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Der Pharmacia Lettre, 2016, 8 (15):26-31
(http://scholarsresearchlibrary.com/archive.html)

Scholars Research Library
ISSN 0975-5071
USA CODEN: DPLEB4

Characterization Traditional Food *Pado* from West Sumatra

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ABSTRACT

Dry Pado and wet Pado does not show symptoms of damage after being stored for 14 weeks at room temperature. This conclusion is based on organoleptic, microbiological (number of bacteria and fungi), and chemical (content of TVB and TMA). The condition is not related to the water content because the both materials have different water content (dry Pado classified as dry food with a water content of 5.2%, and wet Pado wet as wet food with a water content of 52.5%), and also not related to the cyanide (HCN) content, for wet Pado containing HCN 35.5 ppm which much lower than the dry Pado, its HCN content 270 ppm. Suspected, on Pado there are certain compounds that have antimicrobial activity so that food can be kept relatively long time at room temperature.

Keywords: characterization, dry pado, wet pado

INTRODUCTION

Pado is a traditional food made from Picung seed (Pangium edule Reinw), coconut pulp and raw fish. The materials are mixed and stored, covered, for 3-5 days before being consumed or sold.Currently, Pado manufacture can be found in several locations in Agam, West Sumatra, namely around Lubuk Basung, and Maninjau. While sales can be found in the Pasar Bawah Bukittinggi, markets around Maninjau Lubuk Basung and Sungai Limau.

Based on the experience of the manufacturer and merchants Pado, traditional food can be kept relatively long. It also fits with the observations of the author. Pado purchased in the market were put into a plastic box is not damaged after 2 months stored at room temperature. Marlina (2012) also have simulated the preservation of this traditional way and prove that Kembung Fish (the mackerel) on Pado does not decay after stored for several months[1].

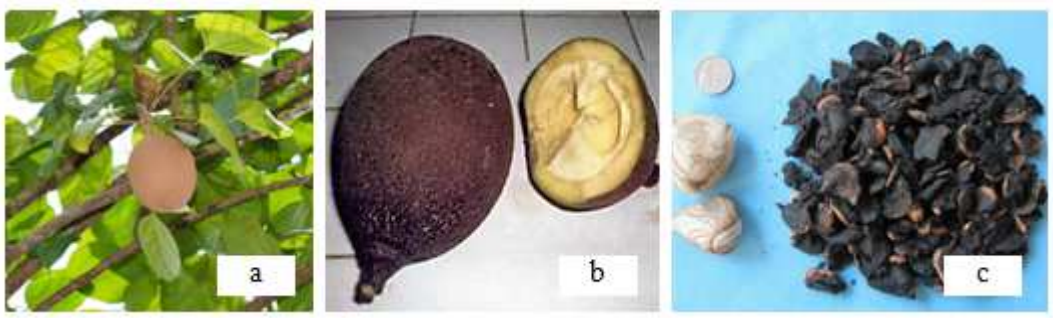

Figure 1. Picung (Pangium edule reinw) (a) Picung Plant ; (b) Picung fruit ; and (c) Dried Picung Seed

The use of Picung seed as a preservative fish have been done differently in the traditional way in West Sumatra as described above. Husni, Samah, and Apriliza, (2007); and Heruwati, Widyasari and Policy (2007) using the seed

meat powder and salt[2; 3]. This mixture can preserve fresh fish between 4 to 6 days. Yusra, Irawati, and Yogi (2008) uses a mixture of shredded Picung pericarp (seeds) and salt to preserve fish bloating(4). Somewhat different way done by Sukarti (2011) by using a paste of fresh seeds to preserve carp Majalaya(5). While Sukarti (2011) reported that the preservation of Majalaya fish by Picung fruit pasta be up to 5 days[5].

There are two ways of Pado preparation. The first is a dry method, where the meat dry Picung seed crushed, then mixed with dried coconut pulp. This mixture was used to cover a layer of fish are layered in containers such as plastic boxes, basin or bamboo baskets. The composition of the material in the container from the container base is a mixture Picung and coconut pulp-fish-Picung mixture and coconut pulp, and so on (Marlina, 2012). Pado is referred to as a dry[1].

The second is a wet method. Picung beans dried meat in the form of rough pieces soaked with water and then mixed with coconut pulp. This mixture was used to cover the layers of fish, as well as the manufacture of dry Pado. Pado is referred to as wet. Both versions produce Pado somewhat different characteristics. Dry Pado looks dry, and wet Pado looks wet. In Agam and Pariaman, mostly Pado made by the wet method. According to them, Pado made by the wet method is preferred because the bitterness is not too strong.

This study aimed to obtain some characteristics of both Pado (dry and wet) that have been stored for a long time (14 weeks). These characteristics are the conditions organoleptic, microbiological and chemical. 14 weeks is a marketing term that most long predicted by most traders Pado. Pado in the region where they are made and sold, ie Maninjau, Bukittinggi and Tiku.

MATERIALS AND METHODS

The materials studied are dry and wet Pado which made itself as practiced by the makers of Pado in Agam District. Dry Pado made in the following manner. Meat dried beans Picung dark brown pulverized in a blender to a powder. This Picung powder (0.5 kg) was mixed with coconut pulp (0.25 kg) were also drained and mashed in a blender. The mixture was stirred and knead until well blended and the color becomes dark brown.

In this study, this mixture is referred to as fractions instead of a fish (FBI). Furthermore, the FBI placed in a plastic box form a thick layer of ± 1 cm. On top of this layer composed some mackerel (called fractions of fish, FI) which have been weeded out without overlapping. Abdominal cavity and the mouth of the fish has previously been filled with powder FBI. To top layer of fish is another layer of the FBI as before. Thus do until the container is fully charged and the top layer is a layer FBI. Overall fish numbers are used per container is 0.5 kg. Once the box is sealed. FBI and fish mixture is referred to as a raw Pado. Furthermore, crude Pado kept for 3-5 days prior to consumption or use.

Making Pado somewhat different from the wet to dry pado. Picung dried meat pounded beans with chilli grinding stone bruise or rupture but not until smooth. A total of 0.5 kg of seed Picung is immersed in 1 liter of water for ± 5 minutes. After that, add coconut pulp as much as 0.5 kg. The mixture was stirred and knead until well blended and the blackish mixture. After that, this mixture (here in after referred to as fractions instead of fish or FBI) placed at the base of plastic bags LDPE (low density polyethilen) into ± 1 cm thick layer. FBI layer arranged above a layer of mackerel (4-5 mice), then in the top layer of fish is placed again one layer FBI. This carried on until all the fish and the FBI used up, and the top layer is the fraction is not a fish.

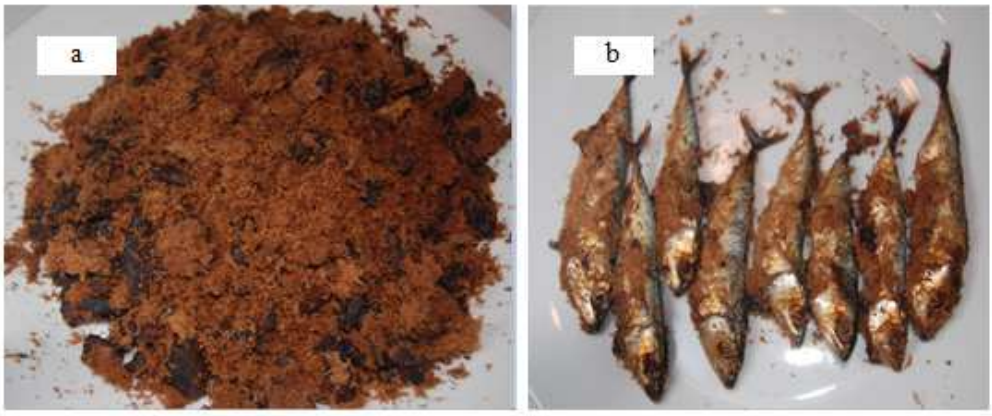

Figure 2. Pado Fraction (a) Not-Fish Fraction and (b) Fish Fraction

After that, the top of the bag tied up with rubber bands. Furthermore, this bag pierced with a pin tightly and evenly across the surface. After that, the radially bag tied with a rubber band attached-connect. Binding start from the top center of the bag that had been tied before, continue down the side toward the base and continue to the other side, then back again to to the bottom and the top center of the bag. This binding resumed again as before on the bag that has not been bound. Distance bond on the side of ± 1 cm. This binding results in blackish brown liquid will come out through a wall of a punctured bag.

This method is usually done by craftsmen Pado. Pado made if the amount is not much. If Pado made quite a lot, the container used was a large plastic bag that is enclosed in a plastic bag. After the sack is closed by tying its upper end, a sack over his walls pierced with nails, then sack weighted with stones (weighing approximately 10-15 kg). Over ride this will cause the liquid will drip through a wall of a punctured bag.

Wet Pado in the bag tight bound is placed on the support that the punch and discharge accommodated. Pado left in this condition for 4 days, then just ready to be consumed. Dried Pado in a plastic box is left stored in a closed condition for 14 weeks, then conducted observations of the organoleptic, microbiological and chemical. Wet Pado after 5 days, opened the binder, then along a plastic bag put in a plastic bag HPDE is still new. Bags tied, then also stored for 14 weeks prior to observing.

Pado organoleptic condition after being stored for 14 weeks assessed from the smell, texture, and appearance of mold growth. This method is usually done by traders still Pado to assess whether or not Pado sold and consumed. Observations organoleptic conditions, Pado box is opened, then brought to the nose to smell the scent of decay. Once it is done touching on Pado to feel its texture. Sightings their mold visually observed that against the appearance of mycelial growth of mold on the surface of Pado. The workings of observations in detail in table 4.

Observations microbiology is done by counting the colony form units of microbes (fungi and bacteria) contained in Pado method "method through which cast" with the media nutrient agar (NA) and potatoes dectrose agar (PDA), respectively for calculating the CFO of bacteria and fungi , The workings of this observation refers to [6]. Chemical observations against Pado done by measuring levels of trimethyl amine (TMA) in the fraction of a fish. TMA is used to measure the level of damage to the fish. In fish suffering from decay, the higher levels of TMA [7]. TMA content measurement refers to Afrianto (2000) Chemical Observations were also conducted on water content, protein content, fat content, ash content, carbohydrate content and HCN content of the fraction is not a fish (FBI) Pado(8). The component measurement refers to the method Sudarmadji, Haryono, & Suhardi (2010)[9].

RESULTS AND DISCUSSION

Dried and wet Pado alike do not show symptoms of damage after 14 weeks stored at room temperature in a closed container. Both Pado does not show symptoms of damage or remove the stench. Smell the same or both Pado, no different with the new. On the surface of both Pado no sightings mycelial growth of fungi. The both texture of Pado is the same, no different from the new. Mucus also absent in both Pado.

Table 1. Observation of smell, visual and texture Pado that have been stored for 14 weeks and the new Pado (aged 4 days)

Observations	After Stored 14 weeks		*New Pado* (stored 4 days)	
	Dried Pado	***Wet Pado***	***Dried Pado***	***Wet Pado***
1)The stench or smell is not typical pado	none	none	none	none
2)The appearance of the mass of mycelia	none	none	none	none
3)The mucus on the surfaces Pado	none	none	none	none
4)Texture	Normal	Normal	Normal	Normal

Decomposition of fish in this Pado does not happen though until the 14th week after manufacture. In fact, at Pado made in a dry, the fish do not show symptoms fraction foul after stored for several months [1]. After stored 14 weeks, the content of microbes on wet and dry Pado relatively low. Total Plate Count (ALT) or Total Bacteria and Fungus (TBK) is 2.0 x 10^3 and 2.2 x 10^3 CFU/g. This value is lower than the maximum limit ALT mostly raw foods are regulated by the ISO 7388: 2009 for the maximum limit of microbial contamination in food [10].

The content of bacteria on fish that became the raw material ranges is 2.3 x 10^4 and 4.3 x 10^4 CFO/g, respectively for raw materials of dry and wet Pado. After processing became Pado, the fish is called a fraction of the fish that contain bacteria 3.5 x 10^4 and 2.2 x 10^4 CFO/g, respectively to Pado Pado dry and wet. The content of total microbes on raw materials of fish and fish fraction (FI) ranges between 2.3 and 4.4 x 10^4 CF/g. The content is lower than the maximum limit of microbial contamination in a variety of foods based on ISO 7388: 2009 on the maximum limit of microbial contamination in food[10]

Table 2. Number of bacteria and fungi on the raw material of fish and fish fraction (FI) on Pado after stored 14 weeks

Microbes	SPC (CFU/g)			
	Dried Pado		***Wet Pado***	
	Raw Fish	Fish Fraction	Raw Fish	Fish Fraction
Bacteria	4.3×10^4	3.5×10^4	2.3×10^4	2.2×10^4
Fungus	1.9×10^3	3.0×10^3	2.3×10^3	2.2×10^3
Total Microbial	4.4×10^4	$3.8\ 10^4$	2.5×10^4	2.3×10^4

Pado fraction of the fish that had been stored for 14 weeks containing a total volatile bases (total volatile base, TVB) 23.2 and 24.1 mg/100 g, respectively to dry Pado and wet Pado. While the levels of trimethylamine (TMA) lower, at 13.8 and 14.0 mg/100 g each for dry and wet Pado. It appears that the content of TVB and TMA in both Pado is not much different. The content of TVB in both fractions of fish is lower dbanding content of a maximum of TVB in fresh fish that is still suitable for consumption, which is 30 mg/100 g [11; 12]. TMA content of the fraction is not a fish from the two types of Pado in the range which is still acceptable to consumers [13].

Table 3. Content of TMA fish fraction (FI) on Pado after stored 14 weeks

Type of fish fraction	TVB (mg/100 g)	TMA (mg/100 g)
Fish fraction of Dried Pado	23.2	13.8
Fish fraction of Wet Pado	24.1	14.0

Not-Fish Fraction (FBI) of the dry Pado was stored for 7 days in water containing 5.2%. The water content is far below the maximum water content for storage of food stuffs in general (≤12-14%). The low water content is associated with a lower water content materials used to make the mixture of Not-fish fraction, which is a dry powder of Picung fruit with water content of 3.1% and a dry powder coconut pulp with a water content of 4.7%. The higher the water content of the Not-Fish Fraction than its constituent materials allegedly by the displacement of some of the water in the fish into the mixture.

Not-Fish Fraction of wet Pado that has been stored 7 days containing water is much higher, at 52.2%. Although it contains more water, Pado also has a long time of storage. Besides water, the quite high components in Pado is fat. In dry Pado, implies 31.6% and the wet Pado, implies 18.8%. These fats derived from Picung seed and coconut pulp. In addition to water and fat, the levels of other components on Pado can be seen in Table 2.

Table 4. The chemical composition of the Not-Fish Fraction (FBI) on dry Pado and wet Pado

Components	***Dried Pado***	***Wet Pado***
Water (%)	5.2	52.2
Fly-ash(%)	5.2	2.5
Fat(%)	31.6	18.8
Protein (%)	10.5	5.8
Fibre(%)	32.9	15.1
Carbohydrates(%)	14.5	5.6
HCN (mg/kg)	270.0	35.5

Cyanide acid levels in Dried Pado was high enough, ie 270 ppm (mg/kg) and exceeds the maximum permissible HCN in cassava flour, which is 40 ppm(14). High levels of HCN is associated with high levels of HCN on Picung seeds powder that will be used to make dry Pado, ie 920 ppm. In wet Pado, HCN content is much lower, at 35.5 ppm. The lower levels of HCN in Pado during manufacture occurs because hatching fluid of the container wrapper Pado which will bring some of the content of HCN Pado.

Table 5. Content of HCN in Dried *Pado* and wet *Pado*

Type of *Pado*	HCN Content (mg/kg, ppm)
Dried Pado	270.0
Wet Pado	35.5
(SNI 01-2997-1996: cassava flour)(14)	40.0

HCN content of the meat raw Picung seeds are very high, which is 3290-3310 mg per kg (ppm). If the picung seeds is boiled as do the Picung mixture before it is used as a preservative, HCN content will decrease to 80%, which became 660 mg/kg (15). In Dried Picung seeds was used for the manufacture Pado, HCN content may vary depend on preparation of them. If the Picung seeds is dried up into black, HCN content will decrease to 659 mg/kg, and dropped lower during the manufacturing process Pado, ie to almost 30 mg/kg [1]. If Picung seeds is dried mashed, HCN content will be 164 mg/kg [16]. During the manufacturing process kluwek who has brooded for 30-40 days and is used for seasoning rawon, HCN content is expected to be much lower.

The highly cyanide content in Not-Fish Fraction (FBI) on Pado (more than 900 mg per kg) relating to the preparation of Picung seeds. In this study, Picung seeds will be dried. After drying and turned black, immediately milled. Because the cyanide content in the fish fraction of Pado's not very high, then Pado research results not suitable for consumption. Maximum levels of cyanide allowed in foods is 50 mg per kg of material[17].

Pado tidak pernah dimakan langsung secarah mentah (tidak dimasak) atau sebagai pangan tunggal. Pado di Agam dan Maninjau digunakan sebagai bahan pembuat sambal cabe. Fungsinya adalah pemberi rasa dan aroma khas *pado*. Cabe dan berbagai bumbu, seperti *pado* (dalam proporsi yang lebih sedikit dari cabe), bawang merah, bawang putih, dan garam dicampur, kemudian ditumis dengan minyak goreng panas sampai tercium bau harum, setelah itu ditambahkan tomat atau sari jeruk nipis dan ditumis lagi beberapa menit. Dengan cara pengolahan tersebut, kadar HCN pada *pado* akan banyak berkurang mengingat HCN adalah senyawa yang mudah menguap pada suhu kamar[18].

Pado never eaten immediately secarah raw (not cooked) or as a single food. Pado at Maninjau Agam and used as an ingredient in chilli paste. Its function is to give taste and aroma Pado. Chilli and various seasonings, such Pado (in proportion less than chilli), onion, garlic, and salt are mixed, then sauteed with hot frying oil to smell fragrant, then add the tomato or lemon juice and stir-fried again some minute. By way of processing these, HCN levels in Pado much reduced given HCN is a volatile compound at room temperature [19].

The content of the bacteria, TVB and TMA in fractions of fish, both in dry and wet Pado already stored 14 weeks within the normal range of fish that do not rot, are respectively 1.9 to 4.3 104 CFU/g, 23-24 mg / 100 g, and 13-14 mg/100 g. Various researchers reported the content of these components in fish that do not decay as follows: TVB 109 mg/100 g and bacteria 4-6 x 10^4 CFU/g on the cob without weeded stored at 0°C for 10 days (Pandit, Suryadhi, Arka, & Adiputra, 2007), TVB 43-46 mg/100 g in dried milk(20), TVB 22-46 mg/100 g in vacuum packed smoked tuna and non vacuum at cool temperatures, total microbial 1.6 to 1.8 x 10^5 CFU/g and TVB 20-25 mg/100 g in tilapia fish (*Oreochromis niloticus*) is kept cold (temperature 2-3^{o}C).

Dry Pado has a low water content, namely 5.2%, lower than the water content are common in most dry foods, such as rice a maximum of 14-15% [21], ground nut 6-8% [22], cassava 14% [23] and 12% cassava flour [14]. While, wet Pado has a water content is much higher, at 52.2%. The water content is higher than the water content of wet semi food, which is generally between 30-50% [24]. Accordingly, no damage after being kept relatively long Pado not related to water content.

The content of cyanide (HCN) is also not associated with durability Pado. At week 14, wet Pado, HCN content is much lower, at less than 40 ppm. Ability Wet Pado is the same with dry Pado, which HCN content of 270 ppm.

Based on that data, not the destruction of Pado after being stored in a relatively long time believed to be related to the presence of compounds that have anti-microbial activity in Pado. Picung seeds contains compounds that can inhibit the growth of microbes, such as mold *Rhizoktomia sp*. which is inhibited by water extract from the seeds of fresh Picung [25], the bacteria producing histamine by water and ethanol extracts of seeds fresh Picung (26), and *Staphylococcus aureus* and *Escherichia coli* by the ethanol extract of the kluwak. Although it has microbial activity, Picung seeds can only preserve fresh fish in a short time, ie up to 6 days.

Over the length of the shelf life of fish at Pado showed higher antimicrobial activity in Pado. The existence of anti-microbial activity on Picung seed extract has been reported. (25-30). However, so far no reports on the activity and antimicrobial capacity Pado.

CONCLUSION

Dry Pado and wet Pado does not show symptoms of damage when observed after storage for 14 weeks at room temperature. This conclusion is based on organoleptic, microbiological (number of bacteria and fungi), and chemistry (content of TVB and TMA). The condition is not related to the water content because the two materials have different water kadara (dry Pado classified as dry food with a water content of 5.2%, and classified Pado wet wet food with a water content of 52.5%, and also not related to the content cyanide (HCN) for wet Pado containing 35.5 ppm HCN is far lower than the dry Pado his HCN content 270 ppm. Allegedly, on Pado there are certain compounds that have antimicrobial activity so that food can be kept relatively long time at room temperature. Subsequent research should be directed to the exploration of compounds that have anti-microbial activity on wet Pado. Wet Pado was selected, because the HCN content was relatively low.

REFFERENCES

[1] Marlina. **2012**. *Jurusan Teknologi Pertanian, Fakultas Teknologi Pertanian, Universitas Andalas. Padang*
[2] Heruwati ES, Widyasari HE, Haluan J. **2007**. *Journal Pascapanen dan Bioteknologi Kelautan dan Perikanan* 2,Juni
[3] Husni E, Samah A, Apriliza K. **2007**. *J. Sains Tek. Far.* 12:45-9
[4] Yusra I, I.,, Yogi S. **2008**. *Mangrove dan Pesisir* VIII:46-54
[5] Sukarti T. **2011**. *Bandung: Empowering Science, Technology and innovation Towards a Better Tomorrow*
[6] Waluyo L. **2010**. *Teknik Metode dasar dalam Mikrobiologi. Malang: UMM Press.*
[7] Liviawaty E, Afrianto E. **2010**. *Penanganan Ikan Segar. Bandung: Widya Padjadjaran.*
[8] Afrianto E. **2008**. *Jakarta: Direktorat Pembinaan SMK ekolah Menengah Kejuruan Dirjn Manajemen Pendidikan Dasar dan Menengah Diknas RI.*
[9] Sudarmadji S, Haryono B, Suhardi. **2010**. *Prosedur analisa untuk bahan makanan dan pertanian. Yogyakarta: Liberty*
[10] Nasional BS. **2009**. *SNI 7388-2009: Batas Maksimal Cemaran Mikroba dalam Pangan. Jakarta: BSN.*
[11] Farber L. **1965**. *Fish as food; New York: Academic Press.* IV:65-126
[12] Zaitsev V, Kizevettler I, Luganov L, Makarova T, Minder L, Padsevalov V. **1969**. *Fish curing and processing. Moscow: Mir Pub.*
[13] Connel J. **1990**. *Fishing News Books, Ltd.*
[14] Nasional BS. **1996**. *SNI 01-2997-1996: Jakarta: Badan Standarisasi Nasional.*
[15] Nurfaida F. **2012**. *FMIPA, Kimia, Universitas Negeri Malang* 20 April 2016
[16] Pratiwi A. **2009**. *Program Studi Ilmu dan Teknologi Pangan Unhas*
[17] FAO/WHO. **1993**. *FAO/WHO Food Standards Programme, Codex Commission Twentieth Session. Geneva: FAO/WHO.*
[18] Gail E, Gos S, Kulzer R, Lorösch J, Rubo A, Sauer M. **2005**. *Ullmann's Encyclopedia of Industrial Chemistry*. Weinheim: Wiley-VCH
[19] Gail E, Gos S, Kulzer R, Lorösch J, Rubo A, Sauer M. **2005**. *Weinheim: Wiley-VCH*
[20] Soedarto, Siswanto HP. **2008**. *Berkala Ilmiah Perikanan* 3 49-53
[21] Nasional. BS. **2008**. *SNI 6128:2008: Beras. Jakarta: BSN.*
[22] Nasional BS. **1995**. *SNI 01-3921-1995: Kacang Tanah. Jakarta: BSN.*
[23] Nasional. BS. **1992**. *SNI 01-2905-1992: Gaplek. Jakarta: BSN.*
[24] Desrosier NW. **1988**. *Jakarta: UI Press.*
[25] Asrori A. **2008**. *Bogor: Fakultas Kehutanan IPB.*
[26] Kusmarwati A, Indriati N. **2008**. *Jurnal Pascapanen dan Bioteknologi Kelautan dan Perikanan*, 3, Juni:29-35
[27] Asri NA. **2011**. *Faculty of Applied Sciences UTM Malaysia*
[28] Chye FY, Sim KY. **2009**. *International Journal of Pharmacology* 5:285-97
[29] Mangunwardoyo W, Ismaini L, Heruwati ES. **2008**. *Jurnal Bahan Alam Indonesia ISSN 1412-2855* 6:163-7
[30] Sulandari L, Sulandjari S, Kristiastuti D. **2010**. *Jurnal Boga dan Gizi*