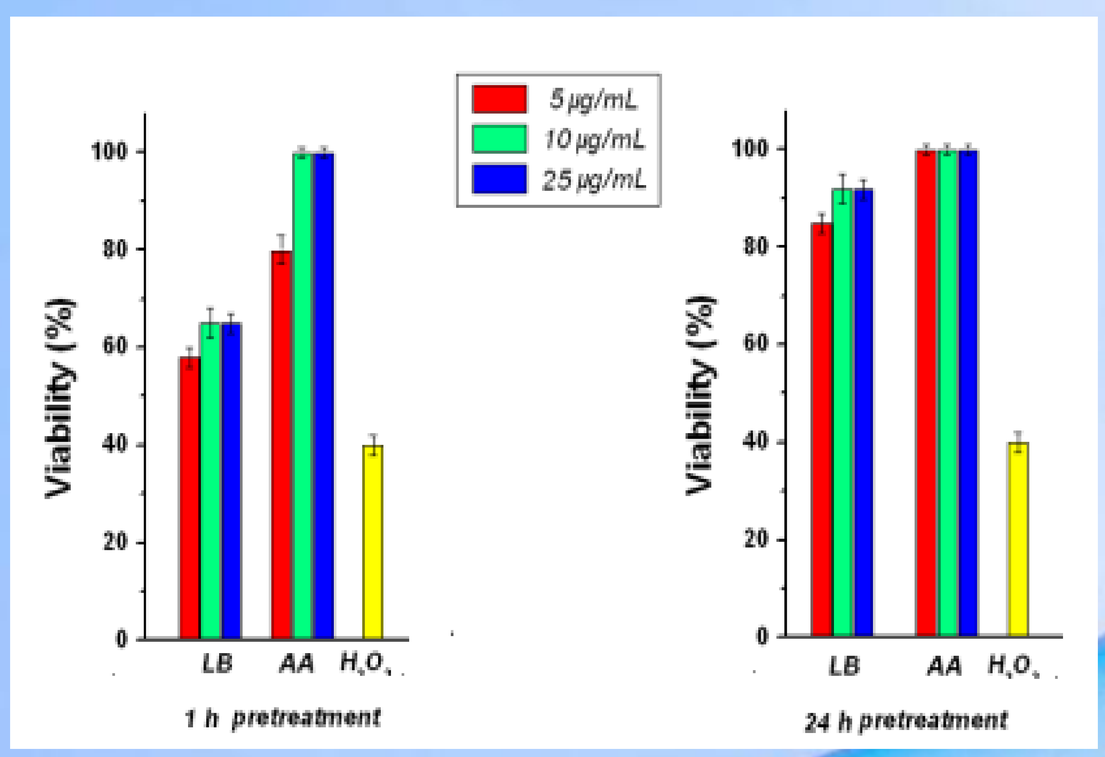
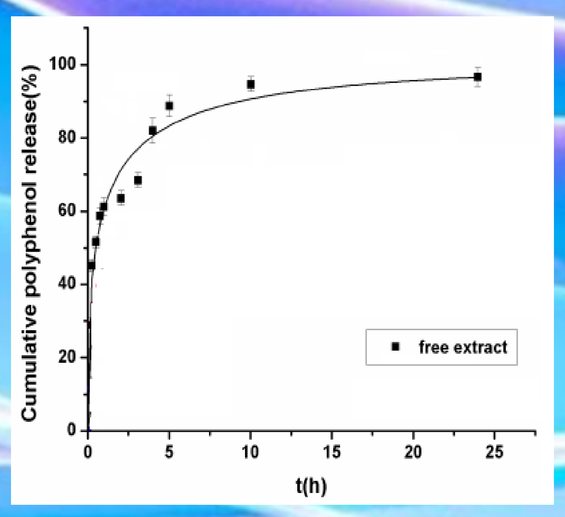


Figure 1. The effect of L. barbarum on L-929 cells;
- pretreatment 1 h before applying H2O2 (left);
- pretreatment 24 h before applying H2O2 (right)

Release kinetic modeling of free extract



Model	Model equation	R^2
Zero order	$Q_t = Q_0 + k_0 \cdot t$	0.6122
Hixon	$Q_0^{1/3} - Q_t^{1/3} = k_{HC} \cdot t$	0.7199
Weibull	$\frac{Q_t}{Q_\infty} = 1 - \exp^{-at^b}$	0.9671
First order	$\ln(Q_t / Q_0) = -k_1 \cdot t$	0.9800

Conclusion:

❑ Data showed the presence of chlorogenic and caffeic acids and a total phenol content of 18.30 mg GAE/g dry material. DPPH method revealed significant antioxidant activity. L. barbarum extract showed a moderate cytotoxic activity. A prolonged pretreatment (24 hours) with L.barbarum extract was able to protect L-929 murine fibroblast cells against H_2O_2 cytotoxicity.

❑ These preliminary findings suggest that Lycium barbarum leaves can be used for the development of dietary supplements.

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