Abstract
It has been common to do fractionation (for example using ammonium sulphate as a precipitating agent) before doing a more sophisticated method for purification of protein. The logic Natural waste like rice husk, corn husk and corn hump are potential as alternatives substrates for Pleurotus ostreatus growth media because its nutrition. This research aimed to obtain the best variation of substrate composition for the growth of the mushroom. Parameters were fresh weight of the fruiting bodies (yield), cap’s diameter and fruiting bodies morphology. Based on the result, medium consist of 0.5 kg rice husk, 0.25 kg corn husk and 0.25 kg corn hump is the only composition gave the same yield as the control (100% sawdust) did. There was also no significant difference on cap’s diameter and morphology of the fruiting bodies.

Keywords: sawdust, rice husk, corn husk, corn hump, oyster mushroom

1. Introduction
Edible mushrooms are widely consumed in Indonesia where the climate is suitable for the natural growth as well as the cultivation of certain mushrooms. White oyster mushroom (Pleurotus ostreatus) is the most commonly cultivated edible mushrooms in Indonesia (Surawiria, 2002). The cultivation process of white oyster mushroom usually makes use of a sawdust bag as a substrate for the mushroom growth. Nowadays, the availability of sawdust tends to be limited, hampering the oyster mushroom cultivation in general. Therefore, search efforts for alternative substrates providing sufficient nutrition for the mushroom growth have gained a big interest.

Rice husk, corn husk and corn hump are examples of agricultural solid waste obtained easily in huge amount in agricultural countries like Indonesia. They are used so far only as mix components for making fertilizer. The carbohydrate content in Rice husk, corn husk and corn hump has been reported to be high enough, making them potential as alternative growth substrates for mushroom growing on sawdust. This work aimed to evaluate the capacity of those materials in substituting the sawdust portion in the common growth substrate.

2. Methodology

| F2 spawn of white oyster mushroom | Substrates preparation (of various compositions) and spawn inoculation | Cultivation conditions | Fructification and Harvest

3. Result

3.1. Days to complete mycelium running

Figure 1. Time to complete the mycelium running affected by substrate composition. Control = 1 kg sawdust, a = corn hump:corn husk (5 kg:0.5 kg), b = sawdust:corn husk (0.5 kg:5 kg), c = rice hump:corn husk (0.5 kg:5 kg), d = sawdust:corn hump (0.5 kg:5 kg).

No remarkable differences were observed in mycelium running time on spawn pack of the different substrates used, except for composition of rice hump:corn hump:corn husk (0.5 kg:0.25 kg:0.25 kg). It ranged from 5-6 days, whereas for 7 to 8 days. Variation in the time might be due to variations in bag textures, where the rice hump lowered the hardness and compensation of the bags. The result might be different if the rice husk would have been graded before used as a substrate mix component.

3.2. Fresh weight of harvested mushroom fruits

Analysis of data reveals no significant effect of the substrate composition on the cap’s diameter. Yet, in terms of fresh weight, it was clearly shown that the rice hump alone was not suitable for growing the mushrooms, while the compositions of rice husk:corn hump:corn husk (0.5 kg:0.25 kg:0.25 kg) performed as well as the control (sawdust) did.

3.3. Number and morphology of effective fruiting bodies

Number of well-developed fruiting body was recorded and presented in Table 1. Dry and pin headed fruiting body was discarded be treated and only fruiting body was included during counting. The percentage of effective fruiting body did not vary significantly in different substrates. They were rather similar in numbers, size, color and also cap’s diameter.

3.4. Yield per packet/leg

Significant variation was found in yield of white oyster mushroom grown on different substrates used. The maximum biological yield was recorded with control (1 kg sawdust) and also with the composition of rice husk:corn hump:corn husk (0.5 kg:0.25 kg:0.25 kg). The lowest biological yield was observed in composition of rice husk:corn hump (0.5 kg:0.5 kg). Chen et al. (2005) explained the process of break-down of lignin. There is an apparent correlation between the ability to degrade lignin and the production of phenolic, which esters phenolic compounds to simple aromatic compounds that can be absorbed by mushroom mycelium and is used for nutrition. The product of cellulolytic action in simple and soluble carbohydrates and the end products being glucose was absorbed by the fungal mycelium for growth and energy. Therefore, cellulose-rich organic substrates are good for the cultivation of mushroom (Garrity and Miller, 1983; Quammie, 1987). High cellulose content in wood results in enhanced cellulose enzyme production and increased yield of mushroom (Romansky and Kandorsky, 1979). The substrates with high lignin and phenolic content should decrease the activity of the enzyme, hence slow growth and low yield.

4. Conclusions
The maximum biological yield was recorded with control (1 kg sawdust) and also with the composition of rice husk:corn hump:corn husk (0.5 kg:0.25 kg:0.25 kg). Thus, that composition can be considered as an alternative growth media for white oyster mushroom.

5. Acknowledgements
Funding and laboratory facility were provided by the University of Surabaya.

References