

# CHARACTERIZATION OF BIOACTIVE COMPOUNDS OF PORTUGUESE OYSTER *Crassostrea angulata* FROM BATU KARAS ESTUARY

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**Abstract** Portuguese oyster *C. angulata* is one of the potential source of bioactive compounds from estuary in Indonesia, especially from Batu Karas Village Pangandaran District. The aims of this research were to explore and characterize the bioactive compounds of the estuary oyster. The oyster separated from the shell, and then extracted in ethanol solvent with orbital maseration method in 24 hours. After filtration and evaporation, bioactive extract were characterized with qualitative phytochemical method. The extraction resulted 3.42% yield. Bioactive compound of the oyster has phytochemical characters, respectively, alkaloid,

flavonoid, and fenol hidroquinon positives. The oyster bioactive compounds need to characterize with quantitative method, and biological activityies analysis futher more.

**Keywords:** cupped oysters, secondary metabolites

## INTRODUCTION

Estuary cupped oysters belong to Ostreidae family, Bivalvia class, Mollusc phylum. The estuary cupped oysters have two groups, Pacific oyster (*C. gigas*) and Portuguese oyster (*C. angulata*). Pacific oyster has bigger size than

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Portuguese oyster, but none of both oysters explored of bioactive compounds yet in Indonesia. Portuguese oyster in Batu Karas estuary has unique habitat and usually utilized for healthy purposes empirical, so we interested in exploring research the bioactive extract of the oyster.

Resmiati *et al.* (1998) and Astuti *et al.* (2001) have explored the estuary and the oyster for the aquaculture purposes. Lee *et al.* (2018) investigated extraction of bioactive compounds from oyster (*Crassostrea gigas*) by pressurized hot water extraction. Pacific oyster muscle hydrolysates were prepared by pressurized hot water extraction (PHWE) to investigate various physico-chemical and bio-functional parameters. This study showed that PHWE of Pacific oyster muscle affects the hydrolysis efficiency, degree of hydrolysis, glycogen, protein, phenolic, and amino acids contents, radical scavenging and antihypertensive activities, and molecular weight. Karthikeyan *et al.* (2014) studied on the antimicrobial potential and structural characterization of fatty acids extracted from Sidney rock oyster *Saccostrea glomerata*. According to the researches of the oysters, *C. angulata* has big potential bioactive compound extracts to explore and characterize.

## METHODS

*C. angulata* was collected from Panireuman River estuary, Batu Karas Village, Pangandaran District, Indonesia. Ethanol solvent used to extract the oyster. Phytochemical reagent is used to analyze qualitative phytochemical analysis.

**Sample preparation.** The live and fresh oyster was transported to IPB University laboratory within 24 hours approximately, and separated the oyster muscle from the shell immediately. The flesh cut into small pieces and homogenized.

**Proximate analysis.** The flesh oyster sample was used for proximate composition analysis. Kjeldahl digested was used for measuring total nitrogen and crude protein content. Lipid content was determined by Soxhlet system. Moisture content was determined by oven drying at 105°C after a constant dry weight was obtained. Total ash was measured by furnace oven at 550°C for overnight.

**Extraction.** The flesh was extracted with ethanol solvent by 1:4 comparison. The extraction processed with orbital maseration method in 24 hours, and then filtered with Whatman 40 filter paper. The extract was concentrated in rotary vacuum evaporator at 60°C.

**Qualitative phytochemical analysis.** Assays of oyster extract were performed using qualitative phytochemical methods, to analyze the existence of alkaloid, triterpenoid, flavonoid, phenol hydroquinone, and saponin. Alkaloid assays were performed using Dragendorff, Meyer, and Wagner reagent solutions.

## RESULTS AND DISCUSSION

**Proximate composition.** The oyster flesh contained 12.71% protein, 1.61% lipid, 82.65% moisture, and 1.82% total ash. According to Table 1 showed that, the oyster muscle is good protein source from marine bivalve molluscs, because of the highest content after moisture content. The oyster muscle is also good mineral source. Lipid has the lowest content of the oyster muscle flesh.

Actually, the components of oyster can vary according to the season, age of population, species, geographic location, and temperature (Lee *et al.* 2018). Qualitative phytochemical analysis. Phytochemical analysis is an initial qualitative test of crude extracts to determine the types or groups of secondary metabolite of the extract. The groups of bioactive compounds of the extract can be determined by observing the color change and the formation of a precipitate after adding a specific reagent for each qualitative test. According to Table 2, the oyster extract has positive indicator to alkaloid, flavonoid, and hidroquinon compounds.

Alkaloid analysis is conducted to detect the presence of cyclic organic compounds nitrogen contained. The presence of alkaloids is indicated by the formation of red precipitate by Dragendorf reagent, brown precipitate by Wagner reagent, and white-yellowish precipitate by Meyer reagent.

The presence of flavonoids compounds is indicated by the formation of yellowish layer. Flavonoids are a large group of phytochemicals that are protective and are found in many fruits and vegetables. Flavonoids are often known as bioflavonoids which act as antioxidants, which can neutralize free radicals. Examples of flavonoid compounds are anthocyanins, kaemferol, and resveratrol. Various phenolic compounds have the characteristic of aromatic compounds. Some of the compounds in the phenolic group include simple phenols, lignins, anthraquinones, tannins, and phenyl propanoids (Harborne 1987). The presence of phenolic compounds of the extract indicated by the formation of green colour.

Marine resources have been identified as excellent reservoirs for the extraction of potent functional bioactivities compounds (Wang *et al.* 2017).

**Table 1** Composition of bioactive crude extract and proximate

| Component     | Composition (%) |
|---------------|-----------------|
| Crude extract | 3.42            |
| Crude protein | 12.71           |
| Lipid         | 1.61            |
| Moisture      | 82.65           |
| Ash           | 1.82            |

**Table 2** Qualitative phytochemical analysis

| Chemical group       | Indicator |
|----------------------|-----------|
| Alkaloid: Dragendorf | ++        |
| Meyer                | +         |
| Wagner               | +         |
| Triterpenoid         | -         |
| Flavonoid            | +         |
| Phenol hidroquinon   | +         |
| Saponin              | -         |

## CONCLUSION

This study showed that the Portuguese oyster has the big potential of protein source from marine shellfish, especially estuary shellfish. This protein content have good resource for bioactive peptide and good source of amono acids. The *C. angulata* oyster also has good extract yield that can be explore for furthermore analysis. The extract has good phytochemical characteristics, because of the indication of the bioactive compound groups content. The oyster extract need more analysis to specific quantitative characterize and biological activities analysis.

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