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Effectiveness Analysis of the Utilization Liquid Smoke Distilled from Organic Materials as an Alternative to Preservation Fish

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Abstracts

Liquid smoke is alternative preservation fish that does not cause pollution and does not damage the respiratory organs. Liquid smoke contains antibacterial and antioxidant so that it can preserve fish that have a fast rot character. This study aims to determine the characteristics and effectiveness of using liquid smoke as an alternative to preserving fish. The research method applied in preserving fish using liquid smoke is soaked; soaked and dried; and soaked and aerated. The variables in this study include the combination of bay leaves, lemongrass, and galangal; Pandan leaves; and tuna. The results showed that the characteristics of the liquid smoke of bay leaves, lemongrass and galangal and pandan leaves were almost the same clear color, the level of viscosity was like water, and the smell of smoke flavor each stung the distinctive aroma of organic matter. Based on data analysis, it was found that an effective way to use liquid smoke in replacing traditional fumigation was to soak it than dried in the sun. This is because soaking can increase antibacterial activity while drying can reduce water content in fish.
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Key words: distillation; liquid smoke; bay leaves, lemongrass, and galangal; pandan leaves.

1. Introduction

Reference [1] since increase of the fish production every year, the growth rate of fisheries production in 2015 to 2017 is 3.97% per year, so the development of processed fish must continue to be optimized. Reports on fisheries production in 2015 reached 22.31 million tons consisting of 6.68 million tons of capture fisheries and 15.63 million tons of aquaculture. In 2016, fishery production increased to 23.5 million tons, namely capture fisheries by 6.831 million tons and aquaculture by 16.68 million tons. In 2017 total fishery production increased and reached 24.21 million tons. This production consists of 17.22

eat the fish. Pandan leaves are usually used as a deodorizer and natural green giver in food. The distinctive aroma of pandan leaves arises because of the presence of a phenyl alanine derivative compound, 2-acetyl-1-pyrroline [12].

Table 4. Physical Properties of Fish with Preservation Method 2

PRESERVATION RESULTS				
Days to-	**Liquid smoke of bay leaves, lemongrass and galangal**	**Liquid smoke of pandan leaves**	**Given Salt**	**No Preservation**
2	smell of bay leaves, lemongrass, galangal; slightly soft texture	pandan odor; crowded by ants; slightly soft texture	smell of salted fish; slightly soft texture	fish special odor; slightly soft texture
4	fish odor; rather hard texture	Fish odor; crowded by ants; rather hard texture	smell of salted fish; rather hard texture	fish odor; soft texture
6	fish odor; rather hard texture	fish odor; rather hard texture	smell of salted fish; rather hard texture	maggots appeared
8	fish odor; rather hard texture	fish odor; rather hard texture	smell of salted fish; rather hard texture	-

The third method is fish soaked in 10 ml of liquid smoke for 60 minutes, then aerated for 7 hours and stored in plastic. The results of observations can clearly be seen in Table 5.

Based on observations in methods 2 and 3, it was found that fish that were soaked in each type of liquid smoke after being dried in the sun still had a distinctive odor from the organic material is used. In addition, with both its two methods, the process of preserving fish is more effective than method 1. This is because in method 1, the fish is watery and increasing bacterial activity.

Table 5. Physical Properties of Fish with Preservation Method 3

PRESERVATION RESULTS				
Days to-	**Liquid smoke of bay leaves, lemongrass and galangal**	**Liquid smoke of pandan leaves**	**Given Salt**	**No Preservation**
1	smell of bay leaves, lemongrass, galangal; very soft texture	pandan odor; very soft texture	smell of salted fish; soft texture	fish odor; soft texture
2	fish odor; soft texture	fish odor; soft texture	smell of salted fish; soft texture	fish odor; soft texture
3	slightly rotten odor, soft texture	slightly rotten odor, soft texture	slightly rotten odor, soft texture	smell bad, maggots appear
4	smell bad, maggots appear	smell bad, maggots appear	smell bad, maggots appear	smell bad, maggots appear

As a whole it can be stated that method 2 is the most effective in the preservation fish. In method 3, fish can only last up to 4 days because the water content in fish is still slightly reduced so that bacterial activity is still high. The process of preservation of fish using liquid smoke with aerated will only reduce a little water content in fish, bacterial activity can be eliminated if using the edible coating method and then the fish are kept frozen [13].

It is clear that liquid smoke from bay leaves, lemongrass, and galangal; and pandan leaves can be used to preserve fish with a

distinct distinctive aroma. The main content of bay leaves and lemongrass is citral which can be used as a fish preservative as well as deodorizing fish. In addition to citral, bay leaves also contain tannins, flavonoids, and the content of nerolidol which influences the distinctive aroma of bay leaves [14]. In lemongrass besides citral there are also content of citronellal, methylheptane, n-decyl aldehyde, linalool, geraniol [15]. The role of galangal as a food preservative is inseparable from the ability of galangal which has antimicrobial activity. Reference [16] the results show of stated that galangal contains essential oils in the rhizome, containing saponins, tannins and flavonoids. Phenolic compounds and flavonoids are sources of natural antioxidants that are usually found in plants.

Fragrant of pandan leaves can also be used to preserve fish or other food products because fragrant pandan (Pandanus amaryllifolius Roxb) contains alkaloids, saponins, flavonoids [17]. The statement is also supported by other results study which states that pandan leaves contain flavonoids, alkaloids, saponins, tannins, polyphenols, and dyes which are thought to have contributed to antibacterial activity [18].

Each substance in pandan can be known to be able to play a role as free radicals or as a natural antioxidant [19]. Antioxidants can be used to repair tissue cells, enhance the immune system, enhance anti-aging effects, and can protect nerves. Besides flavonoids, there are also alkanoid substances in pandanus and have been proven to have the ability to regenerate damaged pancreatic β cells [20].

4. Conclusion

Based on the results of research that has been done, it is found that the characteristics of liquid smoke of bay leaves, lemongrass and galangal; and pandan leaves are almost the same, namely clear color, level of viscosity such as water, and the odor of vapor is very strong each other's distinctive aroma of organic matter. From the results of the analysis of the effectiveness of the use of liquid organic matter smoke in fish preservation is the most effective method of preservation of fish is the method of soaking and drying in the sun. In this method, the water content is completely gone so that bacterial activity in fish is very low.

Suggestion

To improve the results in this study, the authors suggest conducting research with the same treatment in each method. In methods 2 and 3 there are 4 different treatments namely fish given liquid smoke from bay leaves, lemongrass, galangal; given liquid smoke from pandan leaves, given salt; and without any additions. Method 1 should also be treated with 4 different treatments so that the assessment of results is more optimal.

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References

[1] Kementrian Kelautan dan Perikanan Republik Indonesia, “Laporan Tahunan Kementrian Kelautan dan Perikanan Tahun 2017”, Jakarta: Kementrian Kelautan dan Perikanan RI, 2018.

[2] Haji, A. G., Z. A. Mas’ud, B. W. Lay, S. H. Sutjahjo, & G. Pari, “Karakterisasi Asap Cair Hasil Pirolisis Sampah Organik Padat (Characterization of Liquid Smoke Pyrolyzed From Solid Organic Waste)”, *J. Tek. Ind. Pert.,* vol. 16, no. 3, pp. 111–118, 2007.

[3] Fatimah F. & S. Gugule, “Penurunan Kandungan Benzo (a) pirena Asap Cair Hasil Pembakaran”, *Chem. Prog.*, vol. 2, no. 1, pp. 15–21, 2009.

[4] C. Luditama, “Isolasi dan Pemurnian Asap Cair Berbahan Dasar Tempurung dan Sabut Kelapa Secara Pirolisis dan Distilasi”, *Skripsi*, Bogor: Fakultas Teknologi Pertanian, Institut Pertanian Bogor, 2006.

[5] Sutin, “Pembuatan Asap Cair dari Tempurung Kelapa dan Sabut Kelapa secara Pirolisis serta Fraksinasinya dengan Ekstraksi”, Bogor: Institut Pertanian Bogor, 2008.

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[6] S. Budijanto, R. Hasbullah, S. Prabawati, Setyadjit, Sukarno, & I. Zuraida, "Identifikasi dan Uji Keamanan Asap Cair Tempurung Kelapa untuk Produk Pangan", *Jurnal Pascapanen,* vol. 5, no. 1, pp. 32–40, 2008.

[7] M. D. Guillen, P. Sopelana & M. A. Partearroyo, "Polycyclic Aromatic Hydrocarbons In Liquid Smoke Flavorings Obtained From Different Types Of Wood, Effect Of Storage In Polyethylene Flasks On Their Concentrations",*J Agric Food Chem,* vol. 48, pp. 5083–6087, 2000.

[8] S. Husseinsyah & M. Mosthapa, "The Effect of Filter Content on Properties of Coconut Shell Filled Polyester Composites", *Malaysian Polymer Journal,* vol. 6, no. 1, pp. 87–97, 2011.

[9] J. M. Lingbeck, P. Cordero, C. A. O'Bryan, M. G. Johnson, S. C. Ricke, & P. G. Crandall, "Functionality of Liquid Smoke as an All-Natural Antimicrobial in Food Preservation", *Meat Science*, pp. 197–206, 2014.

[10] H. Noviani, "Pengembangan Teknologi Kemasan Atmosfer Termodifikasi pada Penyimpanan Fillet Ikan Mas Segar Menggunakan Edible Coating dari Karagenan", Bogor: Departemen Teknologi Hasil Perikanan IPB, 2004.

[11] JJ. Connell, "Control of Fish Quality Second Edition". England: Fishing News Books Ltd, 1980.

[12] A. F. Faras, S. S. Wadkar, & J. S. Ghosh, "Effect of Leaf Extract of Pandanus Amaryllifolius Roxb On Growth Of Escherichia Coli and Micrococcus (Staphylococcus) Aureus", *International Food Research Journal,* vol. 21, no. 1, pp. 421–423, 2014.

[13] F. A. Azzahra, R. Utami, & E. Nurhartadi, "Pengaruh Penambahan Minyak Atsiri Lengkuas Merah (Alpinia purpurata) pada Edible Coating terhadap Stabilitas pH dan Warna Fillet Ikan Patin Selama Peyimpanan Suhu Beku", *Jurnal Teknosains Pangan,* vol. 2, no. 4, pp. 32–38, 2013.

[14] Sembiring, B. Sofianna, Winarti, Christina. "Identifikasi Komponen Kimia Minyak Daun Salam (Eugenia Polyantha) Dari Sukabumi Dan Bogor", Repositori Publikasi Kementerian Pertanian RI, 2003.

[15] Zaitun, R. Khathir, R. Agustina. "Penyulingan Minyak Atsiri Sereh Dapur (Cymbopogon citratus) dengan Metode Penyulingan Air-Uap", *Jurnal Ilmiah Mahasiswa Pertanian Unsyiah,* vol. 1, no. 1, pp. 1009–1016, 2016.

[16] Firmawanti M., Mamik S.M, Rumondang M, dan Verdiana M.R.M, "Isolasi Minyak Atsiri Lengkuas Merah". Jurusan Kimia, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Diponegoro, Semarang, 2009.

[17] S. Dalimartha, "Atlas Tumbuhan Obat Indonesia Jilid 1", Jakarta: Trubus Agriwidya, 2009.

[18] Y Arisandi & Y Andriani, "Khasiat tanaman obat", Jakarta: Pustaka Buku Murah, 2008.

[19] A. Lugasi, J. Hovari, K.V. Sagi & L. Biro, "The Role of Antioxidant Phytonutrients In The Prevention of Disease", *Acta Biologica Szegediensis*, vol. 47, pp. 119–125, 2003.

[20] F. Arjadi & P. Susatyo, "Regenerasi Sel Pulau Langerhans pada Tikus Putih (Rattus norvegicus) Diabetes yang diberi Rebusan Daging Mahkota Dewa", *Phaleria macrocarp (Scheff.) Boerl,* vol. 2, no. 2, 2010.

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