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Different times of smoked traditional toward organoleptic value product of tuna se'i (smoked fish) during storage at room temperature

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ABSTRACT

Fish product tuna se'i (smoked) as a hot smoked product from tuna fish or *Yellowfin* fresh or frozen loin. Step processing starts from thawing from the frozen loin, cutting long form like the stick average 15-20 cm long, wide 2.5-3 cm, and thickness as 2.5-3 cm, local name the fish form is" laloak", it is soaked during 30-45 minutes in brine solvent with ingredient pepper, laid on the rack in the traditional oven cement, product distance high from smoke source is 100 cm. Special privilege from product tuna se'i is appearence, taste, colour and special flavour. The research showed using treatment of different time (2 hours, 3 hours 4 hours, 5 hours and 6 hours) smoked traditional toward organoleptic value with sensory test, during storage 10 days at room temperature, showed different level value of sensoriy or organoleptic test. At the 6 hours smoking time treatment showed as level sensoriy value (favourite from panelis) or organoleptic test was higher than others. Value of sensory test sequent as colour (8.8); flavor / odor (8.6); taste (8.9); and texture (8.7). After product tuna se'i has packaging with vacum plastic (polietilene) combine with alumunium foil (standing pouch), and storaging product during ten days at room temperature, have make decresed of sensoric value and sequent test as colour (6.9); flavor (6.70; taste (6.8) and textur (6.8) that was still on Standard Nasional Indonesia with minimal value was 7 and still on panellist favourite.

Key words: *Se'i, smoked, Sensoric, Standing pouch, Plastic PE, Vacum*

Introduction

Tuna se'i (smoked) have been known in community in Kupang - East Nusa Tenggara since 2007, this product has adoption from specific smoked meet from land animal like beef smoked. Tuna se'i have been making with step process has cutting long form like the stick average as 15-20 cm long, wide as 2,5-3 cm, and thickness as 2,5-3 cm, local name the fish form is "laloak" (a cut of tuna fish meat like a long special for smoked process), a cut of tuna fish meat to smoke use kesambi cut of tree or coconut shell as a smoke source. Tuna se'i as a diversification of fishery product has a good prospect economic value. Tuna se'i has a ready to eat food, mostly have been quality standard according to Indonesia Quality Standard (SNI (2013), smoked fish processing with combined of temperature and time sufficient in the special oven, to form of coagulation of fish meat protein, have a purpose to kill micro-organisme like parasite, pathogen bacterie, as hazard for human health. Smoking time approximately 5-7 hours at temperature 90°F (32 °C) and than to increase of temperature until 150°F or 160°F

(65-71 °C), effort and smoking procedure and processing have a purpose to vaporize water content at fish meat, and avoid of product rift and shelf life.

Smoked fish as processing fish procedure with smoke as hot resource and all at once drying product to purpose decrease of water content of fish meat, have effect to quality about nutrition, proximate value and shelf life product, effort have using spacific of time as important to analysis how to relation smoked processing with smoked product quality.

This research was conducted to analyze the effect of different smoking time on organoleptic value tuna se'i product, during storage at room temperature. Hot smoking product should have meat witha a good texture and cushy, preferred than cold smoked product, but more moist than grilled product, mostly the hot smoked fish to cut like a cube form (Petterson, 2004). Commonly known the hot smoked product as a popular because that is simple to processing in the smoked house (Kenneth Hilderbrand, Jr., 1996; Lesllie Shallcross, 2017).

Smoke have a role important to make forming colour, texture and taste. Carbonil primary smoke compound as phenol. Roles of smoke give influence towards organoleptic value, cause the reaction about acid compound from phenol with lipid, protein and carbohydrate (Cardinal *et al*., 2006).

Hot smoked fish method have been processing in sequence as smoked to follow cooking. Smoking time has aproximatly 5, 6, and 7 hours at temperature 32.2 °C, and then temperature increase until 65.5 °C and cooking, the smoked fish procedure was succsess when water content at fish meat has vapour to prevent of broken texture and avoid shelf life of storaging time.

After smoked fish processing, packaging tuna se'i product with polyethylene plastic vacuum combined with alumunium foil (pouch packed), product has storaging at room temperature (24-30 °C) before consumption.

Materials and Methods

This esearch have been done at smokehouse tuna se'i . small scale group "MD Batu Kapala" – Nunhila Village- Kuoang City – Organoleptic test (sensory test and hedonic test) at Exacta Laboratory of Artha Wacana Christian University, Kupang, East Nusa Tenggara.

Equipment

Equipment as traditional oven, tools of organoleptic test (dish, tissue paper, water) stationary, camera

Substance

Substance as loin tuna fish, salt, pepper, coconut skull, kesambi leaf, freshwater, ice, polyethylene plastic combine with alumunium foil package (standing pouch).

Methods of research as experimental research, as quantitative experimental. Treatment used was different smoked hours (2,3,4,5 and 6 hours), continously packaging step with standing pouch (polyethylene) vacuum packaged combine plastic with alumunium foil and storaging during ten days at room temperature. Sensory analysis with organoleptic test SNI Regulation to know how to level favourite from panelis to consumse.

Experimental Design

Experimental designed have been Complete random design with 5 (five) treatment, 3 (three) times repeated and have 15 (fifteen) samples. Level treatmant is ancient of smoking as : A (2 hours); B (3 hours); C (4 hours); D (5 hours); E (6 hours)

Experimental Design

Treatment design of experimental units using random. as shown in Figure 1.

Group I				
1A1	2B1	3C1	4D1	5E1
Group II				
6E2	7C2	8B2	9D2	10A2
Group III				
11D3	12B3	13E3	14A3	15C3

Fig. 1. Experimental design.

Where:
A, B, C, D dan E: Treatment
Angka 1 - 3 : Repeated number
Angka 1 - 15 : Randome number.

Mathematics Model

Mathematics model with basic complete random design according to Gaspersz (1996) :
$Y_{3} = \mu + \delta i + \beta j + \epsilon_{ij}$;

Where:

Y_{ij} = Observation value at smoking treatment as – i at group – j
μ = Mean value using smoked hours
α_i = Treatment effect as–i
δi = Effect group as-i
βj = Effect group as-j
ϵ_{ij} = Galat effect at using smoked hours as–i at repeated as–j.

Friedman analysis :

$X^2 = 12/ Nk(k+1) \Sigma R(J)^2 -3N(k+1)$

Where:

N = Number of line
K = Number of column

Procedure

The research procedure follows the following steps: Frozen tuna loin as a raw material for processing tuna se'i; Thawing process during 3-4 hours not submersed in the freshwater purpose not loosing nutrient, after thawing, laid on clean cutting board, cutting tuna loin according measure:l*w*t (long*width*thickness) = 15cm*3cm*3cm (like traditional cutting meat "lalolak") or stick; Stick meat tuna fish laid on clean tray and separated; Using brine 10% appropriate weight of tuna mea (meat of fish tuna meat 10.000g: salt 250g: fresh water 5 l: 5000g block ice; Tuna meat (stick cut form) soaked in the stainless steel bowl with cool brine during 45 minutes; Tuna meat stick cut form to drain well in stainless steel strainer; Prepeared of smoked oven with burning coconut shell and hard tree as source of smoke, let the coconut shell have burning; after smoke oven full of smoked, open the oven and be regulated the stick of cut tuna meat, at special tray in oven with temperature approximatly 75 - 80 °C; the tray in oven distance from source of smoke as 100 cm; Closed the tray with kesambi leaf, and closed the oven let to smoke during one hour, kesambi leaf be appointed, continued smoking proccess to second time for 2 hour; 3 hour, 4 hours; 5 hours; and 6 hours according to treatment; After smoked processing stick cut form tuna as tuna se'i be appointed and separated appropriate with the treatment; Every sample give the special code to packaging with standing poush pakage (polyethylene plastic combine with alumunium foil) and storage; Sample bring to laboratory continously organoleptic test (15 samples), and other sample (15 samples) storage in the room temperature during 10 days; After 10 days every sample (15 samples) using organoleptic test; Analysis and interpertation of result organoleptic / sensory test, appropriate SNI regulation sensory smoked fish

Observation Variable

Variable observation specific, as subjective variable with organoleptic or sensory test (performance/ colour, flavour/odour, taste and texture) and hedonic test appropriate SNI regulation sensory smoked fish. Sensory testing have been done by 25 panellist slighty skilled and scientific.

Results and Discussion

Sensory Test

Acceptance level of consumer toward tuna se'i product using organoleptic/sensory test colaboration with hedonic test using at subjective variable colour, odour/ flavour, taste and texture.

Color

Hedonic scale compare with colour sensory of tuna se'i product, with different smoked hours depth inter 2,3,4,5 and 6 hours treatment is shown in Figure 2.

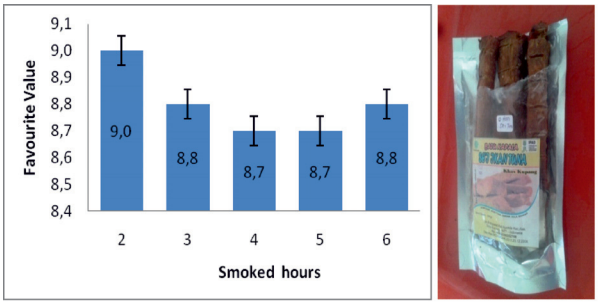

Fig. 2. Diagram result of level panellist favourite toward colour tuna se'i

Figure 2 shows level of panellist favorite toward colour of tuna se'i as smoked different hours, still at value 8.7 until 9.0 means average panellist favourite as likely until very likely, with description as undemaged, glisten sepcific smoked product. Friedman test shows smoking time effect toward level panellist favourite of colour value with Chi Square arithmetic lower than Chi Square Table, that means smoked hours effect toward the same of value panellist favourite inter one tratment and others (2,3,4,5 and 6) hours. Colour effect for smoked product like tuna se'i as assumed those from phenol

compound with aromatic ring as carbolic acid (C_6H_5OH) was soft acid compound in pure condition or phenol compound could be forming solid crystal with specific colour,well born from coconut shell rich cellulose and lignin and the *kesambi* leaf one or other material to catch the smoke during smoking process, could the *kesambi* leaf capable to protect during smoked processing to produce spesific goldy colour of tuna se'i product.

Odor

Hedonic scale compared with odor sensory of tuna se'i product, with different smoked hours depth inter 2,3,4,5 and 6 hours treatment have been shown in Figure 3

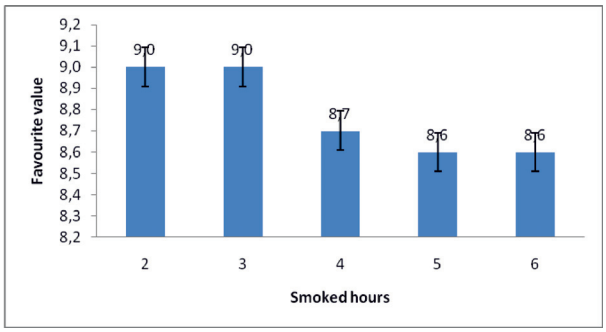

Fig. 3. Diagram result of level panellist favourite toward odor tuna se'i

Figure 3 shows level of panellist favorite toward odor of tuna se'i as smoked different hours, still at value 8.6 until 9.0 means average panellist favourite as likely until very likely, with description as specific smoked fish slighty hard odor to specific hard smoked fish. Friedman test shows smoking time effect toward level panellist favourite odor value with **Chi Square arithmatic lower than Chi Square Table**, that means smoking time effect toward the same of value panellist favourite inter one tratment and others (2,3,4,5 and 6) hours.

Smoked hours treatment not given affects about value of panellist favourite toward tuna se'i odor, that was assumption smoked processing using coconut shell as source of smoke produce carbolic acid (C_6H_5OH) was soft acid compound in pure condition, or phenol compound could be forming solid crystal, well born from coconut shell rich cellulose and lignin and the *kesambi* leaf one or other material to catch the smoke during smoking process, could the kesambi leaf capable to protect during smoked processing to produce not only spesific goldy colour, as well as smoked odor of tuna se'i

Assumption as odor specific smoked tuna se'i was born from cellulose and lignin compound combined with kesambi leaf have been burning when the leaf closed product the traditional oven with proximatle temperature 70-80 °C during smoked processing. Odor of smoked tuna fish (tuna se'i) as specific odor se'i product and that is familiar odor smoked product effect for panellist fovourite to make decision likely or very likely about specific odor tuna se'i

Taste

Hedonic scale compares with sensory taste of tuna se'i product, with different smoking time depth inter 2,3,4,5 and 6 hours treatment have been shown in Figure 4, have shown level panellist favorite toward taste of tuna se'i as smoked different time, still at value 8.6 to 8.9 means average panellist favourite as likely until approach very likely, with description was specific smoked fish slighty hard to slighty smoked fish

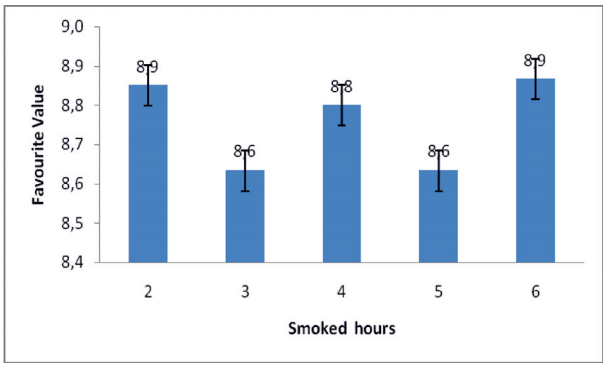

Fig. 4. Diagram result of level panellist favourite toward taste tuna se'i

Friedman test shows smoking time effect toward level panellist favourite taste value with **Chi Square arithmatic lower than Chi Square Table**, that means that means smoking time effect toward the same of value panellist favourite inter one tratment and others (2,3,4,5 and 6) hours.

Smoked from tree consist of several chemical compound make it possible to reactian with food unlimited material, as smoke compound grouping as function smoked produce, like phenolic compound have been contribution to flavour and shelf life product. Specific for smokey flavour to odor and taste became panellist have been decision specific taste of tuna se'i product.

Flavour of tua see'i also effected chemical compound other than phenolic, like free amino acid compound from protein decomposition with salt from steps submersion before smoking processing. Amino acid compounds have a role of taste formation in raw material tuna, like glutamic acid or salty derivative of those 5-nukleotida as if Inosein 5-monofosfat (IMP), guanidin 5-monofosfat (GMP), glisin,alanin, arginin, metionin, valin and prolin (Yamaguchi and Watanabe, 1990; Winarno, 2008).

Texture

Hedonic scale compared with sensory taste of tuna se'i product, with different smoking time depth inter 2,3,4,5 and 6 hours treatment is shown in Figure 5.

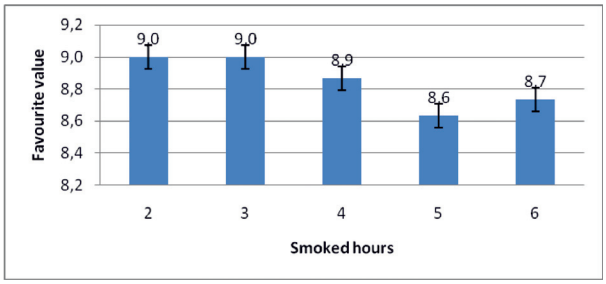

Fig. 5. Diagram result of level panellist favourite toward texture tuna se'i

Figure 5 shows level panellist favorite toward texture of tuna se'i as smoked different time, still at value 8.6 to 9.0 means average panellist favourite as likely until very likely, with description as solid, compact inter tissue as hard firm. Friedman test shown smoking time effect toward level panellist favourite texture value with **Chi Square arithmatic lower than Chi Square Table**, that means that means smoking time effect toward the same of value panellist favourite inter one tratment and others (2,3,4,5 and 6) hours.

Sensory value coverd the colour/performance, odor, taste and texture tuna se'i in the vacuum standaing pouch vacuum pacakge during storage 1o days at room temperature, has shown at Figure 6a,b,c and d.

Figure 6a,b,c and d have shown level panellist favourite toward sensory test covered colour, odor, taste and texture tuna se'i have been decreased appropriate traetment smoking time processing, and during long periode storage at room temperature. Different treatment have been different every sensory attributte value. Average sensory value tuna se'i with every treatment during storage 10 days at room temperature have been shown. Traetment 2

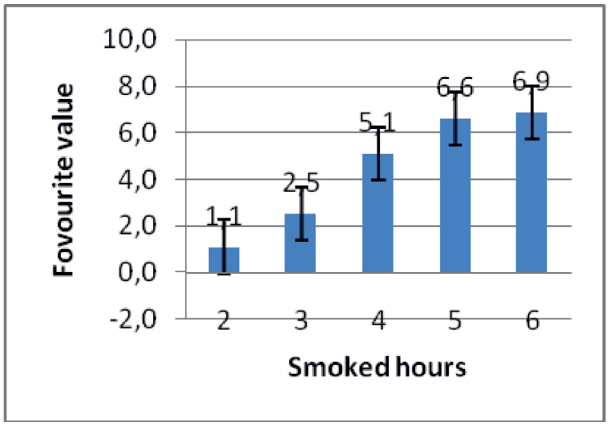

Fig. 6.a Diagram result of level panellist favourite toward colour of tuna se'i after 10 daays storage

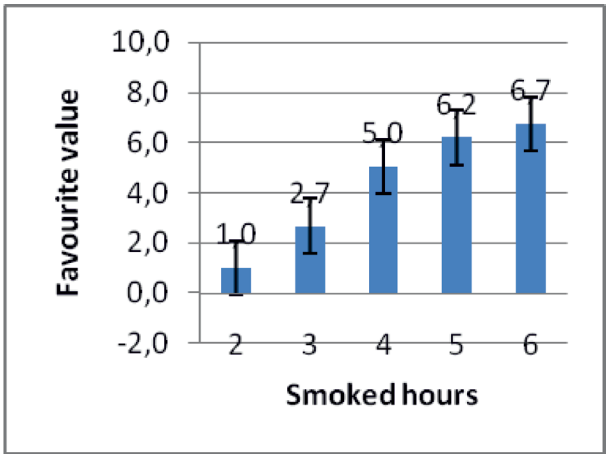

Fig. 6.b Diagram result of level panellist favourite toward odor of tuna se'i after 10 daays storage

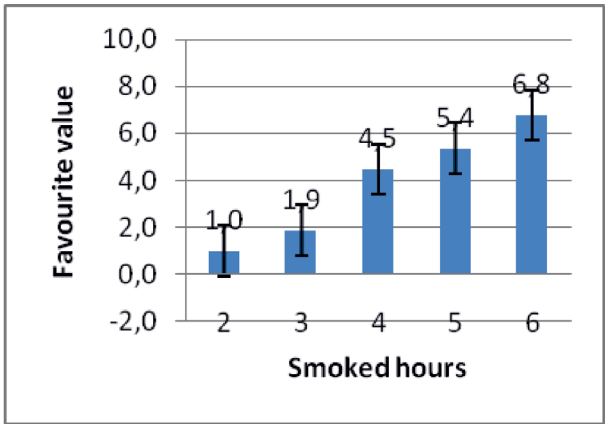

Fig. 6.b Diagram result of level panellist favourite toward taste of tuna se'i after 10 daays storage

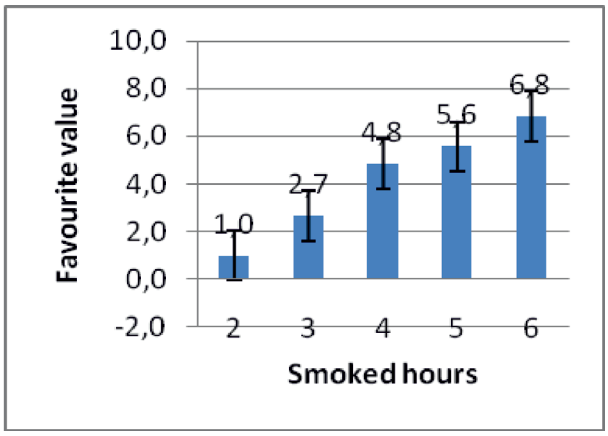

Fig. 6.d Diagram result of level panellist favourite toward texture of tuna se'i after 10 daays storage

hours smoking time have sensory value of colour as 1.0-1.2 that means level panellist favourite very unlikely,with description demage, very dull colour, appearing of white mycelium from fungi growth at surface product. Cause the odor is direct to rancid, testless and texture very soft, inter tissue easy straggling, product is not fit for consumtion.

Tuna se'i with a traetment at 3 hours, panellist has given sensory value avarage 1.9-2.7 that means panellist very not likely until not likely, every sensory value were below standard. The treatment at 4 hours, the panellist has given sensory value as 4.5-5.1 that means average have been still below standard sensory test at not likly until slighty likely. The treatment at 5 hours the panellist have given sensory value over all attribute as 5.4-6.6 that means average slightly likely until likely with description colour still slightly glisen specific smoked product, odor neutral, taste slightly hard, texture solid, compact inter tissue slightly firm. While the last treatment at 6 hours panellist have given sensory value 6.7-6.9 and they prove the treatment 6 hours smoked processing in good, have been sensory value likely with description as proximatly neutral to over all attribute organoleptic tuna se'i (colour, odor, taaste, and texture) during storage 10 days at room temperature (27-35 °C). over all indicated tuna se'i still at sensory value 7 those means produst still neutral according SNI standard and panellist still likely product would have to consummtion. Friedman test affect long period was smoked processing toward hedonic value sensory shown panellist favourite with Chi Square value arithmatic higher than Chi Square Table. This means the treatment 2,3,4,5, and 6 hours have given different effect toward organoleptic/ sensory test over all attribute (colour, odor, taste and texture) during storage of 10 days at troom temperature, and the treatment of 6 hours smoked processing have been proven, tuna se'i product fit for consumtion according to panellist, compared with SNI regulated Standard of Indonesia for smoked fish.

Conclusion

Using different smoking time has proven effect toward value of sensory test, the sequence as colour (8.8); flavor (8.6); taste (8.9); and texture (8.7). After product tuna se'i has packaging with vacum plastic (polyethylene) combined with alumunium foil (standing pouch), and storaging product during ten days at room temperature, have make decresed of sensory value and sequent test as colour (6.9); flavour or odor (6.7); taste (6.8) and texture (6.8) that is still on Standard Nasional Indonesia with minimal value is 7 and still on panellist favourite.

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