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ARTICLE EXAMINATION ON THE USE OF PCALAMARI INK FOR Synthetic Colorants AND Medical products

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ABSTRACT

A large portion of Indonesia's GDP comes from the sale of squid. Squid is a common ingredient in many cuisines throughout the world. Products made from frozen or dried squid are common for export. Squid ink is one possible waste product of these processes. The purpose of this page is to provide a concise overview of the chemical components of squid ink and its possible applications in the fields of non-food goods, biologics, and natural colours. Pigments, proteins, lipids, and hyaluronan extracted from squid may have anti-tumor, anti-cancer, and anti-bacterial properties in the medical area. That may turn out to be one of the things learned in the probe. Squid ink has potential non-food uses beyond its current usage in East Nusa Tenggara's indigenous ikat woven material items and medicines.

***Keywords**: Indonesia, ink, product, chemical, fishtech, products, bioactive*

INTRODUCTION

The value of Indonesia's annual fish exports is rising since the country is the world's most widespread island nation, which naturally has a plethora of marine things (BPS 2022). Trade map data from the Foreign Trade Center places squid, tentacles, and octopus exports at number three, just behind crustaceans and sardines. 6.0% of total Indonesian fish exports, totaling $104.9 million, were accounted for by supplementary data (Kementerian Kelautan and Perikanan – Indonesia, 2021).

In the global squid market, Indonesia is a major player. For culinary purposes, squid is a common ingredient. Squid is often transported in one of two forms: frozen or dry. To illustrate the potential for waste creation, consider the case of squid ink as an example.

The ink sacks and shells from squid are generally thrown away during processing because of the widespread misconception that canned crab is useless. The meat of the squid is the part that is consumed and used the most. Sadly, squid oil is often thrown away after processing. Wasabi sauce is widely consumed in Japan, and the fish it is served with is revered for its nutritional value (Sasaki et al.,1997).

There are many organic elements in discarded smoked had to dock that might be damaging to the ecosystem if not properly used (Dislautkan Kab. Starch 2013). Studies have shown that polenta waste contains a variety of chemical compounds that might alter the flavour and odour of groundwater. Environmental contamination and foul odours will result from squid oil use. The goal of this article is to survey the many applications of squid oil beyond the food industry, including biotechnology and natural dyes.

Squid material's unique set of chemicals

The colored sac of a squid is immediately recognizable since it begins above the big intestine and empties into an area close to the anus. Squids are classified as cephalopods. The melanogenesis pigment is a protein called melanoprotein. It has a mean concentration of 85%, a protein content of 6.6%, a fat content of 0.8%, and a nutrient content of 0.8%. Melanin may be found naturally in squid ink. The findings of Agusandi et al. (2013) provide evidence in favour of this notion.
High amounts of antioxidants A, hyaluronan, and proteins may be present in squid ink. Squid ink contains 14 chemical compounds, some of which are not required to live. These include the amino group, glutamate, asparagine, glycine, trypsin, and tyrosine. Basic amino acids include lysine, valine, pyruvate dehydrogenase, arginine, aspartate, histidine, methyl, phenylalanine, and hydrochloride. Squid ink milk proteins contain a total of 20 amino acids, with glutamic acid and aminotransferase accounting for the largest share of the non-essential amino acid residues (0.37 and 0.41%, respectively), and phenylalanine and leucine accounting for the largest share of the essential amino acid residues (0.19 and 0.28%, respectively) (Kurniawan 2013).
Scientists have identified several compounds in squid ink melanin, including 5,6-indolequinone-2-carboxylic acid and tyrosinase-related proteins (tyrps) 1 and 2 (Nasution et al. 2017). In addition, the three most common elements — catechin, vitamin B6, and lecithin — were isolated (Idris Affandi et al. 2019).

Squid oil is a potential biomedical ingredient.

Alternative medications of natural origin that efficiently treat polymicrobial illnesses are urgently needed to improve people's quality of life. Because they don't have as many unwanted effects as their synthetic counterparts, bioactive chemicals found in nature are preferable for the health of the host organism.
Products found in the ocean have great potential for modern medicine. Squid, and particularly the ink it generates, is one kind of shellfish with potential medical use. Antiretroviral, cytotoxic, antioxidants, and its capacity to shield cells from harm resulting from treatment are only some of the many therapeutic uses for squid ink, which has been shown to play a vital part in the realm of holistic therapies. Squid ink's ability to kill off harmful microorganisms has also gotten a lot of press. Squid ink extract has been found in recent research to be effective against beta-lactam-resistant strains of K. pneumoniae and E. coli (Bara et al., 2013).
Amiruddin (2013) claims that the high vitamin A levels in squid ink might stimulate the body's natural defenses against cancer. The high peptidoglycan concentration in squid ink makes it effective against cancer and tumours by stimulating the production of more immune system cells.
The capacity of melanin in squid ink to inhibit the activity of plasmin is the mechanism behind the melanin's anti-tumor impact. This increases proteins and makes the immunological system more effective, which kills cancerous cells (Zhong et al. 2009). The material that prevents mutations is derived from a glycoprotein and contains a significant proportion (Delianis et al. 2013). The first phases of research on the potential use of cuttlefish ink as a cancer treatment are now underway.
Squid ink contains melanin, which can attach to ferrous ions+. Ferrous ions+ are the most influential metal atom for accelerating the oxidative degradation of lipids. Because it is composed of 2-carboxyl heterocyclic, melanin can form bonds with Fe2+.
Due to it including DHICA/DHI, which have a great capacity to absorb hydroxyl and -NH structures, squid ink is sure to operate as an antioxidant. This is because of the presence of these two compounds.

The elimination of oxygen gas (superoxide) has an IC50 much lower than that of antioxidant medicines presently available in the marketplace (Carnosin). Because polyphenols are able to attach to free radicals, they are able to block the pathway that leads to the production of low-density lipoprotein from cholesterol. It has been shown that the melanin found in squid ink may enhance the lipid profiles of the blood. When squid ink is consumed, one's total cholesterol, triglyceride level, and cholesterol level may all decrease. However, one's high cholesterol level may increase. The studies conducted by Nasution et al. (2017)

It is possible that squid ink might be used as a pharmaceutical to protect cells during chemotherapy for cancer treatment. This would be accomplished by creating more nucleic cells from leukocyte groups and internal organs. Even Nevertheless, chemotherapy is by far the most often used treatment for cancer. Cyclophosphamine is an essential component in medical practice. It is well known that the medication can destroy normal tissue in a wide variety of body cells; nevertheless, the question of whether or not it can destroy cancer cells and assist the patient in recovering from their condition remains unanswered.

Sustainable Organic Dyes from Spent Squid Oil.

Ikat woven textiles are sometimes embellished with squid ink as a natural colour. Dyes are used in the production of ikat plain weave because they determine the final colour and design of the textile. To lessen the environmental damage caused by synthetic colours, this natural alternative is being used (Nitsae et al. 2017)

East Sulawesi Tenggara, specifically the island of Alor, is utilised as a black dye for ikat woven cloth. Neither the squid nor the ink it produces is altered in any way before usage. During the creation of ikat woven textiles, the ink is successfully applied to the fibers. Powdered squid ink has been developed for the long-term preservation of ink as a dye of woven garments (Merpiseldin et al. 2017).

Liquid squid ink colouring chemicals are sensitive to organoleptic changes, such as developing a strong fragrance that suggests the ink is reactive with ambient temperature settings, making long-term storage problematic. Due to this, drying is required to generate efficient dye powdery granules that may be kept longer while functioning as a natural colorant for ikat woven textiles. Squid ink granules do not readily dissolve in water. Thus, it requires other applications as well.

As a natural colorant, squid ink may be prepared in the following methods. First, transfer the oyster sauce from the octopus bag into the allocated container. After weaving, the following process is dying the fabric. The fabric is submerged in an alum solution (at a concentration of 10 percent) at 45 degrees Temperature for an hour while being continuously agitated. After cooling to average Temperature, the twelve-hour immersion process resumed (25 o C – 27oC). Before even being hung to dry, the cloth is taken out of the washing machine and put through a series of hot and cold water cycles. Squid ink is used to colour the cloth once it has been cured. To keep the squid ink used in the dying process for animal print is woven fabric from fading over time. It is "fixed" using a chemical. In this context, K2SO4 refers to a kind of splint. A few more include Al2(SO4)3, FeSO4 (Tanjung), and Ca(OH)2, and. Colour may be "repaired" to make it more permanent and resistant to fading. Dyes that have entered synthetic fibers must be deactivated and activated using a fixator (Kartikasari and Susiati 2016).

CONCLUSION

Squid ink has been shown to have antiviral, anticancer, and antibacterial characteristics. These benefits are likely because to the high discoloration, protein, lipid, and glycoprotein content of the ink. Ikat woven fabric goods, which contain squid ink in addition to its various applications in the culinary and medical

sectors, are native to the Indonesian area of Nusa Tenggara Timur, which is located in the eastern part of the country.

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