

# Testing Of The Cream Formula Turmina Right Extract Against The Inhibition Of The Development Of Melanoma Cells

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## Abstract

Cancer is one of the biggest causes of death in the world and is still a health problem that still cannot be found the right treatment to overcome it. One of the cancers that cannot be ruled out is skin cancer, which occurs as a result of being exposed to direct sunlight for a long time and often without using skin protection or sunscreen. Cancer treatment that is currently being carried out is surgical therapy, chemotherapy which has adverse side effects for patients such as therapy that not only kills cancer cells but also healthy cells. The current therapy needed is the formulation of topical preparations that can be used to inhibit the growth of cancer cells. This study aims to make a cream preparation from turmeric extract to inhibit the growth of melanoma cells. This research was made experimentally by formulating turmeric rhizome extract into cream preparations at a concentration of 0.5%; 2.5% ; 5% ; 10% and 20% were tested against melanoma cell inhibition in vitro. Melanoma cell inhibition testing was carried out using the MTT Assay method by looking at the IC<sub>50</sub> value of turmeric extract cream in inhibiting the growth of melanoma cells. The results showed that 20% turmeric rhizome extract cream was the formulation that gave the best IC<sub>50</sub> value of 524.42 ± 5.2 g/mL.

**Keywords:** cream, turmeric extract, MTT Assay, IC<sub>50</sub>

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## I. INTRODUCTION

Cancer is a disease caused by abnormal, uncontrolled cell growth and has the ability to attack other biological tissues, both those that grow directly on the adjacent tissue (invasion) and cell migration to distant places (metastasis). (2019) and is also one of the types of disease that is the highest cause of death in the world. Until now there has not been found the right solution to overcome (American Cancer Society, 2008).

There are many types of cancer, including blood cancer or leukemia, liver cancer, breast cancer, skin cancer, stomach cancer, tongue cancer, mouth cancer, eye cancer, brain cancer, thyroid cancer, cervical cancer and lung cancer (Ariani, 2015). . One type of cancer that cannot be excluded is skin cancer which occurs due to changes in normal cells to malignant cells due to DNA damage due to being exposed to direct sunlight for a long time and often not using protective skin (American Cancer Society, 2008).

Cancer treatment with chemotherapeutic agents is still an alternative choice in cancer treatment. Chemotherapy therapy has side effects for cancer patients, such as not only killing cancer cells but also damaging normal cells, increasing the risk of infection, and relatively expensive costs (Hao, 2020).

Turmeric is one of the plants that grows in Indonesia and is used as a traditional treatment, one of which is to overcome allergies. The main content of turmeric is curcumin which according to research has an anticancer effect (Diepgen and Mahler, 2002).

Topical drug delivery system through the skin is the administration of drugs that are used to provide a localized effect at the site of application of the preparation through penetration into the skin (Verma, 2013). One of the pharmaceutical preparations with a topical delivery system is a cream preparation which is a semi-solid dosage form, containing one or more drug ingredients dissolved or dispersed in an appropriate base material. Cream preparations are made because cream has advantages including its practical use, easy to wash and clean, can be directly applied without leaving residue on the skin (Masaki, 2010; Yanhendri and Yenny., 2012).

## II. METHOD

### 2.1 Sampling

Samples of turmeric rhizome were taken from Delitua Market, Jalan Besar Delitua, Patumbak District, Deli Serdang Regency. The turmeric rhizome used is a large and old turmeric rhizome which has a rhizome thickness of  $\pm 4.06$  cm.

### 2.2 The formulation of turmeric rhizome extract cream preparation

The formulation of the turmeric rhizome extract cream was made in 5 concentrations, namely a concentration of 0.5%; 2.5% ; 5% ; 10% and 20%.The formula for the cream preparation can be seen in table 1 below.

**Table 1.** Turmeric rhizome extract cream preparation formula

NO	Ingredients	Concentration % (b/b)				
		F1	F2	F3	F4	F5
1	Ekstrak VCO kunyit	0,5	2,5	5	10	20
2	Asam stearat	5	5	5	5	5
3	Setil alkohol	4	4	4	4	4
4	Adeps lanae	5	5	5	5	5
5	Gliserin	15	15	15	15	15
6	Paraffin cair	5	5	5	5	5
7	Span 80	4	4	4	4	4
8	Tween 80	4	4	4	4	4
9	Triethanolamin	2	2	2	2	2
10	Metil paraben	0,1	0,1	0,1	0,1	0,1
11	Propil paraben	0,05	0,05	0,05	0,05	0,05
12	Akuades	ad 100	ad 100	ad 100	ad 100	ad 100

Description :

F1 : VCO turmeric extract cream 0,5% concentration

F2 : VCO turmeric extract cream 2,5% concentration

F3 : VCO turmeric extract cream 5% concentration

F4 : VCO turmeric extract cream 10% concentration

F5 : VCO turmeric extract cream 20% concentration

### 2.3 The procedure for making turmeric rhizome extract cream

The procedure for making turmeric rhizome extract cream is made by heating the mortar which will be used by soaking the mortar in hot water. The formulation of the cream preparation was made by melting the oil phase (stryaric acid, cetyl alcohol, adeps lanae, tween 80 and methyl paraben) with an evaporating dish at 80°C above the water bath until the oil phase melted completely (Mass 1), then made the aqueous phase (mass 1). glycerin, liquid paraffin, span 80, propyl paraben and aquadest) mix until homogeneous (Mass II), triethanolamine is dissolved in hot water in a beaker (Mass III). Add triethanolamine in a hot mortar then mix slowly mass 1 and mass 2, grind quickly until a creamy mass is formed, then add turmeric rhizome extract little by little, stir until homogeneous until it forms a homogeneous cream mass and the color of turmeric is evenly distributed in the cream preparation (Utari., et al. 2019).

### 2.4 Cytotoxic test of turmeric rhizome extract cream against melanoma cells

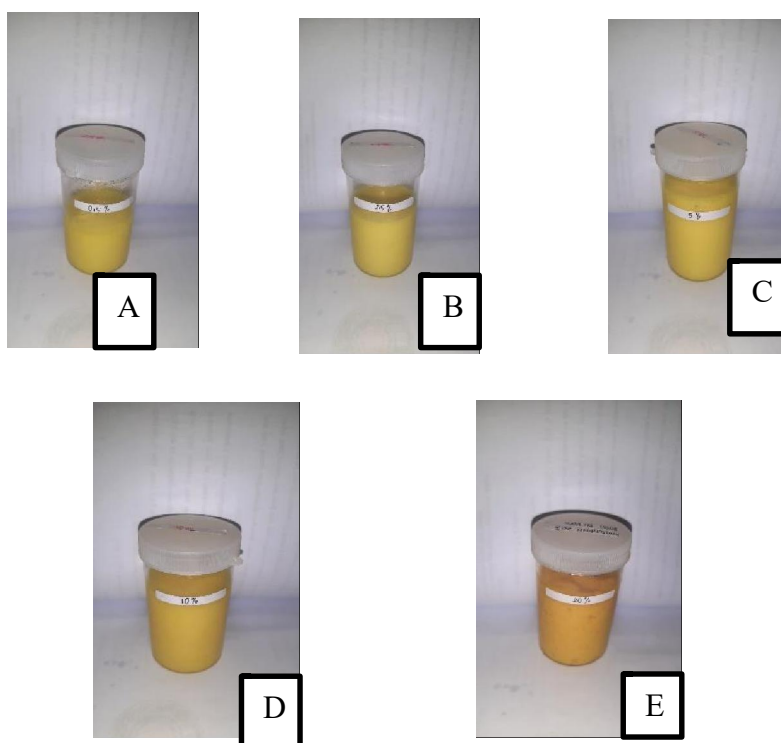
The tools used in this anticancer activity test have been sterilized before being used in an autoclave at 121°C for 15 minutes. Cytotoxic test was carried out using a cream sample of turmeric rhizome extract

formulated at a concentration of 500 g/ml; 250 g/ml ; 125 g/ml ; 62.5 g/ml and 31.5 g/ml. which were homogenized with B16-F10 cells and then planted on a 96-well microplate to obtain a density of 5000 cells/well and incubated for 24 hours to obtain good cell growth. After 24 hours the medium was replaced with a new one then added with the test solution using DMSO cosolvent and incubated at 37°C in a 5% CO<sub>2</sub> incubator for 24 hours. At the end of incubation, the test medium and solution were removed and the cells were washed with PBS. To each well, 100 L of culture medium and 10 g/ml MTT (Sigma) mg/mL were added. To observe the viability, the cells were re-incubated for 4 – 6 hours in a 5% CO<sub>2</sub> incubator at 37°C. The MTT reaction was stopped with a reagent stopper (10% SDS in 0.1 N HCl) then wrapped in aluminum foil to prevent it from being translucent at room temperature and left for one night. Live cells react with MTT to form a purple color. The test results were read with a microplet reader at a wavelength of 595 nm (Auliansyah, et al., 2012).

### III. Result

#### 3.1 The results of the formulation of the turmeric rhizome extract cream preparation

The formulation of turmeric rhizome extract cream preparation.



**Fig 1.**Preparation of turmeric extract cream with a concentration of 0.5%(A); concentration 2.5% (B); concentration 5% (C); concentration 10% (D); concentration 20% (E)

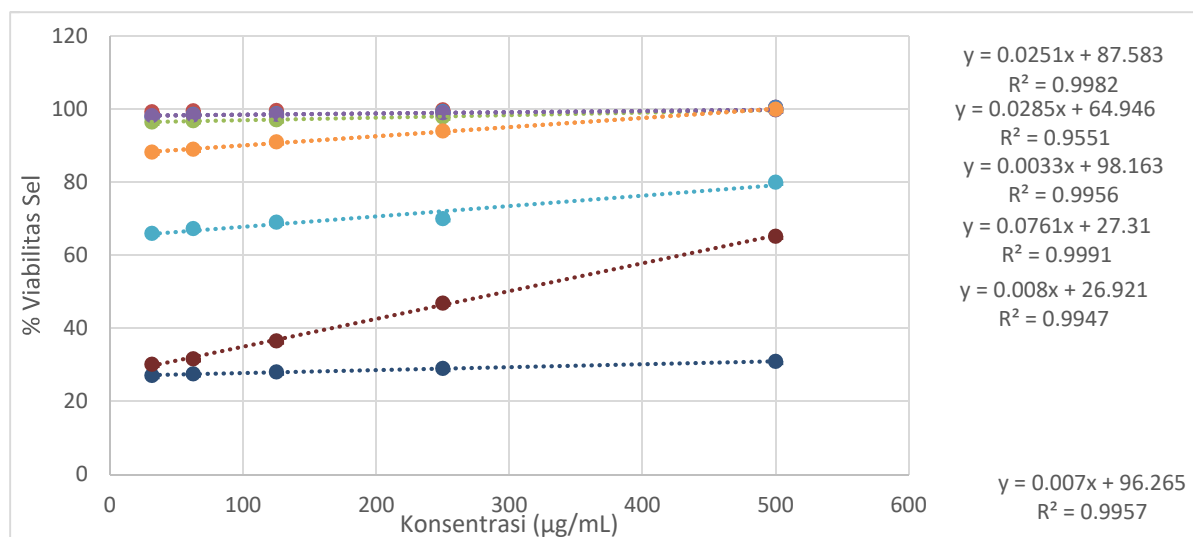
The formulation of the turmeric extract cream preparation gives a yellow color, the preparation is homogeneous and does not clot, has a distinctive turmeric odor and is not sticky on the skin surface.

#### 3.2 Results Cytotoxic effect of turmeric VCO extract cream sample preparation

The IC<sub>50</sub> value is determined by calculating the amount needed to inhibit 50% of cancer cell growth (Zaman et al, 2016).The results of the regression equation obtained can be seen in Figure 2 below.

$$y = 0.0033x + 98.163$$

$$y = 0.007x + 96.265$$



**Fig. 2.** Live cancer cell calibration curve with cream sample concentration

The IC50 value of the tested cream preparation was determined using a linear regression equation obtained by plotting the concentration of the tested sample as the X-axis and the percentage of live cells as the Y-axis. obtained by plotting the concentration of the sample with the percentage of viability of living cells. From the graph above, it can also be concluded that the higher the concentration of the sample used, the higher the percentage of live cell viability. IC50 data obtained can be seen in Table 3.1 below

**Table 2.** Cytotoxic activity IC50) of the cream preparation test material

No	Sample	IC50 value(µg/mL)
1	F1	14594,84 ± 5,2
2	F2	9813,06 ± 4,9
3	F3	6609,28 ± 4,0
4	F4	1497,33 ± 4,4
5	F5	524,42 ± 4,8
6	Cream base	20530,4 ± 6,3
7	Kurkumin	13,46 ± 0,14
8	Doksorubisin	0.634 ± 0.01

Description :

F1 : The formula for the preparation of 0,5% turmeric VCO extract cream

F2 : The formula for the preparation of 2,5% turmeric VCO extract cream

F3 : The formula for the preparation of 5% turmeric VCO extract cream

F4: The formula for the preparation of 10% turmeric VCO extract cream

F5 : The formula for the preparation of 20% turmeric VCO extract cream

The greater the IC50 value of a sample against cells, it indicates that the effect is less toxic to normal body cells. Cells that experience death are characterized by rupture of the cell membrane and changes in cell size (Weerapreeyakul et al., 2012). Based on the data above, it can be seen that from the data obtained, the cream preparation that has the effectiveness of inhibiting cancer cells is a 20% turmeric VCO extract cream. The effectiveness of an effective cream preparation was seen from the lowest IC50 value obtained from all tests. The data obtained from the cytotoxicity test with MTT Assay in the form of absorbance from each well which is the result of readings with an ELISA reader. The average IC50 value of the cream preparations tested gave a weak cytotoxic effect on cancer cells. Based on the viability of B16F10 cells tested with turmeric VCO extract cream at a concentration of 0.5% gave a decrease in cell death rate of 500 g/mL by 0.71%; 2.5% turmeric VCO extract cream gave a decrease in cell death rate of 3.61%; VCO turmeric extract cream 5% gave a decrease in cell death rate of 9.08%; 10% turmeric VCO

extract cream gave a 12,27% decrease in cell death rate and 20% turmeric VCO extract cream gave a 14.33% reduction in cell death. The average IC<sub>50</sub> value of the formulated cream preparations was 0.5% cream preparation of  $14594.84 \pm 5.2$ ; 2.5% cream preparation of  $9813.06 \pm 4.9$ ; 5% cream preparation was  $6609.28 \pm 4.0$ ; 10% cream preparation was  $1497.33 \pm 4.4$ ; 20% cream preparation was  $524.42 \pm 4.8$ ; cream base of  $20530.4 \pm 6.3$ ; curcumin  $13.46 \pm 0.14$  and doxorubicin  $0.634 \pm 0.01$ ; where the activity of formula IV gave a more effective effect on inhibition of B16F10 cells compared to all existing formulas.

#### IV. CONCLUSION

Turmeric rhizome extract formulated into cream preparations with a concentration of 20% had a better cytotoxic effectiveness with an IC<sub>50</sub> value of  $524.42 \pm 4.8$  g/mL compared. with other formula cream preparations can inhibit the growth of B16F10 cells.

#### REFERENCES

- [1] American Cancer Society. Cancer Facts & Figures. (2008).  
<http://www.cancer.org/downloads/STT/2008CAFFfinalsecured.pdf>. Accessed 23 Mei 2020.
- [2] Ariani, S. (2015). *Stop Cancer*. Yogyakarta : Istana Media. Halaman 80 – 81.
- [3] Auliansyah, V., Hasibuan, P. A. A., and Dalimunthe, A. (2012). Cytotoxic Effects of Ethanol Extract of Tanjung Batang Bark (*Mimusopsi cortex*) Against T47D . Cells. *Pharmacy National Seminar Universitas Sumatera Utara 2012: The Role of Pharmacy in Health Development*. Page 169.
- [4] Diepgen TL and Mahler V. (2002). The epidemiology of skin cancer. *Br J Dermatol*; 146 (suppl 61): 1–6.
- [5] Fuadah, F., dan Rezeki, S. (2019). Early Detection of Cervical Cancer Through the IVA Test in Women of Childbearing Age in Babakan Village, Ciparay District, Bandung Regency. *Proceedings of the Seminar on Research Results & Community Service Unjani Expo (UNEX)*. ISSN: 2721-351X
- [6] Hao, Y., Chen, Y., He, X., yang, F., Han, R., Yang, C., Li, W., and Qian, Z. (2020). Near-infrared responsive 5-fluorouracil and indocyanine green loaded MPEG-PCL nanoparticle integrated with dissolvable microneedle for skin cancer therapy. Halaman 542 – 552.
- [7] Masaki H. (2010). Role of antioxidants in the skin: Anti-aging effects. *J Derm Sci*. 58: 85–90.
- [8] Utari, K.D.P., Unique. I.G.A.N., Aryani. N.W.G., Arisanti. C.I.S and Samirana, P.O. (2019). Optimization of the Cream Formula of Turmeric (*Curcuma domestica*) Rhizome Extract with Variations in Concentration of Cetyl Alcohol as a Thickening Agent. *Journal of Pharmacy Udayana* . 7(2): 40 – 44.
- [9] Verma, A., Singh, S., Kaur, R., Jain, U.K. 2013. Topical Gels as Drug Delivery Systems: A Review. *International Journal of Pharmaceutical Sciences Review and Research*. 23(2): 374-375.
- [10] Weerapreeyakul, N., Nonpunya, A., Barustux, S., Thitimetharoch, T and Sripanidkulchai, B. (2012). Evaluation The Anticancer Potential of Six Herbs Against A Hepatoma Cell Line. *Chinese Medicine*. 7(15): 1 – 7.
- [11] Zaman, M. S., Chauhan, N., Yallapu, M. M., Gara, R. K., and Maher, D. M. (2016). Curcumin Nanoformulation for Cervical Cancer Treatment. *Scientific Reports*. (6): 20051.