

# OPTIMASI SUHU DAN WAKTU EKSTRAKSI TERHADAP AKTIVITAS PENANGKALAN RADIASI UV DAUN TAYUMAN (*Bauhinia purpurea* L.) MENGGUNAKAN RSM

Qintan Prameswari<sup>1</sup>, Rizqa Salsabila Firdausia<sup>2</sup>

## INTISARI

**Latar Belakang:** Fenolik dan flavonoid merupakan dua senyawa alami yang dapat berperan sebagai tabir surya. Fenolik dan flavonoid diketahui terkandung di dalam tanaman daun tayuman (*Bauhinia purpurea* L.). Untuk mendapatkan ekstrak yang optimal perlu dilakukan optimasi terhadap suhu dan waktu ekstraksi ultrasonikasi menggunakan metode *Response Surface Methodology* (RSM).

**Tujuan Penelitian:** Mengetahui suhu dan waktu optimal dari ekstrak etanol daun tayuman (*B. purpurea*) yang menghasilkan nilai SPF, %Te dan %Tp paling optimal.

**Metode Penelitian:** Optimasi suhu dan waktu ekstraksi dilakukan menggunakan metode RSM tipe *Central Composite Design* (CCD) yang menghasilkan 14 kombinasi suhu dan waktu ekstraksi yang berbeda. Hasil ekstraksi dilanjutkan dengan analisis nilai SPF, %Te dan %Tp menggunakan Spektrofotometri UV-Vis. Hasil analisis yang diperoleh kemudian diolah dengan aplikasi *Minitab Version 17*.

**Hasil Penelitian:** Nilai Rendemen tertinggi pada daun tayuman diperoleh pada suhu 35°C dan waktu 5,680 menit sebesar 12,66%. Nilai SPF tertinggi diperoleh pada suhu 13,786°C dan waktu 37,5 menit sebesar 23,205. Nilai %Te terendah diperoleh pada suhu 13,786°C dan waktu 37,5 menit sebesar 0.409%. nilai %Tp terendah diperoleh pada suhu 50°C dan waktu 60 menit sebesar 4,895%. Berdasarkan hasil pengolahan data diperoleh solusi optimum yang menghasilkan nilai rendemen sebesar 13,453%, nilai SPF 24,904, nilai %Te -1,299% dan nilai %Tp 1.965%. yaitu pada suhu 13,786°C dan waktu 5,680 menit. Dilakukan proses validasi, dan didapat hasil yang tidak berbeda secara signifikan ( $0,860 > 0,05$ ) pada taraf kepercayaan 95%.

**Kesimpulan:** Suhu dan waktu optimal dari ekstrak etanol daun tayuman (*B. purpurea*) yang menghasilkan nilai SPF, %Te dan %Tp paling optimal adalah suhu 13,786°C dengan waktu 5,680 menit.

**Kata kunci :** *Bauhinia purpurea*, Fenolik, Flavonoid, Optimasi, *Response Surface Methodology* (RSM), Tabir surya, Ultrasonikasi.

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<sup>1</sup>Mahasiswa Farmasi Universitas Jenderal Achmad Yani Yogyakarta

<sup>2</sup>Dosen Farmasi Universitas Jenderal Achmad Yani Yogyakarta

**OPTIMIZATION OF EXTRACTION TEMPERATURE AND TIME ON  
UV RADIATION PROTECTION ACTIVITIES OF TAYUMAN LEAVES  
(*Bauhinia purpurea* L.) USING RSM**

Qintan Prameswari<sup>1</sup>, Rizqa Salsabila Firdausia<sup>2</sup>

**ABSTRACT**

**Background:** Phenolics and flavonoids are two naturally occurring compounds that can be used as sunscreens. Phenolics and flavonoids are known in Tayuman (*Bauhinia purpurea* L.) leaf. To obtain the best extract, the temperature and time of ultrasonic extraction must be optimized using the Response Surface Methodology (RSM) method.

**Objective:** Determine the optimal temperature and time for an ethanol extract of Tayuman leaves (*B. purpurea*) to produce the most optimal SPF, %Te and %Tp values.

**Method:** The RSM method of Central Composite Design (CCD) type was used to optimize temperature and time extraction, yielding 14 different temperature and time extraction combinations. The extraction results were further examined using UV-Vis Spectrophotometry to determine the SPF, %Te and %Tp values. The obtained analysis results were then processed using the Minitab Version 17 application.

**Result:** The highest yield value of 12,66% was obtained on tayuman leaf at a temperature of 35°C and a time of 5,680 minutes. The highest SPF value of 23,205 was obtained at a temperature of 13,786°C and a time of 37,5 minutes. The lowest %Te value of 0,409% was obtained at a temperature of 13,786°C, and a time of 37,5 minutes. The lowest %Tp value of 4,895% was obtained at a temperature of 50°C and a time of 60 minutes. Based on the data processing results, the optimum solution was obtained, yielding a yield value of 13.453%, an SPF value of 24.904, %Te value -1.299% and %Tp value of 1.965% in this, at a temperature of 13.786°C and a time of 5.680 minutes. The validation process was completed, and the results at the 95% confidence level were not significantly different ( $0,860 > 0,05$ ).

**Conclusion:** The optimal temperature and time for an ethanol extract of tayuman leaf (*B. purpurea*) to produce the most optimal SPF, %Te and %Tp values is 13.786°C with a time of 5,680 minutes.

**Keywords:** *Bauhinia purpurea*, Phenolic, Flavonoid, Optimization, Response Surface Methodology (RSM), Sunscreen, Ultrasonication.

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<sup>1</sup>Student of Pharmacy Universitas Jenderal Achmad Yani Yogyakarta

<sup>2</sup>Lecturer of Pharmacy Universitas Jenderal Achmad Yani Yogyakarta