The 4th International Seminar on Environmental Engineering
Department of Environmental Engineering, Institut Teknologi Sepuluh Nopember
School of Public Health, Faculty of Medicine, Udayana University

DESIGN OF NEO-LOCAL WEST SUMATERA STOVE FOR BOILING GAMBIR (Uncaria Gambir Roxb.)

Firdaus[a],

M. Hatta Dahlan[b], Kaprawi[c]

[a]*Student of doctoral program of Environmental Science*
Sriwijaya University
e-mail firdausmtmd@gmail.com
[b]*Promotor,* [c]*Co-promotor*

Abstract

Gambir (Uncaria Gambir Roxb.) is one of traditional export commodity of West Sumatera Province. This product is mainly used for raw material of pharmaceutical industry, batik coloring, leather thinner and clarifier in beer refineries. Study of local West Sumatera stove performances to boil gambir leaves and branches show the results that heat transfer efficiency is less than twelve percents; short service life but very simple operation; indoor pollution due to smoke and burnt risk are high because of no chimney and hot flue gas temperature is still higher than 200 ^{0}C; economically, the stove is very cheap; while environmentally, the stove caused impact on the local deforestation. This paper attempted to design neo-local West Sumatera Stove for boiling gambir using less or no fire-wood by introducing palm fiber and nut as substitution fuel. The improved stove was made of river stone; cement; sand; metal plate, pipe, and frame; and bamboo. The stove consists of two main parts, namely combustion chamber and its pot and flue gas heat utilization. The height of combustion chamber and its pot is 70 centimeters with adjustable grates for biomass fuel bed. Water Boiling Test was conducted with the height of grate 25 to 45 centimeters from the floor of combustion chamber, natural or forced convection air underneath the grate, and damper between combustion chamber and flue gas channel to the chimney 10 to 20 centimeters height opened. The result show that fire-wood, fiber, nut and their mixture demonstrated different behavior of combustion. Two kilograms mixture of 1:1 by weight of biomass fuel of palm fiber and nut boiled 2 kilograms of water in six minutes while stack gas temperature was only 40 ^{0}C.

Key words : chimney, damper, fiber, grate, nut, and stove,.

1. Introduction

Gambir (*Uncaria Gambir Roxb.*) is one of traditional export commodity of West Sumatera Province. This product is mainly used for raw material of pharmaceutical industry, batik coloring, leather thinner and clarifier in beer refineries. Since a tropical plant gambir growth well on Pesisir Selatan and 50 Kota districts. This product is mainly used for raw material of

ISBN 978-602-95595-6-9