

## Home-Based Industry Operating Cost Reduction As Replacement Impact Of The Traditional Stove

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### ABSTRACT

Crispy-fried onions is a popular garnish and flavour enhancing produced by deep frying. Home based industries producing crispy-fried onions use a traditional conventional stoves for heating oil. Since conventional stoves fuel by biomass, such as woods, deep frying process releases toxic fumes that comprises small particles, carbon monoxide, and other noxious fumes. Therefore, replacement the conventional stove stove in crispy-fried onions home-based industries by the gasifier stove is necessary because the gasifier is healthier than the traditional stove.

Home-based industries adopt the healthy stove technology for the traditional stove replacement as long as the stove is low-priced fuel intake, easily operated and simply constructed. This study is aim to evaluate energy cost for red onions frying in a home based industry that is production cost component. At the beginning of frying process, initial amount of woods was placed in gasifier stove, than certain amount of wood was added into the gasifier stove periodically for 1 hour.

The result shows the gasifier stove requires 0,6 kg of woods / 1 kg fried onions / hour only while the traditional stove requires 1 kg of woods / 1 kg fried onions / hour. These numbers means the energy cost of the healthy stove is lower than the the traditional that effect on variable cost reduction from Rp. 655.000,- to Rp 462.000,-.

**Key Words:** *crispy-fried onions; gasifier; healthy stove; home-based industry; operating cost*

### 1. INTRODUCTION

A home-based industry has low capital investment that affects on its energy production cost, man power numbers, management, safety, healthy and welfare. Dried fried onions is one of most popular home-based industry which is usually run by household women. The conventional stove which is a type wood-fired cook stove is run for heating oil in this fried onions industry. Since this stove is

simply constructed, easily operated, low-priced fuel intake, it helps home-based industries owner for having more profit and saving money. However, particulate emissions from the conventional stove that is fired biomass such as woods contribute significantly to ambient (outdoor) air pollution. Open direct firing in the conventional stove releases toxic fumes comprises microscopic particles, carbon monoxide, and other noxious fumes which are up to 100 times higher than the recommended limits set by WHO.

Indonesia Government concerns to provide families and home-based industries, such as fried dried onions, an universal access for efficient, cleaner and healthier cooking stove as the government's responsibilities. The World Bank in collaboration with Indonesia's Directorate of Bioenergy, Ministry of Energy and Mineral Resources launched the Indonesia Clean Stove Initiation In 2012 by focusing on Central Java Province. Then, the regulation on the health and safety effects of biomass cook stoves are going to be issued. For this reason, until there is a similar program in Pekanbaru, communities education and technology access for clean and affordable energy has been initiated by institution.

## 2. EXPERIMENT

The gasifier stove as a healthy stove that was donated to the fried-dried onions industry is satisfying the owner as long as it uses biomass, such as wood. However, replacement the traditional stove imposes mindset, behaviours habits and fuel cost. With the aim to assist the owner accessed clean energy, firstly, the owner was educated about the traditional stove health impact, then operating the healthy stove was demonstrated to the owner. At last, effect of replacement on production cost was evaluated in order to verify that the healthy stove make more saving money which is compiled in this paper.

Evaluation cost data were collected during frying process in this industry. A quantity of raw red onions were prepared by chopping, salting and flouring while the healthy stove and the traditional stove were started up. Later, frying process was conducted and frying process was allowed normally 1 (one) hour in that fried-dried onions were collected. During frying process, certain amount of woods was added into the healthy stove regularly.

## 3. RESULTS AND DISCUSSION

Total quantity of woods that was consume are deposited wood in stove before start up and added wood during frying process. The results are tabulated below.

Table 1. Fuel consumption for an equal period

Stove Type	Fuel (kg)	Fried Onions	Time	Fuel Consumption
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		(kg)		Rate (kg fuel/kg onion/time)
Traditional	7,4	7,4	1	1
Healthy	3,2	5,2	1	0,6

The healthy stove consumes 0,6 kg wood/kg onion/hour that implies the healthy stove only consumes 40% fuel less than traditional stove. It affects on operating cost which consists of raw material cost, utility cost and other operating expenses. Operating cost per day for the traditional stove and the healthy stove are shown on Table 2 below.

Table 2. The Traditional Stove and The Healthy Stove Operating Cost in Rupiah Per Day

	Item	Traditional Stove		Healthy Stove	
		Quantity	Price 10 <sup>3</sup>	Weight (kg)	Price 10 <sup>3</sup>
Raw material	Red Onions	37 kg	481	37 kg	481
	Frying oil	4 kg	44	4 kg	44
	Maizena flour	1 kg	60	1 kg	60
Utility	Fuel (wood)	37 kg	50	37 kg	30
	Electricity (blower)	0	15	0	0
	Water Process	0	10	0	10
	Fuel Lugging	0	10	0	3
Operating Labor		3 man	150	0	150
Distribution and Selling cost		0	50	0	50
Medical Servis		0	y*	0	b
<b>Total</b>			<b>870</b>		<b>828</b>

Note :  $b < y$ ; according to the health impact cost as explanation of this paper background

According to Table 2, there is saving money for the owner  $(Rp\ 870.000 + y) - (Rp\ 828.000 + b) = Rp\ 42.000 + (y - b)$ . Figure 5% per day indicates that the present operating cost does not decrease significantly as replacement effect but the owner has more saving money for her and her families health in the future or numerous benefit as Rp  $(y-b)$ . The owner was reminded that replacement rationale is not only saving money as profit and decreasing operating cost recently but also increasing welfare opportunity. The owner and family reduce health impact that is innumerable recently and tomorrow.

Adjustment system for onions frying with the healthier system is attracted the owner after operating cost was calculated. Afterward, they require assesment for construction, routine operating, maintanance and troubleshooting as replacement consequence.

#### 4. CONCLUSIONS

Replacement the traditional stove with the healthy stove for the short frying periode affects the owner saving money 5% of production cost recently, and furthermore, innumerable health benefit tomorrow..

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