POKJANAS

INTERNATIONAL CONFERENCE ON MEDICINAL PLANTS 2012

Horison Hotel Purwokerto, 11-13 October 2012

PROCEEDING BOOK

Scientification of Jamu (Evidence-based Jamu Development): A Breakthrough Program from Plant to Medicine for Health Care

The 43rd Meeting of National Working Group on Indonesia Medicinal Plant

"Exploration, Conservation, Development, and Utilization of Indonesian Medicinal Plant"

Penerbit :
UNIVERSITAS JENDERAL SOEDIRMAN
PURWOKERTO

PROCEEDINGS OF INTERNATIONAL CONFERENCE ON MEDICINAL PLANTS

Scientification of Jamu (Evidence-based Jamu Development): A Breakthrough Program from Plant to Medicine for Health Care

In occasion of

The 43th National Meeting of National Working Group on Indonesia Medicinal Plant

11-13 October 2012

Purwokerto, Indonesia

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Published by.
Universitas Jenderal Soedirman

Perpustakaan Nasional RI: Katalog Dalam Terbitan

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Cetakan Pertama, 2012

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Perancang Sampul	: Panitia
Penata Letak	: Sarmoko Prima Andika Citra Revo Almando Harris
Pracetak dan Produksi	: Tim UPT. Percetakan dan Penerbitan Unsoed

Penerbit

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ISBN: 978-979-9204-80-6
vii + 271 hal, 29.7 cm x 21 cm

Preface

"Jamu" is the specific terminology of Indonesian traditional medicine which is widely empirically in society. Although this tradition had been lived for hundred years, the application in formal health care setting is still in infancy. Scientification of Jamu isame giving the evidence of its efficacy and safety by doing research and networking among practitioners and researchers. Thus, the quality and quantity usage of Jamu as a part on prevention, promotion, and cure services will be improved.

Celebrating the 49th Jenderal Soedirman University anniversary, Faculty of Medicine and Health Sciences of Jenderal Soedirman University, in concordance with the 43' meeting of Pokjanas TOI (National Forum of Indonesian Herbal Medicine) hosted International Conference under the theme of "Scientification of Jamu (Evidence-based Jamu Development): A Breakthrough Program from Plant to Medicine for Health Care". The conference facilitated academia, health care professionals, researchers, policy makers, and students to comprehending about scientification of Jamu. Important issues about traditional medication in Indonesia and other countries which have applied the combination of traditional and modern medication in their health care setting have been explored and discussed

In order to disseminate to broader community, a proceeding consisted of scientific articles presented at this conference is published. We do hope this proceeding will give a contribution to support the development and usage of traditional medicine.

Purwokerto, December 2012

Dra. Warsninah, M.Si., Apt.

Conference Chairperson

Proceedings International Conference on Medicinal Plants
2011

Evaluation of Formulation of Antidiabetic Herbal Tablet from Andrographis paniculata Ness Leaves

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Abstract

Andrographis paniculata Ness (Family: Acanthaceae) has been used for centuries as traditional remedies. The previous study showed that the ethanol extract of *A. paniculata* had antidiabetic activity and decreased the blood sugar level in rats. The present paper was aime to formulate and to evaluate of the physical features of the herbal tablet of the ethanol extract of *A. paniculata*. Three different formulations of tablets containing various concentration of avicel were prepared by wet granulation. The micromeritic properties were determined for all the batchs including angle of repose, tapping index and now The angle of repose, tapping index and flow time were found to be in the range of 48-52.11 and 6.5-5.4. respectively. F3 exerted the lowest value of the angle of repose and flow time compared to the other formulas. The tablets were evaluated or weight variation hardness, friability and disintegration time. The maximum weight variation of the tablets was 0.94 to 1.38%. Hardness for tablets of all batches was in the range of 5.0 to 75 kg Friability value for tablets of none of the batch ore than 1.30%. The disintegration time of the tablets F1.F2 and F3 were found about 16.70, 14.27. and 13.24 minutes. The di The result revealed that the tes parameter values (weight variation hardness, friability, and disintegration time) were in eceptable limit based on pharmacopoeial standard.

Keyword : *Andrographis paniculata*, herbal formulation, tablets, diabetes, antidiabetic activity

Background

Andrographis paniculata Ness (Family: Acanthaceae) is a herbaceous plant which is widely cultivated in Southern Asia including in Indonesia. The plant which called as King of Bitters has been used for centuries as traditional remedies. Some studies reported that *A. paniculata* has pharmacological properties such as antioxidant, anti-inflammatory, antiviral, antimalarial, anticancer and immunostimulatory activities (Sheeja, el al. 2006: Wiart, et al. 2005; Kumar, et al. 2004). Additionally, a previous

study revealed that the water extract of *A. paniculata* prevented glucose-induced hyperglycemia in rabbit. The hypoglycemic effect of this plant might prevent glucose absorption from the gut (Borhanuddin, et al. 1994). The antihyperglycemic activity of *A. paniculata* has also been reported in streptozotocin-induced hyperglycemic rats. Additionally, the hot water and ethanolic extracts of paniculata had successfully reduced the blood sugar level in alloxan induced rats and in high-Fructose-fat-fed rats (Chowdhury and Biswas. 2012: Zhang and Tan. 2000).

Some studies reported the compounds of the ethanol extract from the leaves include over 20 diterpenoids and over ten flavonoids. Andrographolide (CH2.0.) is the major diterpenoid in *A. paniculata*, making up about 0.56% in leaves extract. This substance is the main bioactive compound which may responsible with the hypoglycaemic activity.

Traditionally, some Indonesian people boil the leaves and consume the resulting beverage for its hypoglycaemic ellect. To provide more convenient in usage and more accurate in dose, in the present study we design to formulate ethanol extract of *A. paniculata* leaves a tablet dosage form and to evaluate the herbal tablets.

Material and Methods

Plant Materials

The leaves of *A. paniculata* were obtained from Research Centre of medicinal Plants, Tawang Mangu. Sukoharjo, Center Java, Indonesia. This plant was identified in the same place as mentioned above.

Preparation of Extract

Dried powdered leaves of *A. paniculata* were extracted using percolation method with ethanol 70%. After few days, the ethanol solvent was evaporated to give a concentrated extract.

Standardization of andrographolide

The content of andrographolide from the compared to a pure andrographolide.

Pre-formulation

Herbal tablets were prepared separately denoted as Fl. 2. and F3. The composition of various form mixed with 2% disintegrating agent and glidant. The wet gran drying, the granules were subsequently passed through mic determined for all the mixtures.

a. Angle of repose

Flow properties of the physical mixtures of all the formulations were determined by calculating angle of repose by fixed height method. A funnel with 10 mm inner diameter of stem was fixed at a height of 2 cm over the platform. About 10 g of sample was slowly passed along the wall of the funnel till the tip of the pile formed and touches steam of the funnel. A rough circle was drawn around the pile base and the radius of the powder cone was measured (Ansel et al. 2005).

Angel of repose was calculated from the average radius using the following formula

$$\tan \alpha = \frac{h}{r}$$

Where, α = Angle of repose; h = Height of the pile; r = Average radius of the powder cone

b. Tapping index

Tapping index of granules were determined by pouring gently sample through a glass funnel into a 100 ml graduated cylinder (Vo). The cylinder was tapped from height of 2 inches until a constant volume was obtained Volume occupied by the sample after tapping were recorded (VI) and tapped index was calculated.

$$\text{Tapped index} = \frac{(Vo - Vt)}{Vt} \times 100\%$$

c Flow time

Flow time of granules was determined based on the time needed all of 25 g granules passed through the funnel.

Formulation of Tablets

Three various formulations of tablets were produced based on the same amount (500 mg) of extract of 4 paniculata. The detail of the composition was given in Table 1. For F1 and F2. the active ingredients were mixed with fillers (Avicel). disintegrating agent and binding agent then granulated by wet granulation method. lubricated by aerosil and finally were compressed by a tablet machine to produce tablets. On the other hand. disintegrating agent of F3 was added externally.

Evaluation of herbal tablet

a. Weight variation test

Twenty tablets were randomly selected and weighed individually. The average weight was calculated. The deviation from the average weight in each case was also calculated and expressed as percentage. Not more than two of the tablets from the sample size to deviate from 5% of the average weight and none of the tablets to deviate by more than 10% of the average weight.

b. Hardness and friability test

Hardness was determined by using a Monsanto tablet hardness tester (n=6). The friability of the tablets was tested for 4 minute at 25 rpm using friability tester (Erweka, Germany).

c. *Disintegration test*

Disintegration test was carried out by disintegration tester (Erweka, Germany). A glass of plastic tube o with an internal diameter of about 28 mm and external diameter 30-31 mm fitted at the lower end with of rust proof wire gauge. Six tablets were placed in the tube, raise and lower the tube in such a manner that molete up and down movement is repeated 28 to 32 per minute. The tablets are disintegrated when no es remains above the gauge, which readily pass through mesh (10 mesh screen).

Results

Preparation of herbal tablets from the extract

The extraction of paniculata leaves using percolation method yielded 24.65% w/w with a black color and a hinter taste. A strong odor and bitter taste are associated with the andrographolide, the main compound of this plant. The extract of *A. paniculata* contained of andrographolide about 3.62% determined by TLC scanner.

Tablets were compressed each of 500 mg weight on tablet compression. No manufacturing defects were observed in tablets like capping. lamination and chipping.

Evaluation of Powder Blend

The angle of repose, tapping index and flow time were found to be in the range of 48-52, 11 and 6.5-5.4 respectively. F3 exerted the lowest value of the angle of repose and flow time value among three formula.

Evaluation of Tablets

The tablet parameters observed are given in table 3. The tablets were compressed at the specified weight (500 mg). The maximum weight variation of the tablets was 0.94 to 1.38%, which falls within the acceptable weight variation range of 5%, hence the

tablets of all batch passed the weight variation test. The hardness of formulation was measured in kg with the help of Monsanto tester. Hardness for tablets of all batches was in the range of 5.0 to 7.5 kg, which falls above the limit of not less than 3.0 kg/cm'. Friability value for tablets of none of the batch was more than 1.30%. The disintegration time of the tablets F1 F2 and F3 were found about 16.70, 14.27, and 13.24 minutes indicating fairly acceptable tablets.

Table 1. Formulation of the herbal tablet.

Ingredients	F1	F2	F3
Plant Extract	250	250	250
Avicel Ph 101	215	200	200
Disintegrating agent	25	50	50
Binding agent	qs	qs	qs
Glidant	2%	2%	2%

Table 2. Pre-compression Parameters of Granules

Parameters	F1	F 2	F 3
Angle of repose (°)	50.19 ± 0.24	51.70 ± 0.29	48.23 ± 0.26
Tapping index (%)	11.42 ± 0.54	11.42 ± 0.54	11.83 ± 0.30
Flow time (second)	6.05 ± 0.16	6.45 ± 0.10	5.47 ± 0.13

Table 3. Compression Parameters of Tablets

Parameters	F1	F2	F3
Weight Variation (mg)	500.2 ± 4.73	500.2 ± 4.73	507.05 ±7.01
Hardness (Kg)	6.50 ± 0.24	5.63 ± 0.18	5.13 ± 0.24
Friability (%)	hygroscopic	0.14 ± 0.03	1.29 ± 0.07
Disintegration time (min)	16.70 ± 0.20	14.27 ± 0.21	13.24 ± 0.41

Discussion

Results of pre-formulation study of granules and standardization parameter of formulated tablet showed that all the parameters evaluated were within the acceplab ed were within the acceptable limit. The powder mixtures possess good flow properties and good packing ability. The granules obtained for the batches (F1-F3) were satisfactory. Table 2 shows the physical properties of the granules like tapping ind index, angle of repose, and flow time, were found to be within the limits which show good flow properties of granules.

Results of physical evaluation of the tablets had acceptable hardness, friability and disintegration time. The tablets must be hard enough to withstand mechanical stress during packaging, shipment and handling by the consumer. The USP14 outlines a standard tablet friability test applicable to manufactured tablets. The principle of measurement involves subjecting the tablet to an increasing load until the tablet breaks or fractures. The load is applied along the radial axis of the tablet. Oral tablets normally have a hardness of 4 to 8 Lachman and Lieberman. 1987). Formulation showed appreciable hardness characteristics (5-6.5 Kg), which facilitated its fast disintegration. The friability (<1.3 %) of formulation indicated that the tablets were mechanically stable. As the average weight of tablets was 500 mg, the weight variation range is 0.9-1.4%. Hence tablets the entired formulated tablet passed the weight variation test. Additionally, the tablets of F2 and 3 disintegrated Within 15 min. whereas FI needed more than 15 min. Disintegration time is an important parameter of tablet. An ideal tablet should disintegrate within 15 min based on Indonesian Pharmacopea IV (1995).

Conclusion

The finding showed that tablets of ethanol extract of *A. paniculata* leaves posses good physical properties (weight variation hardness, friability, and disintegration time) based on pharmacopoeial standard. Further investigation is needed to establish its therapeutic effect in hypoglycaemia.

Acknowledgements

Authors wish to thank to Higher Education of Indonesia for the Grant of Fundamental Research (Batch No. APID/2003/0523/0006). Authors are also thankful to Atik Hidayati for her valuable suggestions.

Tables and Figures

References

Ansel. C.H.. Popovich. G.N.. and V.L. Allen. 2005. Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems. p 189. New York: Lippincott Williams and Wilkins

Borhanuddin. M. Shamsuzzoha, M and A.H. Hussain. 1994. Hypoglycaemic effects of *Andrographis paniculata* Nees on non-diabetic rabbits. Bangladesh Med Res Counc. Bull. 20:24-26

Chen J.X. Xue. HJ.. Ye. W.C.. Fang. B.H., Liu, Y.H.. Yuan, S.H., Yu P. and Y.Q.Wang. 2009. Activity of andrographolide and its derivatives against influenza virus in vivo and in vitro. Biol Pharm Bull. 32(8):1385-1391

Chowdhury. A., and S.K. Biswas. 2012. Comparative study of hypoglycaemic effect of ethanolic and hot water extracts of *Andrographis paniculata* in alloxan induced rat. Int J Pharm Sci Res. 3(3): 815-817

Indonesian Pharmacopea. 1995. Ministry of Health. Fourth Edition. Jakarta

Kumar. R.A. Sridevi. K.. Kumar. N.V., Nanduri. S., and S. Rajagopal. 2004. Anticancer and immunostimulatory compounds from *Andrographis paniculata*. J. Ethnopharmacol. 92:291-295

Lachman L. Lieber, Lieberman HA, Kanig JL. 1987. The theory and practice of industrial pharmacy. 3rd ed ese Publishing House. 1987. p. 293-639.

Nugroho, A.E.. And Andrie. M.. Warditiani, N.K., Siswanto E. Pramono. S., and E. Lukitaning diabetic and antihiperlipidemic effect of Indrauraphis paniculata (Burm. 1.) Nees Andorapholide in high-fructose-fat-fed rats. Indian J Pharmacol. 44: 377-81

Sheeja, K., Shihab. P.K. and G. Kutan. 2006. Antioxidant and anti-inflammatory activities of plant *Andrographis paniculata Nees. Immunopharmacol Immunotoxicol. 28: 129-140*

Wiart, C., Kumar, K.. Yusof, M.Y.. Hamimah, H.. Fauzi. Z. M. and M. Sulaiman. 2005. Antivral propertie ent-labdene diterpenes of *Andrographis* paniculata Nees, inhibitors of herpes simplex virus type 1. Phytother Res. 19: 1069-1070

Yu. B.C., Hung. C.R. Chen W.C., and J.T. Cheng. 2003. Antihyperglycemic effect of andrographolide in streptozotocin-induced diabetic rats. Planta Med. 69: 1075-9

Zhang, X.F., and B.K Tan. 2000. Anti-diabetic property of ethanolic extract of Andrographis panic streptozotocin-diabetic rats. Acta Pharmacol Sin, 21:1157-64

Question and Answer

Q: Do we need determinate the active compound from

A : We didn't isolated the active compound because our object just focus on comparing each tablets