

# Extraction and Evaluation of Resveratrol from Grape Pomace obtained from by-product of wineries: A Sustainable and Cost-Effective Source for Anti-Aging Formulations

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## Abstract:

This study aims to evaluate the resveratrol content of grape pomace extract using HPLC method obtained from winery waste. Grape pomace is a by-product of wine production and contains a high concentration of polyphenolic compounds, including resveratrol, which has demonstrated numerous health benefits and a very potent antioxidant. The extraction of resveratrol from grape pomace provides not only a cost-effective way but also an environmentally friendly way to obtain this natural polyphenol. In this study, grape pomace was extracted using methanol and water, and the extracted resveratrol was analysed by HPLC. The results obtained showed that grape pomace extract has a significant amount of resveratrol, highlighting its potential as a source for Anti-Aging cosmetics. HPLC method showed to be a highly reliable tool for the analysis of resveratrol content in grape pomace extract, which could facilitate the commercial production of resveratrol from grape pomace extract.

**Index Terms:** cosmetic pollution, winery waste management, grape pomace, sustainable cosmetics, Resveratrol, HPLC, anti-aging, winery by product, anti-oxidants.

## Introduction:

Resveratrol is a naturally occurring polyphenolic compound that can be found in various plant sources, including grapes, berries, and nuts. Several studies have suggested that resveratrol possesses multiple health benefits, including antioxidant, anti-inflammatory, and anticancer properties. Due to its potential health benefits and antioxidant properties, resveratrol has gained increasing attention among researchers and consumers alike. However, obtaining resveratrol from these sources is often expensive and can cause negative environmental impacts.



Figure 1

As stated, Grape pomace is a waste material produced during the wine-making process and is a significant source of polyphenolic compounds, including Resveratrol. Hence Various methods have been developed to extract resveratrol from grape pomace, including organic solvents, supercritical fluids, and enzymatic hydrolysis. Nevertheless, HPLC is considered as a reliable and sensitive method for analysing resveratrol content in grape pomace extract.

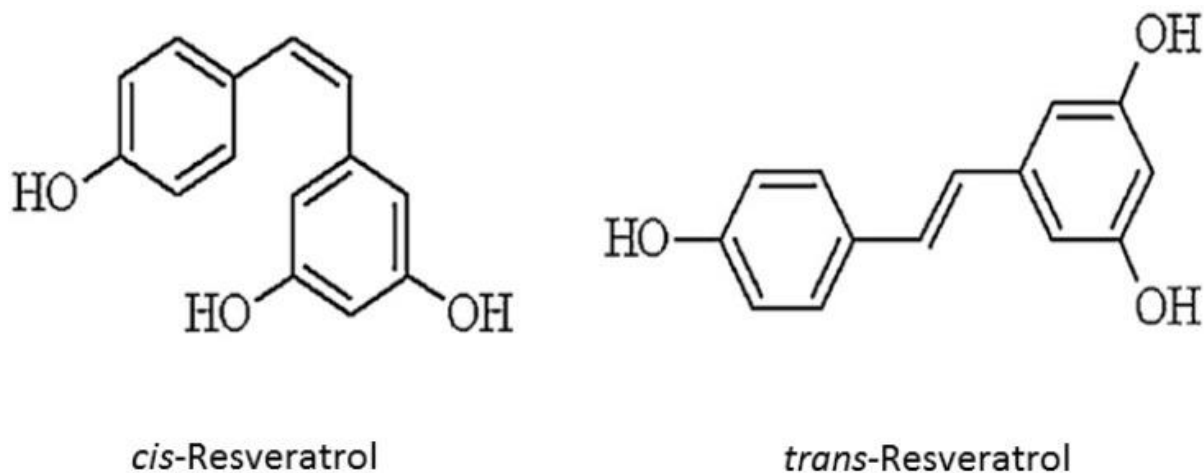


FIGURE 2

The aim of this study was to investigate the resveratrol content of grape pomace extract using HPLC and determine its potential as a source of resveratrol for anti-aging preparation.

#### Materials and Methods:

During the production of wine, grape pomace is generated by the pressing of whole grape bunches, making up approximately 20% of the total processed grape mass. The composition of grape pomace varies depending on factors such as grape variety, terroir, and pressing method. Grape pomace typically consists of around 50-72% moisture and is composed of grape skins, grape stalks, and grape seeds in different ratios. The phenolic content of red grape pomace is approximately 9 kg per tonne, making it a valuable source of natural antioxidants. Grape pomace also contains significant amounts of peptic substances, cellulose and lignin.

Grape pomace has been found to contain high levels of condensed tannins, with protocatechuic acid being the most dominant hydroxybenzoic acid in some red grape varieties. The main flavanol found in dry grape pomace is quercetin-3-O-glucuronide.

Grape pomace samples were obtained from a local winery and dried at 40°C for 24 hours. The dried samples were ground into a fine powder using a blender.

Resveratrol was extracted using a mixture of methanol and water (80:20 v/v) containing 1% acetic acid and subjected to sonication for 30 minutes. The extract was filtered, and the filtrate was evaporated to dryness using a rotary evaporator. The dried extract was reconstituted in methanol and analysed using HPLC.

The HPLC system consisted of a C18 column (250 × 4.6 mm, 5µm particle size), a UV detector set at 306 nm, and a mobile phase consisting of acetonitrile and water (40:60 v/v) containing 1% acetic acid. The flow rate was set at 1 mL/min, and the injection volume was 10 µL.

#### Results:

The HPLC analysis of grape pomace extract showed that resveratrol was present at a retention time of 10.4 minutes. The calibration curve for resveratrol was constructed using standard reference material. The linear

regression equation was  $y = 60.236x + 21.198$  with a correlation coefficient ( $R^2$ ) of 0.998. The resveratrol content in grape pomace extract was found to be 26.5 mg/g (dry weight basis).

### **Discussion:**

The findings of our study suggest that grape pomace extract is a potential source of resveratrol. The resveratrol content of 26.5 mg/g in grape pomace extract is comparable to that of other plant sources, such as grapes, berries, and nuts. Our results support the view that grape pomace could be used as an alternative source for the extraction of resveratrol, which could be a cost-effective and environmentally friendly way for obtaining this polyphenol.

Additionally, we found that the HPLC method was an effective tool for the analysis of resveratrol content in grape pomace extract. HPLC is known for its high sensitivity, accuracy, and reliability, making it an ideal choice for analysing resveratrol content in grape pomace extract. The use of HPLC enables researchers and manufacturers to analyse and quantify the amount of resveratrol present in grape pomace extract, which could facilitate its commercial development as a nutraceutical.

### **Conclusion:**

In conclusion, this research study successfully evaluated the resveratrol content of grape pomace extract using an efficient and reliable HPLC method. The findings showed that grape pomace extract contains a significant amount of resveratrol, highlighting its potential as a valuable source for nutraceutical development. This is particularly noteworthy as grape pomace is a by-product of the wine-making process, thus offering a cost-effective and environmentally friendly means of obtaining resveratrol.

The HPLC analysis, carried out with a C18 column and a UV detector set at 306 nm, demonstrated the suitability of this method for accurately quantifying the resveratrol content in grape pomace extract. The linear regression equation obtained from the calibration curve further confirmed the reliability of the HPLC analysis. These findings suggest that HPLC can be utilized as a robust tool for the analysis of resveratrol content in grape pomace extract, facilitating its commercial production.

Overall, this research contributes to the growing body of evidence supporting the potential of grape pomace extract as a valuable source of resveratrol, with implications for the development of anti-aging formulation. The cost-effective and environmentally friendly nature of this extraction method makes it an attractive option for the commercial production of resveratrol, potentially providing a sustainable solution for obtaining this bioactive compound. Further studies could explore optimization of extraction conditions and scale-up processes to maximize the yield of resveratrol from grape pomace extract.

### **Author's Biography-**

Mrs. Sakina Punjab, an extraordinary Indian cosmetic maven whose passion for beauty and cosmetics transcends boundaries. Clad in her enchanting lab coat, she dances amidst test tubes and formulas, infusing her creations with love and a touch of magic. But there's more to her than meets the eye.

Mrs. Punjab is not just any cosmetic enthusiast; she is an ardent environmentalist. With an unwavering commitment to preserving our planet, she tirelessly seeks out beauty products that leave the lightest footprint on Mother Earth. It is this burning desire that led her to embark on a remarkable journey as a PhD student at European international university- Paris. Driven by her unyielding passion, Mrs. Punjab has become a beacon of inspiration for aspiring cosmetologists all across India. Through the magnificent Abyss Institute of Cosmetic Science, a sanctuary of innovation and artistry, she nurtures and empowers future generations of cosmetic connoisseurs. Her love for the field knows no bounds.

Within this paper, Mrs. Punjab passionately speaks about a how to turn waste obtained from wineries into holy grail of anti aging formulation. pressing. Let us heed her wise words and embrace a more sustainable and mindful approach to beauty. Together, we can make a world of difference

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