ISSN: 0975 -8542

Journal of Global Pharma Technology

Available Online at: www.jgpt.co.in

RESEARCH ARTICLE

Antioxidant Peel off Gel Mask with Stevia Rebaudiana Bert Extract

Mutmainah[1], Lia Kusmita[1*], Yohanes Martono[2], Yuvianti Dwi Franyoto[1]

1. *The Faculty of Pharmacy, STIFAR "Yayasan Pharmasi Semarang" Jl. Letjend Sarwo Edie Wibowo KM 1, Plamongansari, Pucanggading, Semarang 50193, Indonesia.*
2. *Faculty of Chemistry, Christian Universitas of Satya Wacana, Jl. Diponegoro 52-60* Salatiga - *Indonesia 50711.*

***Corresponding Author: Lia Kusmita**

Abstract

Anti-oxidant activity is the activity to deter free radicals. *Stevia rebaudiana Bert* contains multiple compounds, such as flavonoid, that are capable of deterring free radicals. The aim of this research was to produce peel off gel mask based on *Stevia rebaudiana Bert* extract with anti-oxidant abilities. Additionally, it was also used to determine the characteristics including pH, viscosity, dispersion, adhesion, and drying time of the preparation. This research was initiated by creation of the extract, continued by creation of peel off gel mask formula, and finalized by testing the anti-oxidant properties. The research showed a result with the value of *Stevia rebaudiana Bert* extract (IC50 = 60 µg/ ml). From the evaluation result of anti-oxidant activity from the peel of mask using *Stevia rebaudiana Bert* extract, it was proven that the higher the extract's concentration, the smaller the IC50 value, which indicated higher anti-oxidant activity. The characteristic evaluation result of all formula showed that the characteristic evaluation value still fulfilled the set criteria to produced good peel off gel mask.

Keywords: *Stevia rebaudiana Bert; Anti-oxidant; Peel off gel mask.*

Introduction

Free radicals is the cause of skin damage, with the signs of scaly skin, as well as cracked, dry, dull and wrinkled skin; all contributed to skin aging and black-spots emerging [1]. Anti-oxidant compounds can be used as one of the alternatives to deter the negative effects of free radicals [2]. Topical preparations such as peel off gel can be used to clean and treat such skins. These preparations are the types that get dried out and form peelable occlusive film after use [3]. *Stevia rebaudiana Bert* is one of the plants with anti-oxidant compound [4].

According to Goyal *et al* (2010), the leaves, rots and flowers of *Stevia rebaudiana Bert* contain isosteviol, stevioside, diterpene glycoside, and rebaudioside compounds (including A, B, C, D, E, F). The leaves also contain flavonoid, phenolic, proteins and vitamins. The content of phenolic compounds in stevia is high [5]. Phenolic compounds may be important to human health because of their anti-oxidant potency [6, 7].The importance of the antioxidant constituents in the maintenance of health and protection from degenerative disease such as skin cancer. Therefore it is necessary to make antioxidant preparations that can be used by the skin. This research was conducted by formulating the *Stevia rebaudiana Bert* extract in the peel off gel preparations that would be tested for their anti-oxidant properties using DPPH (2, 2-*diphenyl-1-picrylhydrazyl*).

Material and Methods

Material

Plant

The research material was *Stevia rebaudiana Bert* were determination by a botanist at laboratory of pharmaceutical biology Sekolah Tinggi Ilmu Farmasi "Yayasan Pharmasi Semarang" (Stifar).

Chemical and Reagents

Polyvinyl Alcohol, DPPH (2, 2-diphenyl-1-picrylhydrazyl) by sigma –Aldrich (St. Louis, MO, USA, HPMC, propyleneglycol, methyl paraben, distilled water, ethanol pa., ferric chloride, NaCl, gelatin, Magnesium, amyl alcohol, Chloroform, H_2S0_4, Mayer's and Draggendorff's reagent

Methods

Extraction Method

Stevia rebaudiana Bert leaf was dried at room temperature (27˚C) for 1 week, after which it was grinded to a uniform powder. The sample was macerated using ethanol at room temperature for 72 h. The extracts were filtered through a Whatmann filter paper. The extracts were concentrated using a rotary evaporator with the water bath set at 60˚C.

Phytochemical Screening

Phytochemical screenings were performed using standard procedures:

Test Phenolic

About 1 g of the extract was boiled in 10 ml of water in a test tube and then filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or a blue-black colouration.

Test for Tannins

To 1 g of the extract was boiled in 10 ml of water in a test tube and then filtered. A few drops of NaCl and gelatin was added and observed for black deposits.

Test for Flavonoids

About 1 g of the extract was boiled in 10 ml of water in a test tube and then filtered. A few drops of Magnesium and amyl alcohol. Positive flavanoid if red solution is formed in the upper layer

Test for Terpenoids (Salkowski Test)

To 1 g each of the extract was added 10 ml of chloroform. Concentrated H_2S0_4 was carefully added to form a layer. A reddish brown colouration of the interface indicates the presence of terpenoids.

Test for Saponins

To 1 g of extract was added 10 ml of distilled water in a test tube. The solution was shaken vigourously. And observed for a stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigourously after which it was observed for the formation of an emulsion.

Test for Alkaloids

To 1 g of extract was diluted to 10 ml with acid alcohol, boiled and filtered. To 5 ml of the filtrate was added 2 ml of dilute ammonia. 5 ml of chloroform was added and shaken gently to extract the alkaloidal base. The chloroform layer was extracted with 10 ml of acetic acid. This was divided into two portions. Mayer's reagent was added to one portion and Draggendorff's reagent to the other. The formation of a cream (with Mayer's reagent) or reddish brown precipitate (with Draggendorff's reagent) was regarded as positive for the presence of alkaloids.

Determining Anti-oxidant with DPPH

The deterring value from the *Stevia rebaudiana Bert* extract was determined by making a concentration sequence that was dissolved in methanol. Afterwards DPPH was added and homogenized. The solusion was calculated at wavelength of 514 nm. The percentage of inhibitor and the IC50 value were calculated [8].

$$\text{Inhibition \%} = \frac{Abs[DPPH]_0 - Abs[DPPH]_s}{Abs[DPPH]_0} \text{X}100\%$$

$\text{Abs}[DPPH]_0$ = DPPH absorbance

$\text{Abs}[DPPH]_s$ = Sample absorbance

Antioxidant Peel Off Gel Mask Formulation of with stevia Rebaudiana Bert Extract

Peel off gel mask was made by developing PVA and HPMC in the distilled water. It was then stirred constantly until expanded perfectly. Afterwards propylene glycol and

methyl paraben were added and stirred until homogenous. Then the solusion was added to the *Stevia rebaudiana Bert* extract gradually while adding distilled water [9]. The complete formula can be seen in Table 1.

Table 1: Peel off gel mask formula

Component (%)	F1	F2	F3
Stevia rebaudiana Bert Extract	0.3	0.6	0.9
PVA	10	10	10
HPMC	2	2	2
Propyleneglycol	10	10	10
Methyl paraben	0.2	0.2	0.2
Distilled water addition	100	100	100

Description: F1: contains extract 1 x IC50, F2: contains extract 2 x IC50, F3: contains extract 3 x IC50

Peel off Gel Mask Evaluation

Peel off gel mask preparation was observed with organoleptic, pH, viscosity, dispersion, adhesion, and drying time. Viscosity was tested using Brookfield RV tool (DV-I Prime).

Drying time was tested by smearing the preparation of 0.5 g on a glass plate of 5 x 2.5 cm until a thin spread was formed. Henceforth, the spread was put inside an oven with temperature of 37 ± 2 ºC. The dispersion test was conducted by putting the preparation of 0.5 grams on a glass and the formed diameter will be calculated after 1 minute has passed [9].

Results and Discussion

Phytochemical Screening

Phytochemicals are subtances produced mainly by plants, and these substances have biological activity. Biological activity can be derived from secondary metabolite compounds. The presence of secondary metabolites can be known by screening tests. The phytochemical screening of the plants studied showed the Table 2.

Table 2: Phytochemical Screening Results

Metabolite	Ethanolic Extract
Phenolic	+
Tannins	+
Flavonoids	+
Terpenoids	+
Saponins	+
Alkaloids	+

In the present study, ethanolic extract showed positive results for phenolic, tannins, flavonoids, terpenoids, saponins, and alkaloids. All the metabolite potent antioxidant activity [10]. Flavonoids and tannins are phenolic compounds and plant phenolics are a major group of compounds that act as primary antioxidants or free radical scavengers [11].

Anti-oxidant Activity with DPPH

The result of the anti-oxidant evaluation, the parameters was IC50. The anti-oxidant is very strong if the value was less than 50 µg/mL, The anti-oxidant is strong if the value of IC50 is at the range of 50-100 µg/mL, whereas it is medium if the value of IC50 is at the range of 100-150 µg/mL, and weak if the value is at the range of 150-200 µg/mL. If the value is between 200-1000 µg/mL then it was deemed less active but still possesses potential as anti-oxidant [8]. The result data of IC50 is seen at Figure 1.

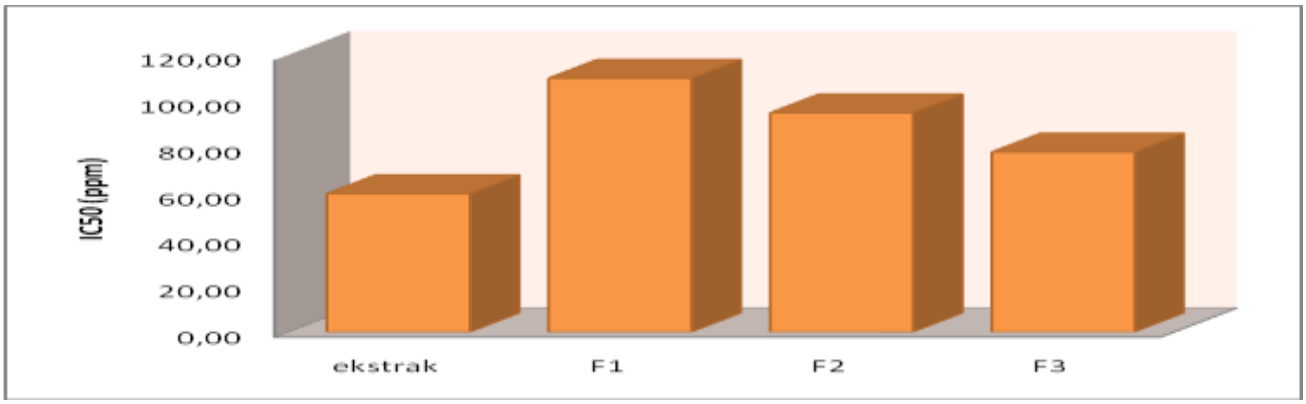

Figure 1: IC50 value of Peel off gel mask

According to the study, each formula showed that the higher the concentration of *Stevia rebaudiana Bert* extract, the lesser the value of IC50. It shows that the anti-oxidant activity was getting bigger. Formula 3 and 2 produced strong-category anti-oxidant, whereas formula 1 was categorized as medium-category. One of the *Stevia rebaudiana Bert* extract anti-oxidant activities could be caused by the phenolic and flavonoid compounds contained within. These compounds could release protons in the form of hydrogen ions. It caused radical electrons within the nitrogen atoms of DPPH compound, as the radical compound, to bind with the hydrogen ions. Afterwards it formed the reduced DPPH [12].

Peel off Gel Mask Evaluation

The result of characteristic evaluation of *Stevia rebaudiana Bert extract* peel off mask can be seen in Table 3.

Table 3: Evaluation result of peel off gel mask

Parameters	F1	F2	F3
Color	white	white	white
Smell	unique	unique	unique
Homogeneity	homogenous	homogenous	homogenous
pH	6.8	6.5	6.1
Dispersibility	10.8	12.6	13.9
Drying time (min)	25	21	19
Viscosity (cps)	59.4	30.6	15.6

From the gel mask preparation, acquired organoleptic with interesting color, acceptable odor by the consumers, as well as convenient shape. All of preparations were homogenous with no rough particles. The pH test of preparation resulted in a value between the skin pH, which is 4, 5-8, 0. Viscosity test showed a value under 30.000 cps.

Conclusion

All of the *Stevia rebaudiana* extract formula showed characteristic evaluation value within the set criteria, and produced good peel off gel mask.

Acknowledgment

We would like to thank Direktorat Riset dan Pengabdian Masyarakat (DRPM) from Kementerian Ristek Dikti for funding this research through the “skim PKPT (Program Kerjasama Perguruan Tinggi)” (practical products) program.

References

1. Syamsidi A (2014) Pengaruh Variasi Ekstrak Metanol Kulit Buah Rambutan (Nephelium lappaceum L.) Terhadap Kestabilan Fisik Krim Antioksidan, Journal of Natural Science, 3(2): 1-9.
2. Siswoyo TA, E Mardiana, KO Lee, K Hosokawa (2011) Isolation and Characterization of Antioxidant Protein Fractions from Melinjo (Gnetum gnemon) Seeds. J. Agric. Food Chem., 59:5648-5656.
3. Vieira RP (2009) Physical and physicochemical stability evaluation of cosmetic formulations containing soybean extract fermented by bifidobacterium animalis. Brazilian Journal of Pharmaceutical Sciences, 45(3):515-525.
4. Tadhani VH, Subhash R (2007) In vitro antioxidant activities of Stevia rebaudiana leaves and callus. Journal of Food Composition and Analysis, 323-329.
5. Mutmainah, Kusmita L, Martono Y, Franyoto YD, Wulandari RP, Kusumaningrum TD. Antioxidant activity, phenol and flavonoid content, and formulation cream of Stevia rebaudiana Bert. IOP Conf. Series: Journal of Physics: Conf. Series 1217 2019; 012152.
6. Goyal S, Samsher S, Goyal R (2010) Stevia (*Stevia rebaudiana*) a bio-sweetener: A review. Int. J. Food Sci. Nutr., 61: 1-10.
7. Rajasekaran T, Ramakrishna A, Udaya Sankar K, Giridhar P, Ravishankar G (2008) Analysis of predominant steviosides in *Stevia rebaudiana* Bertoni by liquid chromatography/electrospray ionization-mass spectrometry. Food Biotechnol., 22:179-188.
8. Molyneux P (2004) The use of the stable free radical diphenylpicrylhydrazyl (DPPH) for estimating antioxidant activity. J. Sci. Technol., 26(2): 211-219.
9. Berighs AO, Julia MR, Hellen KS, Rosane MB, Diva S (2013) Green clay and aloe vera peel-off facial masks: response

surface methodology applied to the formulation design. AAPS Pharm. Sci. Tech., 14(1):445-455.

10. Ayoola GA, Coker HAB, Adesegun SA, Adepoju-Bello AA, Obaweya K, Ezennia EC, Atangbayila TO (2008) Tropical Journal of Pharmaceutical Research, 7 (3): 1019-1024.
11. Polterait O (1997) Antioxidants and free-radical scavengers of Natural Origin. Current Org. Chem., 1: 415-440.
12. Gurav S, Deshkar N, Gulkari V, Duragkar N, Dan Patil A (2007) Free radical scavenging activity of Polygala chinensis Linn. Pharmacology, 2: 245-253.

