

In-vitro anti-solar activity of peel of *Malus domestica*

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ABSTRACT

Hormone production is stimulated by sunlight and it can lead to the synthesis of vitamin D, it also stimulates the reconstruction of cells of the skin. Melanin is the pigment that acts as a natural sunscreen for the skin. Melanin is also stimulated by sunlight. Sunburn, rashes, miliaria, itching, and other skin-related diseases can occur due to the excess harmful sun rays. This study determines the anti-solar property of the UV absorption of the peel of *Malus domestica*. By using the soxhlet apparatus, the extract was obtained. For extraction of 25gm of the powdered drug, 100ml of solvent i.e. distilled water and methanol in the 2:5 ratio were used. The activity is determined by using UV-visible spectrophotometer in the range of 200–400 nm. The maximum absorbance was determined by conc. 6µg/ml at 205nm, good absorbance shows at conc. 4µg/ml at 207nm and moderate absorbance by conc. 2µg/ml at 207nm.

Keywords: *Malus domestica*, UV Spectrophotometer, Anti-solar activity, UV-rays absorption, Wavelength.

The surface area of the skin is 1.5 to 2 m². It is protective in nature. Continuous exposure to sunlight can affect the skin and damage it. To protect the skin from this damage, it releases melanin [1]. Excessive exposure to sunlight can cause rashes, sunburn, miliaria, itching, and other skin-related diseases. To protect the body from this, the sunscreens are used. Based on the wavelength of UV light, it is UVA, UVB, and UVC [2]. Solar radiation affects the skin. UV-A and UV-B can cause sunburn, cutaneous degeneration, and cell skin cancer [3].

MATERIALS AND METHODS

Peel of *Malus domestica* was collected and shade dried. Then it is powered by using a mixer grinder and passed from sieve no. 20.

Extraction method

In the soxhlet apparatus, add 25gm of powdered drug and pour the solvent system in the ratio 2:5 of distilled water: methanol. Pour solvent up to which three cycles were complete. Then start the heating mantle at 55^oc and start the water supply to the condenser. The solvent pass from the powder and along with constituents present in the powder settles in the round bottom flask. Keep this process up to the solvent comes colorless [4].

Qualitative tests

- 1) Shinoda test:** In a dry extract, add 5 ml of 95% ethanol and a few drops of conc. hydrochloric acid and 0.5gm of magnesium turnings. Pink color shows the presence of flavonoids [5].
- 2) Lead acetate test:** In a small quantity of extract, add lead acetate solution, the yellow-colored precipitate is formed [5].

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Fig.1: Peel of *Malus domestica*Fig.2: Peel powder of *Malus domestica*

Fig.3: Peel powder sieving



Fig.4: Shinoda test



Fig.5: Lead acetate test

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Procedure

10mg powdered drug was added in 100 ml of solvent i.e. distilled water: methanol in a 2:5 ratio to prepare a stock solution of 100 μ g/ml concentration. From this stock solution, 5 different concentrations of 2, 4, 6, 8, and 10 μ g/ml were prepared by pipetting 0.2, 0.4, 0.6, 0.8, and 1 ml of stock solution and dilute it up to 10 ml. Then observe the maximum absorbance and the wavelength at which maximum absorbance was observed photo-metrically by using a UV-visible spectrophotometer [6].

RESULTS AND DISCUSSION

The peel of *Malus domestica* contains plant constituents such as flavonoids. This constituent shows anti-solar

activity. UV radiation from the sunlight can cause the diseases like skin rashes, sunburn, miliaria, itching, and other skin-related diseases. To protect the skin from these diseases, anti-solar agents are used. Anti-solar agents absorb the UV radiation which has 200 to 400 nm wavelength [1] (Table 1-3).

In-vitro Anti-solar Activity

Table 1: *In-vitro* anti-solar activity of methanolic extract of *Malus domestica* of concentration: 2 μ g/ml

S. No.	Wavelength nm.	Abs.
1	349.80	0.002
2	344.40	0.002
3	338.60	0.005
4	318.40	0.007
5	305.40	0.007
6	375.80	0.017
7	368.80	0.019
8	362.00	0.018
9	209.80	0.250
10	207.00	0.266
11	348.00	0.000
12	341.80	0.001
13	320.40	0.005
14	310.00	0.006
15	304.60	0.005
16	301.00	0.004
17	274.20	0.016
18	265.60	0.017
19	252.40	0.014
20	203.60	0.234

Table 2: *In-vitro* anti-solar activity of methanolic extract of *Malus domestica* of concentration: 4 μ g/ml

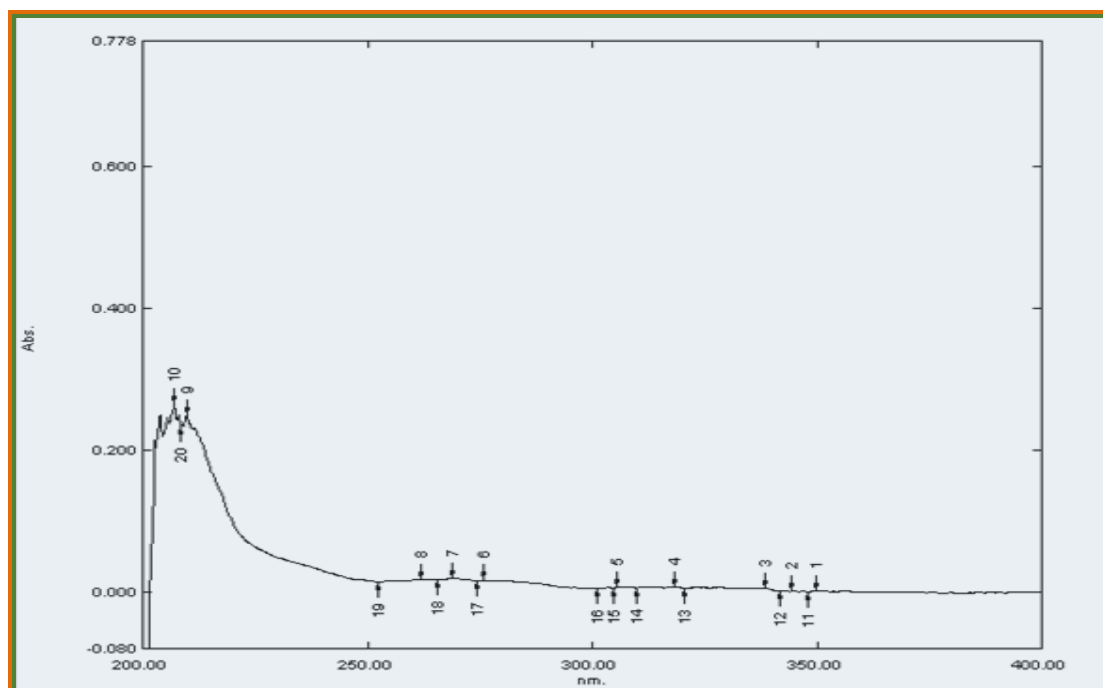
S. No.	Wavelength nm.	Abs.
1	395.00	0.002
2	344.00	0.009
3	332.00	0.014

4	322.00	0.015	13	314.00	0.030
5	310.00	0.018	14	308.00	0.036
6	303.60	0.018	15	302.20	0.045
7	279.80	0.040	16	386.20	0.056
8	260.00	0.042	17	380.40	0.065
9	207.00	0.315	18	278.40	0.063
10	345.00	0.000	19	373.20	0.065
11	342.00	0.006	20	368.20	0.065
12	320.40	0.013	21	363.60	0.063
13	312.00	0.016	22	207.80	0.561
14	306.00	0.016	23	205.00	0.568
15	257.00	0.005	24	375.60	0.015s
16	0.006	0.006			

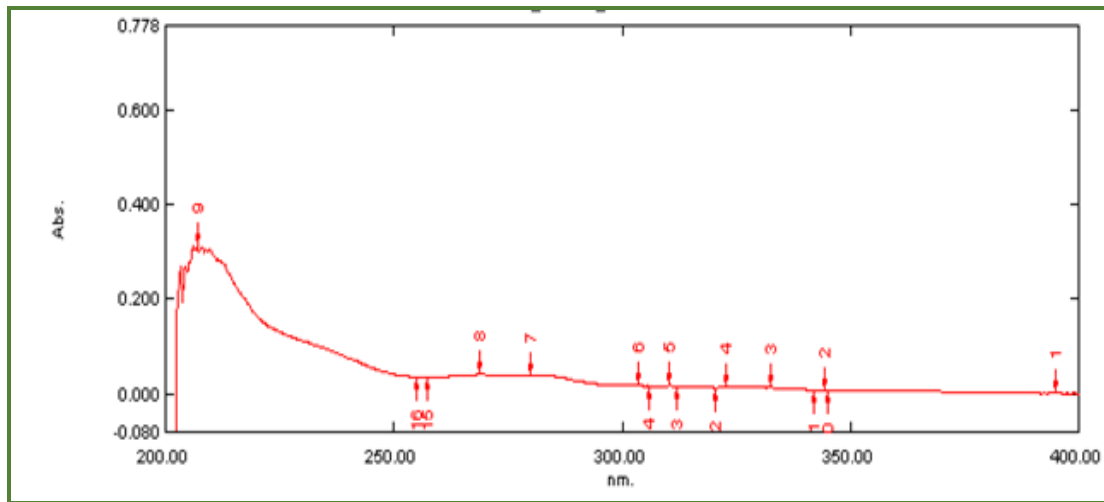
Table 3: In-vitro anti-solar activity of methanolic extract of *Malus domestica* of concentration: 6µg/ml

S. No.	Wavelength nm	Abs.
1	378.40	0.016
2	371.00	0.018
3	354.40	0.022
4	349.00	0.025
5	346.80	0.024
6	342.20	0.024
7	334.40	0.026
8	332.00	0.028
9	327.40	0.027
10	324.40	0.028
11	320.80	0.032
12	319.00	0.031

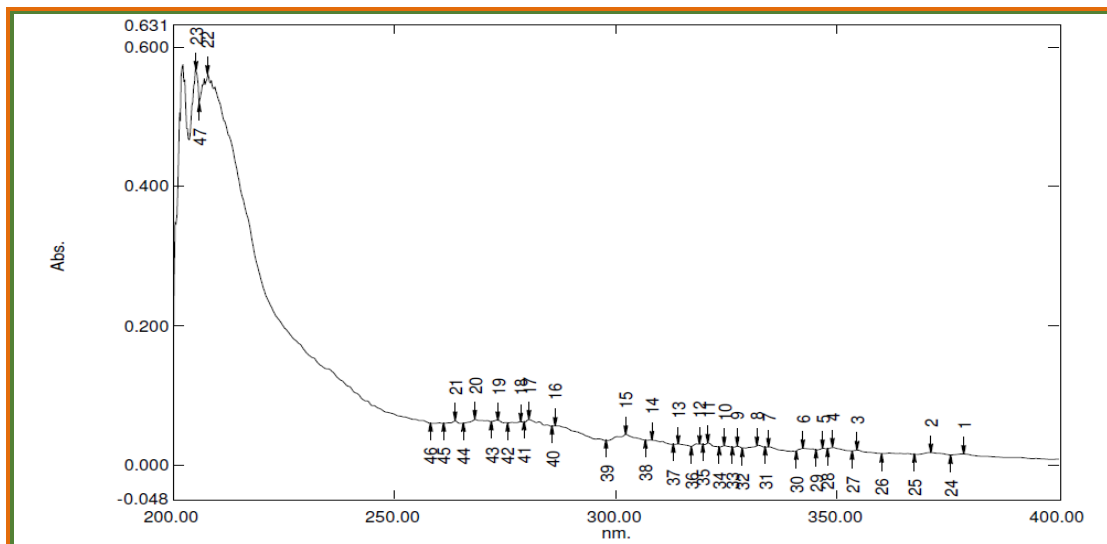
Anti-solar activity is first performed to study the absorption of UV radiation of the peels of *Malus domestica*. Estimation of the anti-solar activity by the methanolic extract was completed by this study. This study gives the range of wavelengths in which absorption of UV radiation was observed. The maximum absorption of UV radiation was found at a concentration of 2µg/ml, at 207nm i.e. 0.266. The maximum absorption of UV radiation was found at a concentration of 4µg/ml, at 207nm i.e. 0.315. The maximum absorption of UV radiation was found at a concentration of 6µg/ml, at 205nm i.e. 0.568. From 2µg/ml, the maximum absorption of UV radiation increases as concentration increases, which is as shown in (Graph 1-4). The extract of 6µg/ml shows maximum absorption of UV radiation i.e. 0.568 as compared to the other concentrations [3] [7].



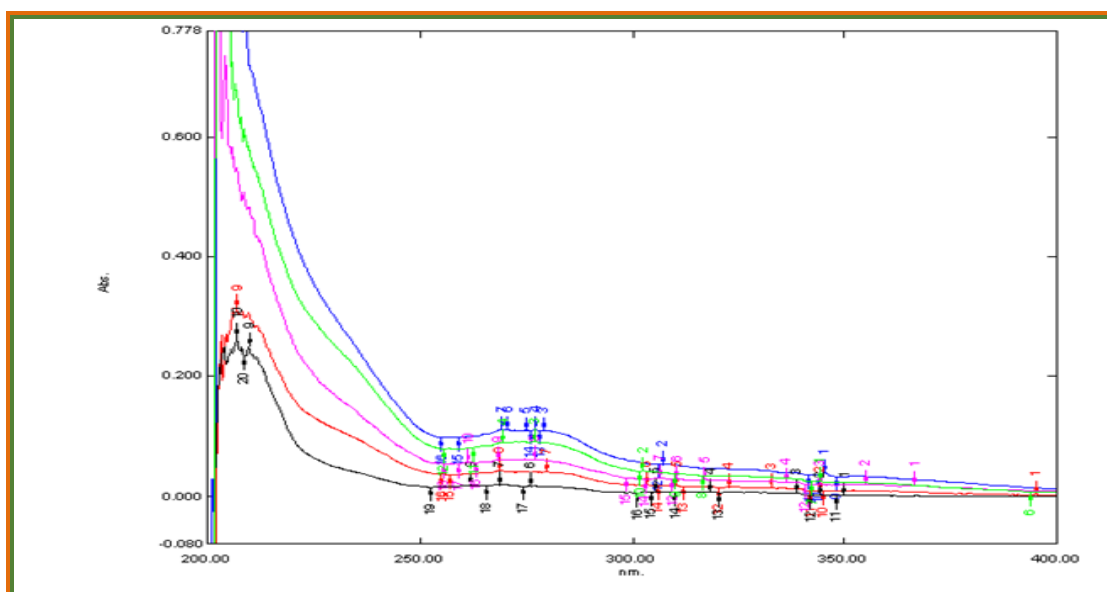
Graph 1: In-vitro anti-solar activity of methanolic extract of *Malus domestica* of concentration: 2µg/ml



Graph 2: *In-vitro* anti-solar activity of methanolic extract of *Malus domestica* of concentration: 4µg/ml



Graph 3: *In-vitro* anti-solar activity of methanolic extract of *Malus domestica* of concentration: 6µg/ml



Graph 4: Comparison of *in-vitro* anti-solar activity of methanolic extract of *Malus domestica* of concentration: 2µg/ml, 4µg/ml, 6µg/ml, 8µg/ml, 10µg/ml

CONCLUSION

The conclusion of this study shows that the methanolic extract of the peel of *Malus domestica* shows anti-solar activity by determining its maximum absorption of UV radiation in a UV region i.e. 200nm to 400nm of wavelength. The extract of 6µg/ml shows maximum absorption of UV radiation i.e. 0.568 as compared to other concentrations. The maximum absorption of UV radiation was found at a concentration of 6µg/ml, at 205nm i.e. 0.568. From 2µg/ml, the maximum absorption of UV radiation increases as concentration increases.

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