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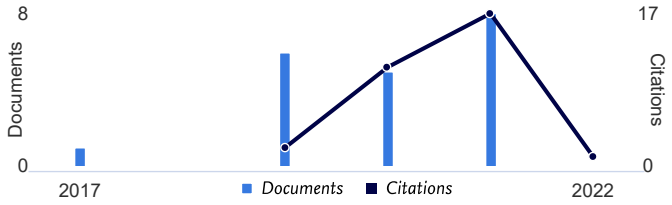


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Hidayati, N., Fuad, H., Munandar, H., ...Darmawati, S., Ethica, S.N.

*IOP Conference Series: Earth and Environmental Science*, 2021, 743(1), 012007

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# Streptolysin encoding genes sagc and sagd as biomarkers of fish pathogen streptococcus iniae: An in silico study

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## Abstract

Streptococcus iniae has been notorious as a serious tilapia fish pathogen leading to many disease outbreaks in warm water marine aquaculture. An in silico investigation about the potential of virulence genes of S. iniae, sagC and sagD, as biomarkers of the bacterial species, has been carried out. The aim was to determine bacterial biomarkers, which are important to facilitate early rapid diagnosis of S. iniae streptococcal infection in fish and also in humans. First, specific primers were designed from sagC and sagD genes of S. iniae SF1 genomic DNA using Primer3Plus. Next, in silico PCR (Polymerase Chain Reaction) analysis was carried out using the newly designed primers and 117 genomic DNA of

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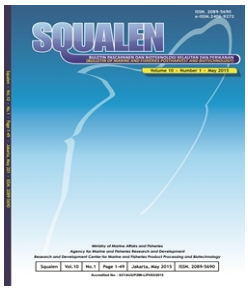

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NEW SQUALEN BULLETIN IS NOW IN SCOPUS

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Squalen publishes original and innovative research to provide readers with the latest research and knowledge on, emerging technologies of marine and fisheries postharvest and biotechnology from tropical waters.

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*Posted: 2021-02-25* More...

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As of July 1st, 2020, Prof. Dr. Ekowati Chasanah has decided to step down as the Editor-in-Chief of the Squalen Bulletin of Marine and Fisheries Product Processing and Biotechnology and will continue to contribute as part of the Editorial Board.

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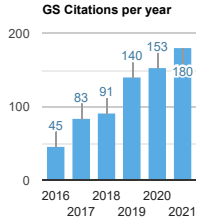


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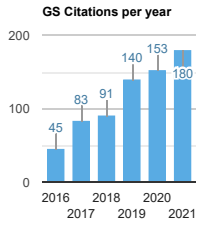


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# Characteristics and Use of Peptones from Catfish (*Clarias gariepinus*) and Pangas Catfish (*Pangasius pangasius*) Heads as Bacterial Growth Media

**Dwi Setijawati[1,2], Abdul Aziz Jaziri[1,2,3*], Hefti Salis Yufidasari[1,2], Mohammad Dwi Pratomo[1], Dian Wahyu Wardani[1], Dinda Ersyah[1], and Nurul Huda[4,5*]**

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**Abstract**

Peptone is a hydrolysate product rich in amino acids, and it is uncoagulated at high temperature. Commercial peptone produced from land animals cannot be declared as acceptable in terms of lawfulness due to religious concerns. Catfish (*Clarias gariepinus*) and pangas catfish (*Pangasius pangasius*) are important species for the fish processing industry in Indonesia. The filleting process resulted in value by-products. The fish head as the by-products can be utilized as a main raw material for higher economic value products, such as peptone. The aim of this study was to characterize peptones extracted from the heads of catfish and pangas catfish with different acid conditions. The characteristics of chemical composition, yield, color parameter, solubility, amino acid content, bacterial growth rate and biomass production were observed. The catfish peptone (CFP) and pangas catfish peptone (PCP) obtained with different acid conditions showed high protein content in the range of 84.35% to 90.80% ($P<0.05$). The yields of CFP and PCP were significantly different ($P<0.05$) and varied between 4.75% and 5.66%. The solubility of treated peptones varied between 98.03% and 99.52%, and the peptones were rich in glycine, glutamic acid, proline and leucine. Bacterial growth test showed that both CFP and PCP had better growth rates compared to the commercial peptone tested in this study. In addition, the biomass production with peptone from catfish and pangas catfish was higher than that with the commercial product ($P<0.05$). This research proposed that catfish and pangas catfish heads could be developed as an alternative source for peptone production.

**Keywords: peptone, fish by-product, acid-assisted extraction, growth rate, biomass production**

## 1. Introduction

Indonesia is the third largest country in terms of total aquaculture production (FAO, 2018). In 2017, its production reached 17.22 million tons, and an increase of approximately 37 million tons in 2030 was projected (Ministry of Marine Affairs and Fisheries, 2017). Catfish (*Clarias gariepinus*) and pangas catfish (*Pangasius pangasius*) are aquaculture commodities with high productivity rates. The average growth of catfish and pangas catfish production in Indonesia increased 56.32% and 31.76% from 2015 to 2018, respectively. The total catfish production reached 841.75 thousand tons in 2017 and increased by approximately 1.81 million tons in 2018 due to the biofloc program. The production of pangas catfish increased from 245.75 thousand tons in 2017 to 492 thousand tons in 2018 (Ministry of Maritime Affairs and Fisheries, 2018). Both catfish and pangas catfish are commercially important species from an industrial point of view. They are usually used for fillet production as raw materials in meatballs, fish cakes, nuggets and other diversified fish products; meanwhile, by-products, especially the head portion, are used as low added-value products. The heads of catfish and pangas catfish weigh approximately 27.49% and 43.28% of the total catfish weight, respectively (Ningsih et al., 2011). These by-products can be served

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# Growth Rate and Histamine Production of *Klebsiella* sp. CK02 Isolated from Skipjack Tuna Compared with *Morganella morganii* ATCC 25830 at Various Incubation Temperatures

**Aldino Dityanawarman[1], Indun Dewi Puspita[1]*, Susana Endah Ratnawati[1], Nurfitri Ekantari[1], and Mark Tamplin[2]**

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**Abstract**

One of an important quality parameter in tuna is the level of histamine content. The contamination of histamine in tuna is mainly due to the activity of histidine decarboxylase produced by the bacteria. A rapid growth of histamine producing bacteria is correlated with the practice of temperature abuse during handling. This study aimed to develop predictive growth modeling of two histamine-producing bacteria in the function of temperature. The growth and histamine production of *Klebsiella* sp. CK02 and *Morganella morganii* ATCC 25830 at various temperatures were measured in tryptic soy broth histidine (TSBH) and tuna fish infusion broth (TFIB) growth media. Broths were incubated at 4°C and 15°C for 7 days, and at 30°C and 40°C for 24 hours. The Baranyi and Roberts model was used with DMFit to determine primary growth kinectics, and the Ratkowsky square root model to describe bacterial growth rate as a function of temperature. Histamine production was enumerated by the apparent yield factor ($pY_{his/CFU}$) value. Growth rate increased with temperature, with a maximum rate at 40°C for *Klebsiella* sp. CK02 (0.740 log CFU/h) and *M. morganii* (0.578 log CFU/h). The $T_{min}$ for *Klebsiella* sp. CK02 in TFIB was -8.9°C, indicating better survival in low storage temperature, compare to *M. morganii* ATCC 25830. In addition, *Klebsiella* sp. CK02 produced a lower $pY_{his/CFU}$ at 15 and 30°C compared to *M. morganii* ATCC 25830.

**Keywords: growth rate, temperature, histamine, *Klebsiella* sp. CK02, *M. morganii* ATCC 25830**

## 1. Introduction

*Scombridae* and *Scomberesocidae* fish commonly have a high concentration of the amino acid histidine (Rawles, Flick, & Martin, 1996). During fish spoilage, bacteria can produce decarboxylase, an enzyme that converts free histidine and other amino acids into histamine and other biogenic amines, two substances frequently used as fish quality indicators (Lehane & Olley, 2000), as well as food safety indicators due to the toxic effects of histamine (Sumner, Ross, & Ababouch, 2004). Histamine-related toxication, known as histamine fish poisoning (HFP), is often associated with consumption of seafood (Rawles et al., 1996). Histamine production in fish is mainly caused by improper handling temperature, which causes the growth of histidine decarboxylase (HDC)-producing bacteria or histamine-producing bacteria (HPB) (Lehane & Olley, 2000). Sumner et al. (2004) reported that common HPB are from the Enterobacteriaceae family, such as *Hafnia, Klebsiella*, and *Morganella*, as well as from the Bacillaceae family, with varied abilities of histamine production among species. *Enterobacter aerogenes, Morganella morganii, Photobacterium damselae, Raoultella planticola,* and *R. ornithinolytica* can produce >1,000 ppm histamine, whereas *Citrobacter freundii, Escherichia coli, Hafnia alvei,* and *Vibrio alginolyticus* generate low histamine levels of <500 ppm, under similar culture conditions (Björnsdóttir-Butler, Bolton, Jaykus, McClellan-Green, & Green, 2010). Among HPB species, *H. alvei, Klebsiella pneumoniae,* and *M. morganii* have been isolated from fish samples that allegedly caused scombroid poisoning (Rawles et al., 1996). Moreover,

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