



# SKIN PHOTOPROTECTION PRODUCTS WITH WILD APPLE FRUIT EXTRACTS AS A SOURCE OF BIOACTIVE POLYPHENOLS: A COMPARISON OF POLAR AND NON-POLAR SOLVENTS

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Ultraviolet radiation is one of the main cause for the development of oxidative stress-related skin damages and photoaging. Oxidative stress generates free radicals which lead to the skin changes. Polyphenols of natural origin represent a good bioactive antioxidant substances and might prevent oxidative stress damage by free radicals neutralization. Application of plant extracts as a good source of polyphenols (including phenols, flavonoids, tannins and anthocyanins) for skin photoprotection is a novel preventive and therapeutic strategy against UV related-skin-diseases.

The aim of this study was preparation of different fruit extracts from wild apple fruit (*Malus sylvestris fructus*, (L.) Mill., Rosaceae), originated from Serbia; examination of total content of phenols - TPC, flavonoids - TFC, tannins - TTC and anthocyanins - TAC; as well as comparative analysis of contents of polyphenols in extracts obtained by polar and non-polar solvents.

## MATERIALS AND METHODS

The liquid extracts were prepared in drug extract ratio - 1:5, at temperature of 22±2°C, by maceration as extraction method and using two different solvents (purified water as polar solvent and virgine olive oil as non-polar solvent). TPC was determined according to the Folin-Ciocalteau method and expressed as gallic acid equivalent - GAE; TFC by Markham`s methods and expressed as rutin equivalent - RE; TTC by vanillin test and expressed as catechin equivalent - CE and percentage content of anthocyanins by Eur.Ph.6.0.

## RESULTS

Water extract showed similar content of TP (585.65±23.32 mgGAC/100g of dry drug-dd) and better content of TA (4.88±0.92 %) compared to oil extract (TPC was 400.47±39.12 mgGAC/100g dd and TAC 0.70±0.05 %). Extraction of flavonoids and tannins from wild apple fruit was better with oil as non-polar solvent, so oil extract showed much better content of TF (182.22±27.12 mgRE/100g dd) and TT (2263.64±167.92 mgCE/100g dd) compared to water extract (TFC was 6.03±1.23 mgRE/100g dd and TTC 709.09±89.45 mgCE/100g dd).

## CONCLUSIONS

Our results demonstrated that bioactive polyphenols are quite abundant in wild apple fruit extracts, which might indicate that wild apple fruit extracts have the potential for usage as natural source of polyphenols in UV-skin-protection products. Non-polar solvent (virgine olive oil) was better solvent for extraction compared to polar solvent (purified water), and oil extract might be more effective than water extract due to the better content of polyphenols. Future development of skin photoprotection products with wild apple fruit extracts as a source of bioactive polyphenols might be justified.

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