

# Antioxidant properties of maqui berry extracts (*Aristotelia chilensis* (Mol.) Stuntz) and their potential photoprotective role in human skin fibroblasts

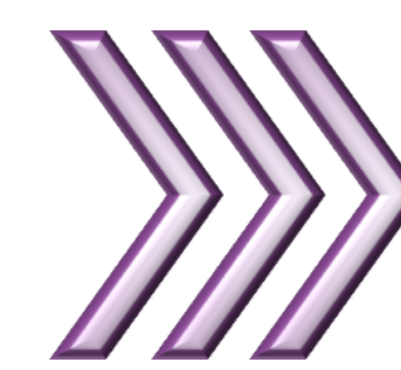


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Maqui (*Aristotelia chilensis* (Molina) Stuntz) is a native evergreen shrub that mainly grows in central and southern America, especially Chile and Argentina. Maqui berries are known worldwide for their extraordinary antioxidant properties and in comparison to other berries, maqui is extremely rich source of bioactive compounds such as flavonoids, anthocyanins, phenolic acids [1,2]. Recent studies have demonstrated strong antioxidant and anti-inflammatory properties of maqui [3] and its ability of oxygen radical absorbance as well as oxidative stress reduction. It is well known that exposure to UVB radiation causes many adverse effects to the skin, including photoaging, inflammation, photoimmunosuppression and photocarcinogenesis [4,5].

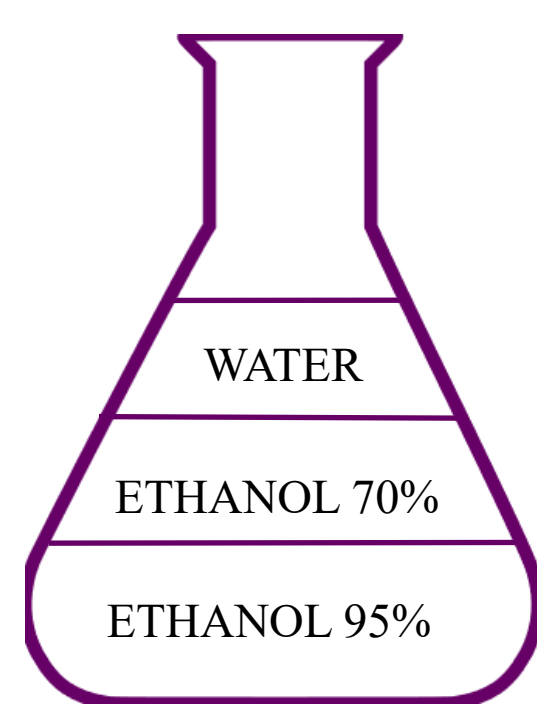


The aim of the study was to evaluate the photoprotective effect of maqui berry extracts on human skin fibroblasts exposed to UVB radiation in *in vitro* studies.



### Extracts preparation

Maqui berry powder made from the dried berries (Chile origin) was purchased from local market. To prepare extracts different solvents were used - ethanol 70% (MEE70) ethanol 95% (MEE95) and water (MWE).



### DPPH assay

The free radical scavenging capacity was performed using an ethanol solution of DPPH at a concentration of 0.1 mmol/L. Absorbance was measured on spectrophotometer at 517 nm after 30 minutes of incubation in the dark at room temperature.

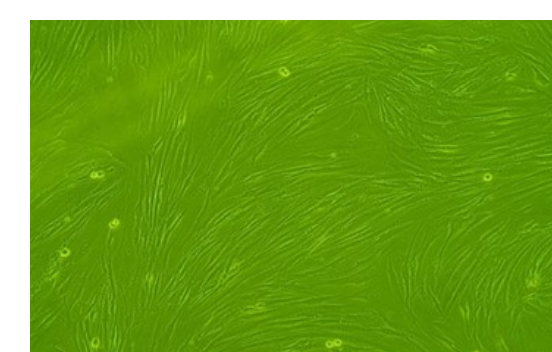


### TPC

Powder total polyphenol content (TPC) was evaluated by the Folin-Ciocalteu method which was modified. Absorbance reading was taken at 760 nm with a spectrophotometer.

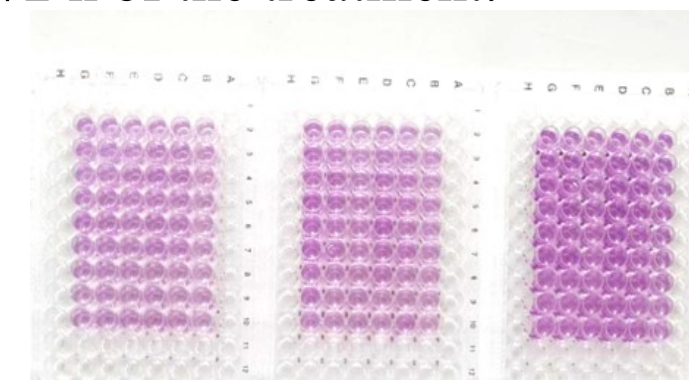
### Cell culture

Normal human skin fibroblast (NHSF) cell line (CRL-1474) was obtained from the ATCC collection (Rockville, MD, USA).



### MTT test

Cell viability was measured using an MTT assay. The effects of maqui extracts on NHSF were studied after 24 h, 48 h and 72 h of the treatment.



### DNA synthesis

DNA biosynthesis in NHSF cell line after treatment of maqui berry extracts was carried out by radioisotope method by measuring the incorporation of [3H]-thymidine into cells' DNA.

### UVB irradiation

The effect of maqui berry extracts on NHSF cells exposed to UVB radiation was assessed after irradiation with UVB (10, 25 and 50 mJ/cm<sup>2</sup>) before evaluating DNA damage.



Table 1. Characteristics of the antioxidant properties of the studied extracts.

Type of extract	DPPH [mg Tx/L]	DPPH [% of free radical scavenging]	TPC [mg GAE/100 g]
MWE	283.63 ± 7.29	66.04	57.75 ± 0.44
MEE70	284.60 ± 4.31	64.35	56.47 ± 0.19
MEE95	211.80 ± 6.14	46.48	56.65 ± 0.69

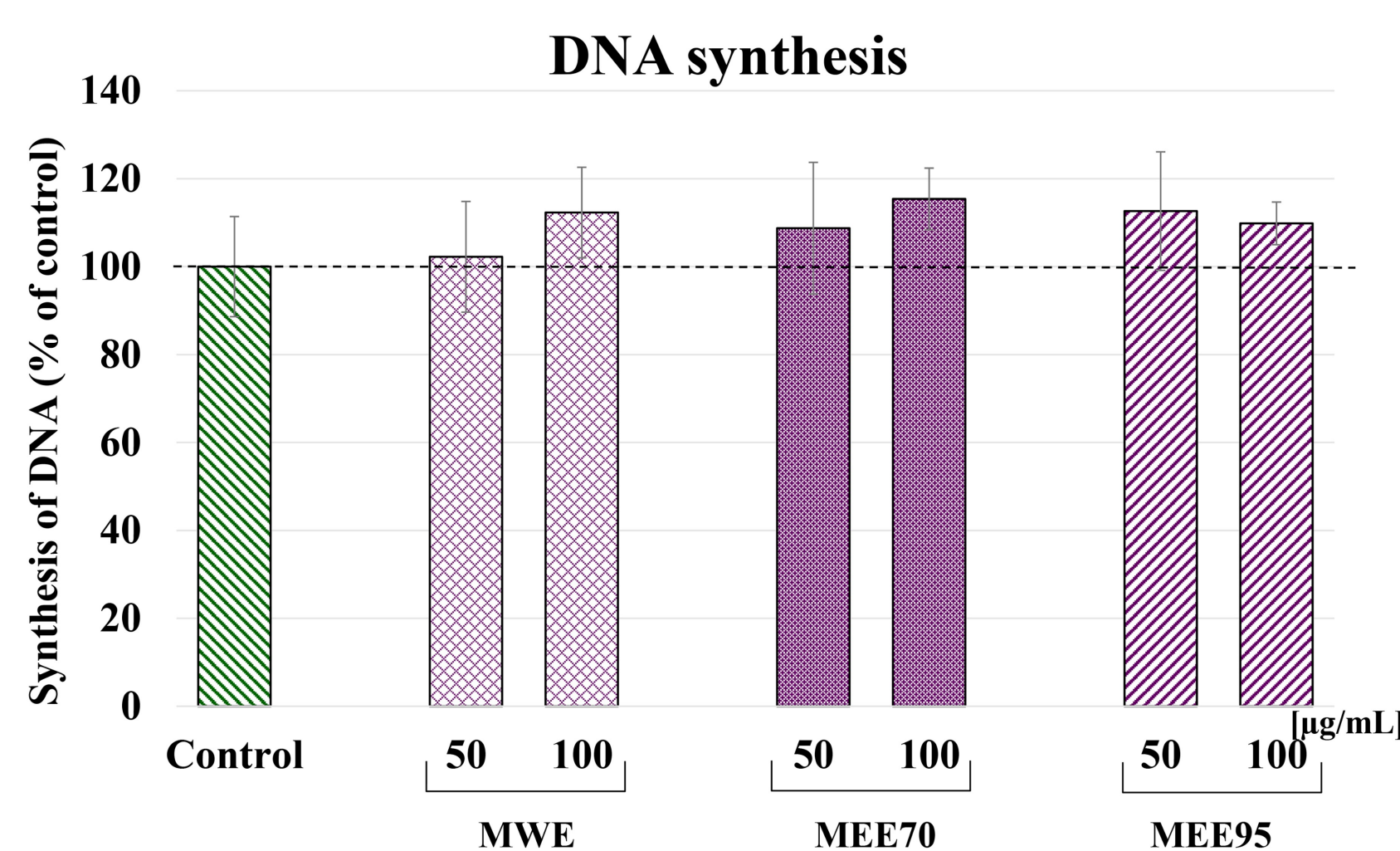


Figure 1. Effect of MWE MEE70, MEE95 extracts at concentrations 50 and 100 µg/mL on the incorporation of [3H]-thymidine into DNA of normal human skin fibroblasts (NHSF cells) after 48 h incubation. \*  $p < 0.05$ —statistically significant difference to control.

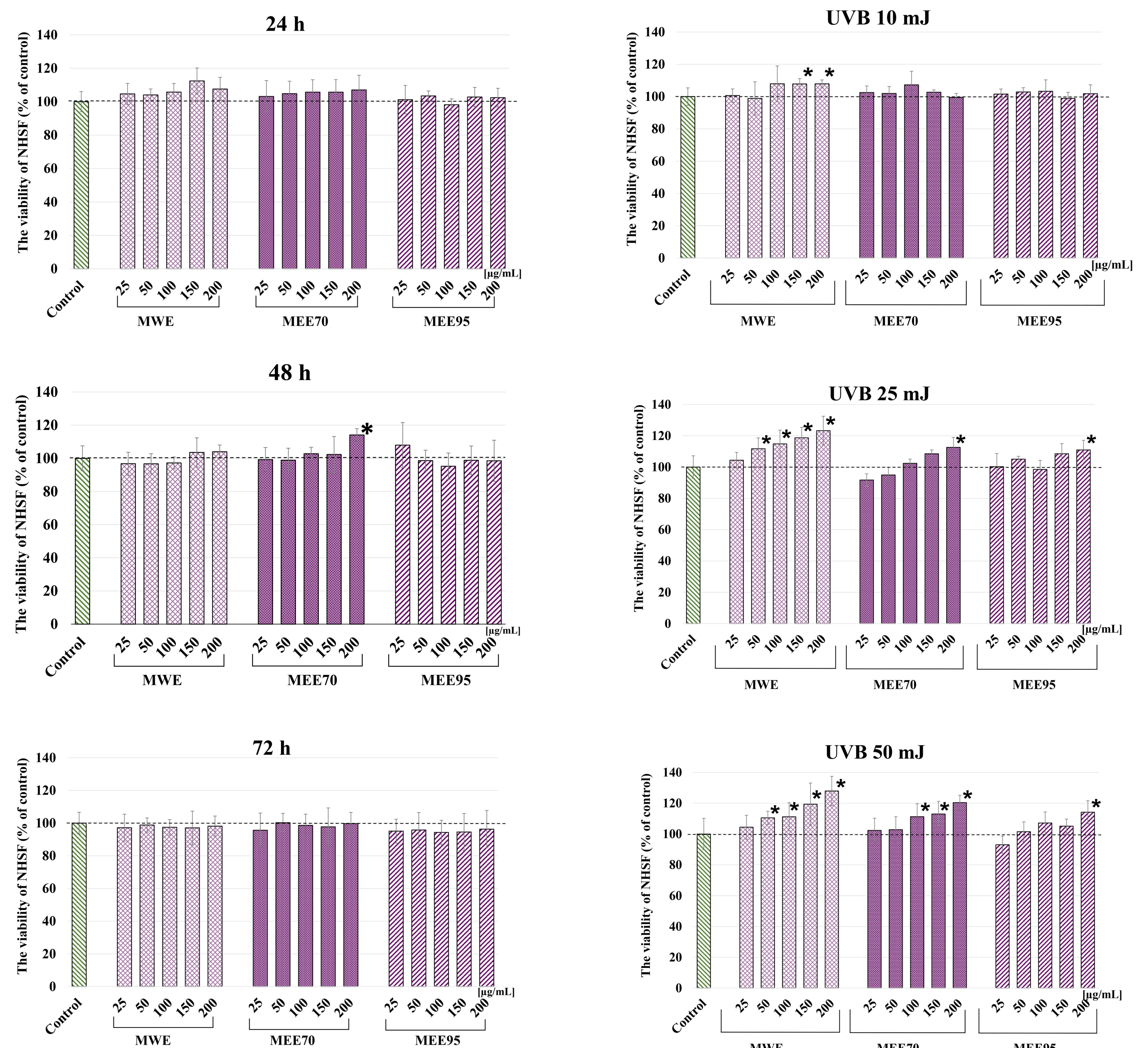


Figure 2. Effect of MWE MEE70, MEE95 extracts at concentrations (25, 50, 100, 150, 200 µg/mL) on the viability of normal human skin fibroblasts (NHSF) after 24, 48 and 72 h of incubation. \*  $p < 0.05$ —statistically significant difference to control.

Figure 3. Effect of MWE MEE70, MEE95 extracts at concentrations (25, 50, 100, 150, 200 µg/mL) on viability of NHSF cells after application of UV radiation (10 mJ/cm<sup>2</sup>; 25 mJ/cm<sup>2</sup>; 50 mJ/cm<sup>2</sup>). \*  $p < 0.05$ —statistically significant difference to control.

**Conclusion**  
The results indicate that maqui extracts, could potentially be used in the production of nutricosmetics and skin care products

Antyoksydacyjne właściwości ekstraktów z jagód maqui (*Aristotelia chilensis* (Mol.) Stuntz) i ich potencjalna rola fotoochronna na fibroblasty skóry ludzkiej

Słowa kluczowe: ekstrakt z jagód maqui, aktywność antyoksydacyjna, zdolność fotoochronna, fibroblasty

### Streszczenie

Maqui (*Aristotelia chilensis*) jest rośliną o właściwościach antyoksydacyjnych i przeciwzapalnych. Celem pracy była ocena wpływu ekstraktów z jagód maqui na fibroblasty skóry ludzkiej poddane działaniu promieniowania UVB. Zbadano całkowitą zawartość polifenoli (TPC), zdolność przeciwutleniającą (DPPH), żywotność komórek i syntezę DNA. Uzyskane wyniki wykazały, że ekstrakty z jagód maqui charakteryzują się wysoką zdolnością antyoksydacyjną. Dawka 200 µg/ml 70% etanolowego ekstraktu z maqui znacznie zwiększyła żywotność fibroblastów skóry ludzkiej po 48 godzinach inkubacji. Uzyskane wyniki wskazują, że ekstrakty z maqui mogą potencjalnie znaleźć zastosowanie w produkcji nutricosmetyków i produktów do pielęgnacji skóry.

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