I. INTRODUCTION

Jernang is a resin name of secreted rattan fruit in which can be produced through extracting process. In Indonesia *Jernang* can be generated mainly from rattan fruit belongs to Daemonorops draco, Palmae family. Rattan *Jernang* population abundantly grow in Sumatera (Jambi, north Sumatera, NAD, Bengkulu, west Sumatera) and Kalimantan island (east Kalimantan and central Kalimantan). The other *Jernang*' name are dragon's blood, kino, red benzoin, *Jernang* manday, *Jernang* beruang, *Jernang* kuku, getah badak, getah warak, so on.

According to Sumadiwangsa, 2000, *Jernang* is classified into hard resin group which is a flash, transparent, matt and as well as brittle solid material. It will become melting if it gets heating treatment and it is also a flammable materials with typical smoke and aroma. In addition, Coppen (1995) stated that *Jernang* is a hard solid resin, has red color, amorfly structure, 1,18-1,20 density, low acid number, around 140 ester number, soluble in alcohol, 120^{o}C boiling point, soluble in eter alcohol, fatty and essential oil. Some of *Jernang* resin is soluble in chloroform, acetate etil, petroleum spiritus and disulfide carbon and not soluble in water.

As much as 57-82% of the main chemistry component of *Jernang* is ester resin and dracoresino tannol. According to *Chu, 2006 in Risna*, 2006, the *Jernang* resin color is red in which has composition of dracoresen (14%), dracoalban (until 2.5%), not soluble resin (0.3%), residue (18.4%), benzoat acid, benzoilasetat acid, dracohodin, and some pigment like nordracorhodin and nordracorubin.

Jernang resin is used commonly for coloring material and medicines, tooth paste, antiseptic, and as well as traditional medicine for diarrhea (*Grieve, 2006*). According to *Anonim* (2006) stated that *Jernang* resin has aphrodisiac effects and can be benefit as astringent, antiseptic, medicine for asthma, syphilis and also stomach disease like diarrhea and dysentery.

II. OBJECTIVES

The objective of this guideline is to increase knowledge and provide information of *Jernang* and its benefits.

III. SPECIES BELONG TO *JERNANG*

In the worldwide, there are about 115 rattan species which is group of Daemonorops. This rattan distribution stretches out from India, Southern China, Malaysia, Indonesia and Papua New Guinea as well. Furthermore, about 87 species of these rattans have invented in Indonesia (*Dransfield & Manokaran, 1994*).

Rattan species for producing *Jernang* belongs to *Daemonorops draco* BL.; *D. draconcellus* BECC,; *D. mattanensis* BECC.; *D. micrantus* BECC.;, *D. motleyi* BECC.; *D. propinquess* BECC.; *D. rubber* BL.; *D. sabut* BECC.; *D. micracanthus* BECC. etc (Heyne, 1987.; Dransfield and Manokaran, 1994.; Januminro, 2000). Those species are distributed in Sumatera Island (Aceh, Sumatera Utara, Riau, Sumatera Barat, Jambi, Sumatera Selatan and Bengkulu), West Kalimantan and East Kalimantan.

Figure 1. *Jernang*, 1-year old

Figure 2. *Jernang*'s fruits

IV. CULTIVATION TECHNOLOGY

According to *Sumarna (2004)*, generally, rattan cultivation stages have some patterns, as follows:

A. Planting materials

Technically, for producing *Jernang* resin, ripen fruits are used as planting materials. The characteristic of ripen fruits can be identified based on omnivore fauna behavior. If we found the scattered fruit scales (pericarp) under the natural main tree, it means that physiologically the fruit is ripe. The other planting materials which can be employed for planting materials are fruit/seeds. They can also be acquired from transplanting or natural seedling.

Figure 3. Ripen/old rattan *Jernang* fruits

B. Nursery Technique

1. Nursery from seedling/seeds

Nursery technique can be done through nursery site preparations in which it can meet adequate seedling needs in cultivating. Technically, after clearing seeds from fruit scales and sacrotesta, the nursery technique can be under taken, as follows:

Figure 4. Rattan *Jernang* seedlings

a) Sowing Seeds Technique

Rattan seeds sowed flatly if the field and should be met the planting needs (each hectare is 2000-3000 tree; seeds 1 kg=300-400 unit+30%). Seedlings are ready for transplanting when rattan seed germinated; the first sigh is the emergence of spear like protuberances. After that, seedlings can be moved into the poly bag with fertile media and finally ready to be planted in the field.

b) Storage technique

Cleaned seeds that have been soaked in the water for 24 hours then put into transparent sack/plastic bag as many as 1000 seeds and tightly closed. This plastic bag is kept in room temperature. After germinated, seeds can be moved into the poly bag until it is ready to be planted (7-9 months).

Figure 5. Germinated seeds

2. Seedling from transplanting

Planting material which be implanted is spear like protuberances bearing leave and has roots adhere on the main tree. Furthermore, poly bag with fertile media adhered into rattan germinated and it will have roots after 15 days. Seedlings are ready for transplanting when rattan seed germinated; the first sign is the emergence of spear like protuberances after which seedling leaves expand. Then, seedling can be moved to nursery site and maintained until it is ready to be planted in the field.

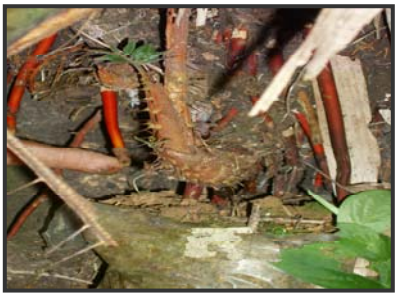

Figure 6. Transplanted rattan seedlings

C. Fruit Harvesting Technique

Generally, smallholder's rattan harvest *Jernang* from natural forest. Usually, small holder rattan conducts this activity both in group and personal action. Harvesting season is from September until December (Elvidayanty & Erwin, 2006)

1. Fruit sorter

Jernang fruits can be harvested 2-3 months before they are ripe or with fruit size is as big as a glass marble. The reason is that ripe fruit contains less resin than young fruit does.

Figure 7. *Jernang* fruit covered by the resin

On the other hand, the best standard of rattan fruit quality to produce resin can be observed from fruit shape, as big as a glass marble and whole outer fruit scales covered by resin.

2. Harvesting technique

Harvesting technique of *Jernang* fruit should be carried out carefully. If rattan fruits get seriously shaken in this phase, it means we will loss the resin. Fruit harvesting should be done through tree climbing which is closed to rattan plant. Moreover, rattan fruit spanned by a pole with binder in the end, in order to avoid the fruit falling down as the branches cut off.

Figure 8. A pole tools with a binder in the end

V. EXTRACTION TECHNIQUE

A. Technique Description

Jernang resin extracting process can be done through two methods, either wet or dry processing technique.

1. Wet processing technique

In this technique *Jernang* fruits are processed through the stages as follows:

1) Put the whole *Jernang* fruit free of branches into a basket
2) Move the fruit into a can full of water
3) Crush the fruit slowly in order to pull out the resin, and the resin will flow into the can bottom
4) Remove the water in the can and put the solved resin under sunlight. Shape the resin into small particle in order to make drying process easy.
5) After dried, the resin is sorted according to the size, packed with the leaves and storage or sold directly.

2. Dry processing technique −first stage

In this stage, *Jernang* fruits are processed as follows:

1) *Jernang* fruits are dried under sunlight for 3 days or until the fruits become wrinkle.
2) The dried and wrinkled fruits are crushed until the resin departs.
3) Sieve the resin and put into hot water until dough is formed.
4) The dough resin is sorted according to market demand (cylinder, small circular, so on).

3. Dry processing technique −second stage

In this stage, *Jernang* fruits are processed as follows:

1) Place the rattan fruits under sunlight for 3-4 days until the fruits become dried and wrinkled.
2) Move dried fruits into a basket and mixed with cockle skin.
3) Hung the basket with *Jernang* fruits using a rope as height as 1 meter, and shake the basket. The resin will flow onto a mat or other materials laid flatly.
4) Put the gathered particle into the bag or sack made from cloth material, moved into the hot water and push to get resin lump out.
5) Put the resin lump outside and make it harden, and ready to pack (sell).

B. Extraction Process by Anak Dalam Tribe

Traditionally, Anak Dalam tribe who live in the National Park of Bukit Dua Belas, Sorolangun regency, Jambi Province do the extracting process of *Jernang* fruits for a long time. They use a simple technique which is a dry extraction. The extraction stages are as follows:

a) Remove rattan fruits from their branches.
b) Put the fruits in rattan basket called “ambung”
c) Hit by the tool ambung with *Jernang* fruit inside, use plastic as mattras.
d) *Jernang* resin will flow through ambung’s gap, gather the resin in plastic
e) This process produces a rendemen of about 7,42%.

Figure 9. Replacing the fruit from the branches

Figure 10. Rattan basket "ambung"

Figure 11. Crushing *Jernang* fruit

Figure 12. The red color of *Jernang*

C. Extraction by Malaya Tribe

In general, all small holders rattan who live in and around forest like to collect *Jernang* fruit and so do Melaya tribe in Merangin Regency. They collect the *Jernang* fruit in the National Park of Kerinci Seblat and extract it through dry extracting technique. The stage of extraction are as follows:

a) Remove rattan fruits from their branches.

b) Put the fruits in a rattan basket called "sarau"

c) Shake up and down this "sarau".

d) *Jernang* resin will flow out through sarau's gap, gather it in a plastic.

e) This procoess produces a rendemen of about 6.41%.

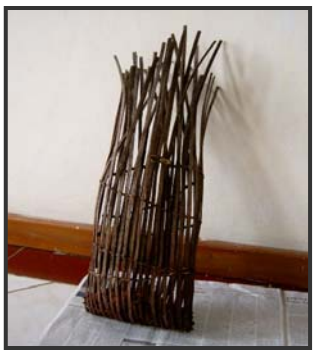

Figure 13. Rattan basket "Sarau"

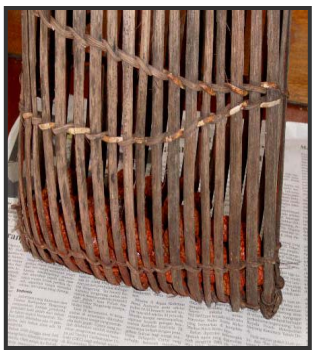

Figure 14. *Jernang* fruit in Sarau

Figure 15. Extraction method by Malaya tribe, Jambi

Figure16. *Jernang* Resin from extraction

Figure 17. *Jernang* fruit

VI. PROCESSING

In common, the extracted *Jernang* can be processed into *Jernang* bulge based on market demand. The extracted resin in particle form can be harden automatically.

Anak Dalam Tribe put the resin particle into the plastic and steam it for 5-10 minutes to gain bulge resin. On the other side, bulge process by smallholders rattan who live in Lamban Sigatal and Sipintun villages, Pauh sub district, Sorolangun regency use frying method. This method uses no oil in order to make the bulge softer. Afterward, the resin is taken into the plastic.

Figure 18. Fried *Jernang*

Figure 19. Bulge *Jernang*

In *Jernang* trade, quality control of *Jernang* resin is based on color difference appearances. The first resin quality has deep red color, and the rest is light red. The resin quality determination is subject to buyer skill negotiation.

The quality determined is based on SNI (Indonesia National Standard): 01-1671-1989 can be grouped into 2 types which are first and second quality. Specification requirement can be found in Table 1.

Table 1. Specification requirement of *Jernang* quality (SNI: 01-1671-1989)

No.	Test type	Unit	Requirement	
			Quality I	Quality II
1.	Water content, (b/b)	%	Max. 3	Max. 6
2.	Dirt rate, (b/b)	%	Max. 14	Max. 39
3.	Dusty rate, (b/b)	%	8	20
4.	Melting point	^{0}C	80 - 120	80 - 120

VII. PACKAGING

Jernang resin packaging is simple and there is no permanent standard. This condition caused by almost of *Jernang* resin come from the people and *Jernang* resin is not industrial product. *Jernang* resin packed in the plastic bag through a processing technique.

In SNI Document No. 01-1671-1989, *Jernang* resin prepared in bulge form with packaging in plastic bag, strong and tightly close, furthermore, put into a gunny sack or sowing plastic. Each plastic has maximum net weigh of 30 kg.

VIII. ECONOMIC VALUE

Economic value assessment based on interview with Small holders *Jernang* is conducting in the National Park of Kerinci Seblat, Merangin regency and Laban Sigatal village, Pauh sub district, Sorolangun regency.

To appraise economic value of *Jernang*, we need to know the cost component like harvesting, extraction, and processing cost as well. The costs are identified as operational costs in the field needed by the *Jernang* people (paddy field, fish/meat, kerosene, etc)

For smallholders *Jernang* in Manau River, commomly the operational cost needed is about Rp 200,000 for one week. They will get around 2 kilograms of *Jernang* resin with selling price Rp 400,000 per kg. It means they earn Rp 600,000 per week.

Meanwhile, smallholders *Jernang* in Lamban Sigatal village, Pauh Sub District, Sorolangun Regency need one month in hunting *Jernang* resin. The operational cost in the forest and hosehold needed are Rp 1,000,000. They get 7 kgs of *Jernang* resin selling price (farmgate) of Rp 400.000 per kg in. They earn Rp 2,200,000 per month.

This observation finds that in fruit season, the average income of *Jernang* smallholders is from Rp 2,200,000 to Rp 2,400,000.

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