



## Processing of *Sraa Sor* (rice liquor) in Takeo Province, Cambodia

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**Abstracts** *Sraa sor* (rice liquor) is a traditional khmer liquor made from rice with fermentation and distillation processes. The objective of this research is to describe the rice liquor processing in Takeo province. A semi structure questionnaire and observation were used to survey the rice liquor processing with 58 rice liquor producers. Producers learned the method of rice liquor production from their parents. Whole rice of *Srouv Krohom* (rice variety) or broken rice mixed with many varieties and *mé sraa* Vietnam (yeast variety) bought at local markets were used to produce liquor. Rice husk and fire woods were used for steaming or boiling rice and distillation. Producers used pond water or well water for cooking rice and rain water for adjusting alcohol concentration. The producers sold their *sraa sor* to middlemen because they could receive money on site. Amount of cooked rice was 20kg and yeast 500g at one time. Seventy eight liters of water were added after fermenting two over nights. Time spend on distillation was three hours. The alcohol degree was said 30 percent in final production by farmers.

**Keywords** rice liquor (*sraa sor*), processing, yeast, fermentation, distillation

## INTRODUCTION

Rice (*Oryza sativa* L.) is one of the leading staple crops of the world. There are many alcoholic products made from rice such as sake (Padhye and Salunkhe, 1979), Lao rice whiskey (Hatsadong & Gibson 2006) and *sraa sor*. In Asian countries, rice wine and liquor are popular alcoholic beverages and the given names vary from location to location such as sake, a well-known and popular traditional product in Japan (Iwata et al., 2003). Alcoholic beverages are divided into two categories based on the basis making process including fermenting alcohol beverages (wine, beer, sake, etc.), and combination of fermentation and distillation (whisky, brandy, liquor, vodka, tequila, etc.) (Lisdiyanti and Kozaki, 2003). *Sraa sor* processing belongs to combination of fermentation and distillation.

In Cambodia, rice can be a raw material to many products such as rice starch, noodle and *sraa sor* which is a traditional Khmer liquor and has been produced since long time ago. However, *sraa*

*sor* processing methods vary from area to area and from family to family. Hence, the objective of this research is to describe the rice liquor processing in Takeo province.

## METHODS

This research was conducted in Takeo province, Cambodia. Farmers who produce *sraa sor* were targeted for interviews. The total sample number was 58 in this study. Two kinds of data, primary and secondary, were required for the research. Primary data comprised information from interviews. Semi-structured interviews and observation were used as the method for households' survey through questionnaires. Secondary data were taken from technical papers, book, journals, and other publications. The collected primary data were installed and analyzed with SPSS version 16.

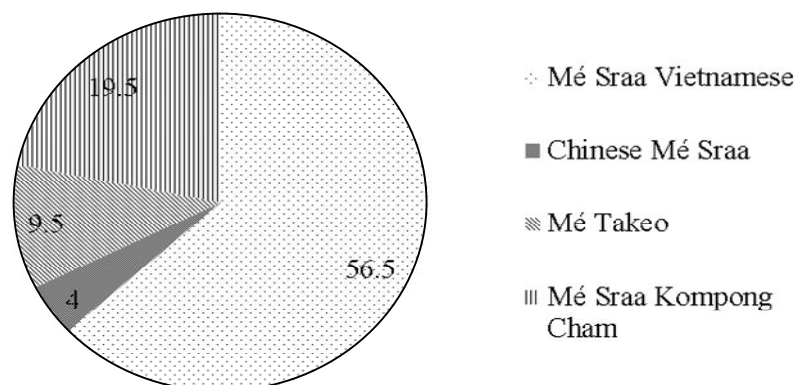
## RESULTS AND DISCUSSION

Varieties and sources of rice: Table 1 shows the varieties and sources of rice. Forty percent of producers are utilizing broken rice mixed with many varieties, 28% of whole rice of *Srouvkrohom* (rice variety), 25% of whole rice of IR, and 7% other rice for producing liquor. All rice varieties were bought at local markets such as at millers at 18%, village markets 45.5%, own rice 9.1%, neighboring farmers 9.2% and others 17.3%. The broken rice mixed with many varieties and IR rice is cheaper than to the others. Taste was not different between whole rice and broken rice mixed with many varieties.

**Table 1 Varieties and rice sources for *sraa sor* production**

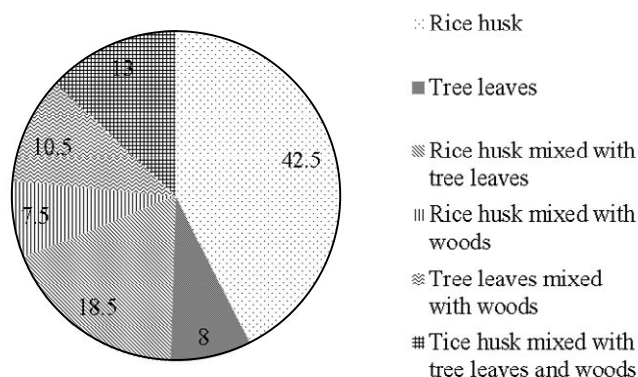
Types of rice	Percent	Sources of rice	Percent
Broken rice mixed with many varieties	40	Millers	18.0
Whole rice of <i>Srouvkrohom</i>	28	Village markets	45.5
Whole rice of IR	25	Own rice	9.1
Others	7	Neighboring farmers of	9.2
		Others	17.3

Types of *mé sraa* (rice yeast): Fig. 1 shows the types *mé sraa*. *Mé sraa* is the conversion of starch into sugar and ethyl alcohol. The producers utilized the *mé sraa Vietnamese* at 56.5%, *mé sraa Chinese* at 4%, *mé Takeo* at 9.5% and *mé sraa Kompong Cham* at 19.5% to produce liquor. *Mé sraa Vietnamese* is better than other *mé sraa* because they produced the high alcohol and quantity production. *Mé sraa Kompong Cham* is good at smell and taste but with low productivity.



**Fig. 1 Types of *mé sraa***

**Types of Fuel Consumption:** Fig. 2 shows the types of fuel consumption. The producers utilized rice husk at 42.5%, tree leaves 8%, rice husk mixed with tree leaves 18.5%, rice husk mixed with woods 7.5%, tree leaves mixed with woods 10.5% and rice husk mixed with tree leaves and woods 13% for cooking rice and distilling fermented liquid. Rice husk consumption is popular because it is easy to find and to control fire, and cheaper than other materials. The producers collected the tree leaves and woods by themselves.



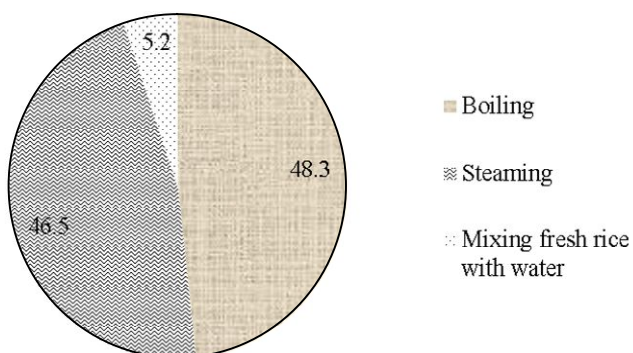
**Fig. 2 Types of fuel consumption**

**Water Resources for Cooking and Fermentation:** Table 2 shows water resources for cooking and fermentation. Water for cooking from well was 43%, pond 47% and rainwater 10%. For fermentation, water resources from well was used at 35%, pond 52% and rainwater 13%. Well and pond are normally available around their houses, except the rainwater which can be accessible in the rainy season and utilized to blend the liquor. Taste of rice liquor using well water is better than pond water because pond water have muddy smell.

**Table 2 Water consumption and addition in fermentation**

Water resources for cooking	Percent	Water resources for fermentation	Percent
Well water	43	Well water	35
Pond water	47	Pond water	52
Rainwater	10	Rainwater	13

**Rice Cooking Methods:** Fig. 3 shows the rice cooking methods. The cooking methods were boiling 48.3%, steaming 46.5% and mixing fresh rice with water 5.2%. Rice boiling is a traditional method for cooking rice. Rice steaming is acceptable for cooked method because it is non-burn and smoky smell. Method of steaming rice is better than boiling rice because of no burn rice.



**Fig. 3 Rice cooking methods**

### Methods of processing liquor

Preparation of rice: Materials for making liquor are rice, water and *mé sraa*. Rice was weighed according to the purpose. The rice was washed to remove rice bran and dusty and soaked overnight for water absorption.

Cooking rice: The washed rice was put to boil or steam. During the cooking, stable fire provision is needed because the strong fire causes horrible smell and taste. Therefore, the fire should be controlled from the start till the end of cooking rice.

Mixing cooked rice and *mé sraa*: After cooking rice, the steamed rice was spread from distillation pan to a mat for cooling. After that *mé sraa* was sprinkled and mixed with rice (*mé sraa* 500g / 20kg of rice).

Fermentation: Steamed rice mixed with *mé sraa* was divided equally into 4 pots which amount of cooked rice mixed with *mé sraa* around 10 to 12Kg per pot. Water around 20 to 24kg per pot was added in the second day (around 48 hours) without stirring the content and it was continued to fermentation for two days. The duration of fermentation lasted 84-96 hours before distillation. This fermentation process produces ethanol as Henderson (2004) stated that the principal metabolic process in winemaking is the alcoholic fermentation, which consists in the biotransformation of grape sugars (glucose and fructose) into ethanol and carbon dioxide. In a standard fermentation, about 96% of the sugar is converted into ethanol and carbon dioxide, 1% into cellular material and 4% into other products such as glycerol (Henderson, 2004).

Distillation: Put the fermented liquid and solid of cooked rice mixing with *mé sraa* and water (*baay sraa*) in the distillation pan. After one hour, *baay sraa* becomes hot. The fire control should be stable. The first drop of clouded liquor with sediment may be in 5 to 10 minutes. After 10 minutes, transparent *sraa* was observed and it became clouded again. The producers used plastic bottle to keep *sraa sor*. Usage of glasses or ceramic pots is better than plastic bottle in storage of *sraa sor* because some chemical of plastic can be extracted with alcohol which plastic smell is released into *sraa sor*. Distillation is evaporable liquor from fermented liquid of cooked rice mixing with *mé sraa* and water that the fermented liquid was boiled in a vessel which Verma (1998) showed. The vapor was led to the water cooler to be liquefied and collected to the glass bottles.

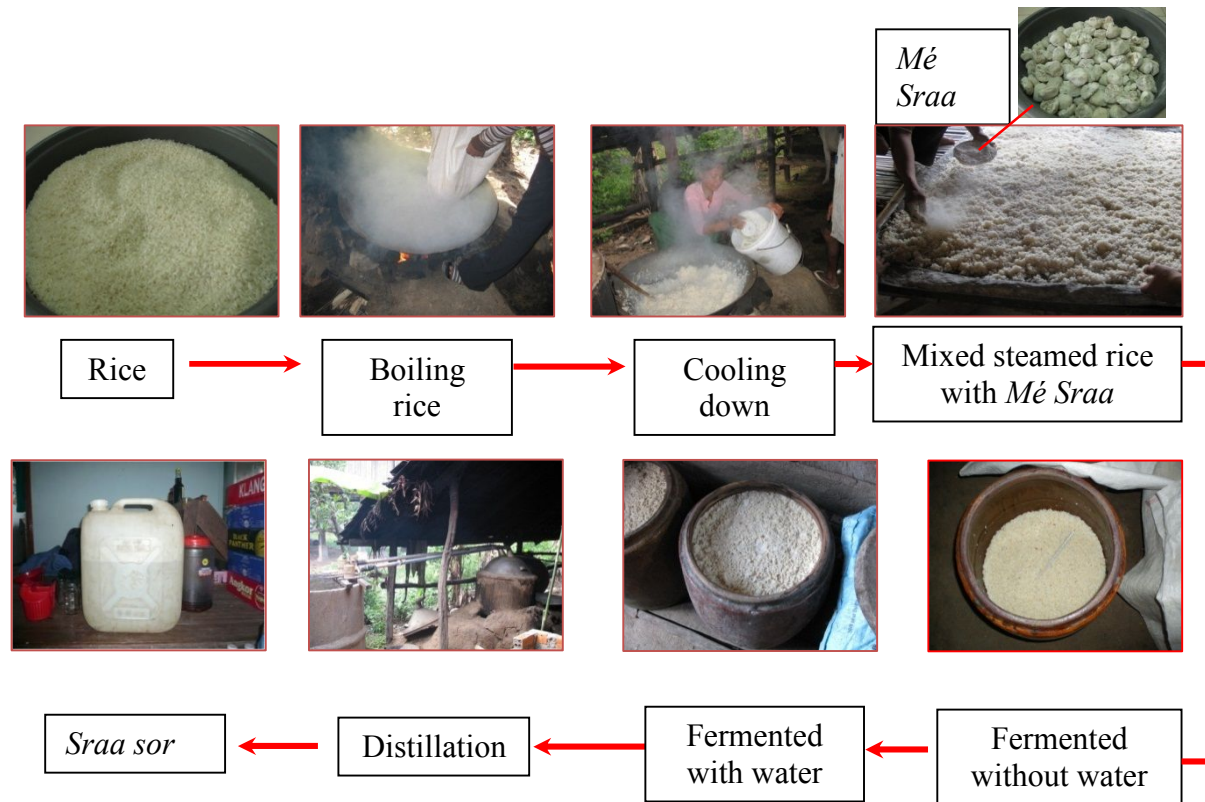
**Table 3 Good and low quality of *Sraa sor***

Good quality		Low quality	
Items	Percent	Items	Percent
Sweet taste	29.0	Sour smell	43.5
High alcohol	17.0	Low alcohol	19.5
Good smell	30.5	Smoking smell	22.5
Comfortable liquor	23.5	Tasteless	14.5

Good and bad quality of *Sraa sor*: Table 3 shows bad and good quality of *sraa sor*. Good quality of *sraa sor* was sweet taste at 29%, high alcohol 17%, good smell 30.5% and comfortable liquor 23.5%. However, bad quality was sour smell at 43.5%, low alcohol 19.5% smoking smell 22.5% and tasteless 14.5%. Good quality of *sraa sor* was depending on good smell, sweet taste and high alcohol because it was preferred by consumers and easy to drink which opposite with smoking smell, sour smell and tasteless were low quality of *sraa sor*.

Local people used milled rice as raw materials for making *sraa sor*. After quick wash, the milled rice were steam/boil for 60 to 90 minutes, spread on bamboo mat for cooling, and spread of *mé sraa*. After that, put the steamed/boiled rice mix with *mé sraa* in the cups and ferment them without water 2 and with water 2 nights. The product of fermented solution was put into distillation pan and distilled. The alcohol beverage is contained about 50% alcohol. If the farmer sale this *sraa* to the market, they diluted the product into 30%. The processing of this method of *sraa sor* was similar to distilled spirit from rice wine in Southeast Asia countries (Lisdiyanti and Kozaki, 2003),

and Lao Lao rice whiskey (Hatsadong & Gibson 2006), but it is opposite to sake (Iwata, et al., 2003) and whisky (Henderson, 2004).



**Fig. 4 Preparation process of *sraa sor***

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## CONCLUSION

In conclusion, rice liquor process is divided into four steps; rice cooking, mixing of cooked rice with *mé sraa*, fermented without and with water, and distillation. Rice liquor processing is the combination of fermenting and distillation based on basis liquor processing. However, most of the *sraa sor* producers faced problems in *sraa sor* business such as a low sale price, high price of a raw material, low quality of *sraa sor*, and cloudy color.

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