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Quantitative Descriptive Analysis of Sambal Terasi, an INDONESIAN dish, in relation to its free amino acids profile

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- ***Terasi***
  => Traditional fermented salt paste of Indonesia
  => Condiment made from planktonic shrimp *(rebon)*
  => Products similar: *belacan* Malaysia; *kapi (Thailand & Cambodia); bagoong-alamang* (Philippines); *Mam ruoc, Mam tom (Vietnam) jeotgal/jeot* (Korea); *ngapi seinsa or hmyinnga-pi* (Myanmar).

- **Many typical flavors: fermentation & storage give variation and typical flavor in food**
- **Glutamate, proline, glycine, leucine, isoleucine, alanine, arginine, valine, methionine are believed as the taste active components in several fish and fisheries products**

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=>**The sensory attributes: *nasi goreng belacan* (*belacan* fried rice), *asam pedas* (tamarind flavored dish), sambal belacan (chilli belacan), kangkong goreng belacan (stir fried water convolous) (Jinap et al., 2010)**

=> Indonesian dishes: identity & taste distinction>> types of *terasi*, ingredients; preparation (Owen's, 2008); No scientific information about the affect of different type of *terasi* , its FAA to the flavor of *ST* ; the changes during *ST* preparation

=>*Terasi:* regions, family recipe/preferences, raw materials treatment before fermentation (ingredients: the species of shrimp, additional fish; salt quantity); production steps,

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Methods

- ***terasi* (6) from North Sumatera, West Kalimantan, DKI Jakarta, West Java, Central Java, and East Java.**
- **Interviews w/ producers, re-sellers and restaurants**
- ***ST* => standard recipe (modified from restaurants)**
- **10% (DM) *terasi*. The salt (NaCl), adjusted highest Cl^-**
- **FAA determination: Asp, Glu, Asn, Ser, Gln, His, Gly, Thr, Cit, Arg, Ala, Tyr, Val, Met, Trp, Phe, Ile, Leu, Lys, & Pro (OPA & FMOC)**

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Methods

Quantitative Descriptive Analyses of *ST:*

11 trained panelists, 8 females and 3 males of the age 20 to 37 year

Attributes: Sweetness (sucrose), saltiness (NaCl), sourness (lemon and vinegar), bitterness (caffeine), umami (monosodium glutamate), *rebon* (dried *rebon*), and fishy (dried anchovies)

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Methods

SPSS 21

- **Hierarchical cluster analysis, Wards method and square Euclidean distance (measure the similarity) among *STs*.**
- **Sensorial analyses of QDA were subjected to Spearmans correlation test and t-test at the level of $p = 0.05$ to see the possible relationship of FAAs to the taste of *ST***

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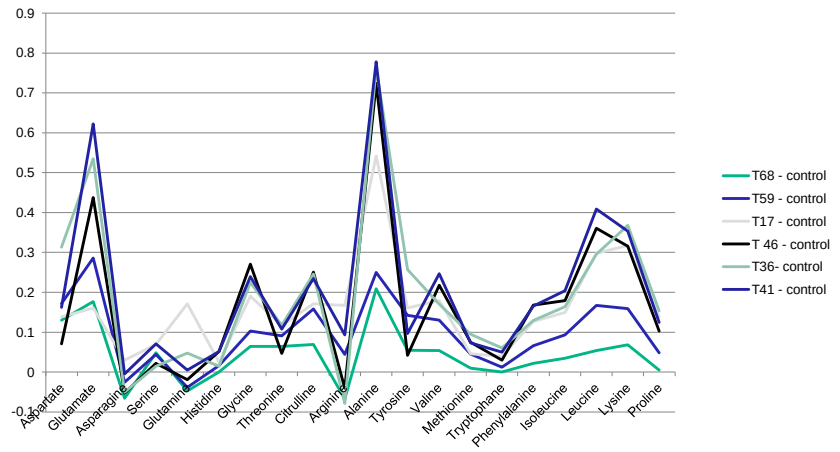
Result and Discussion



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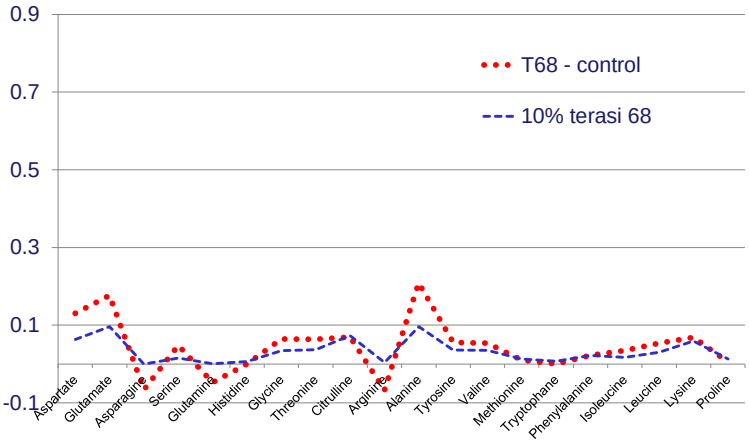

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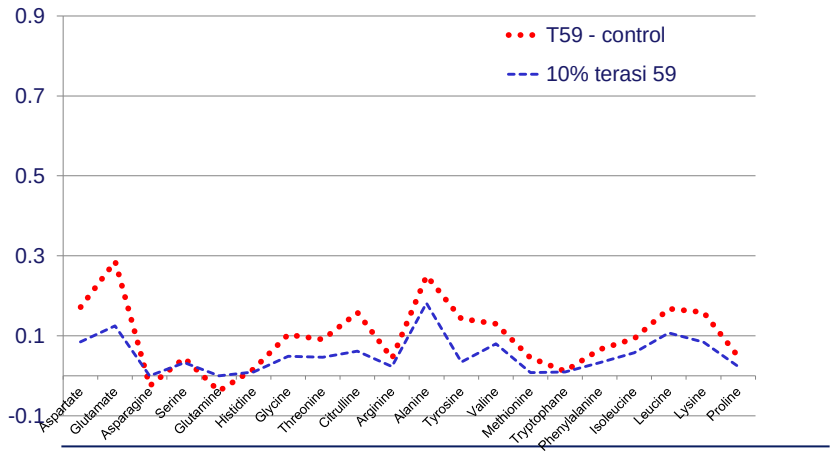

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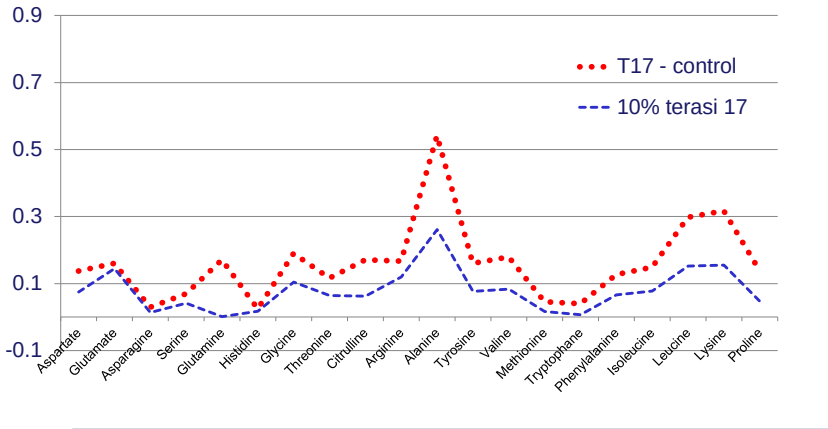

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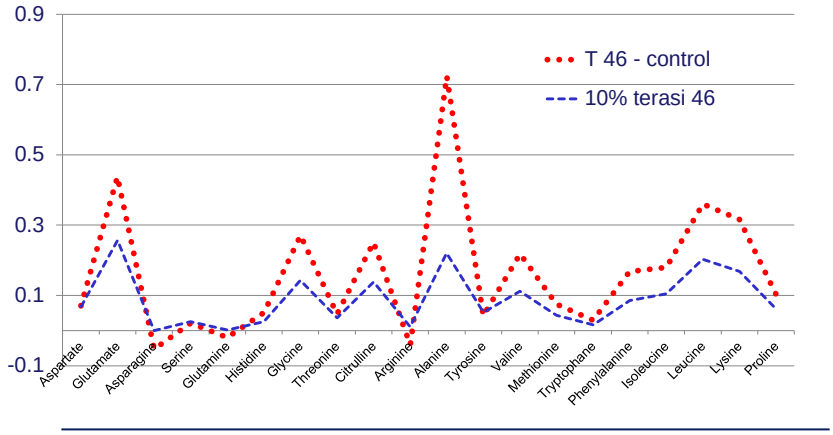

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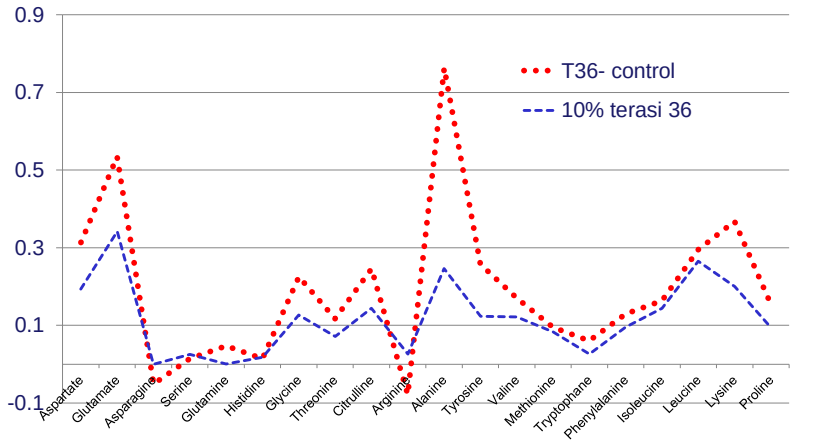

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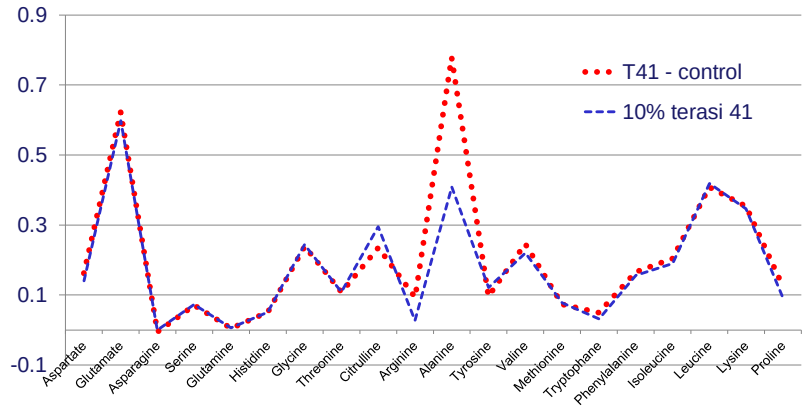

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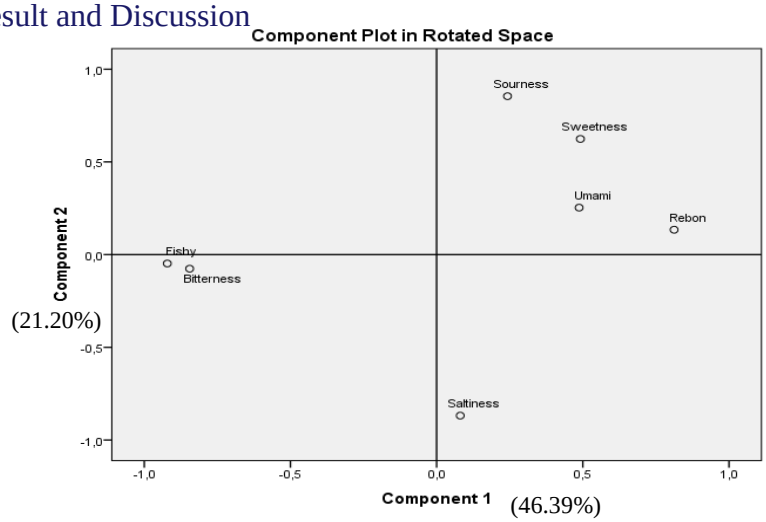

(21.20%)

(46.39%)

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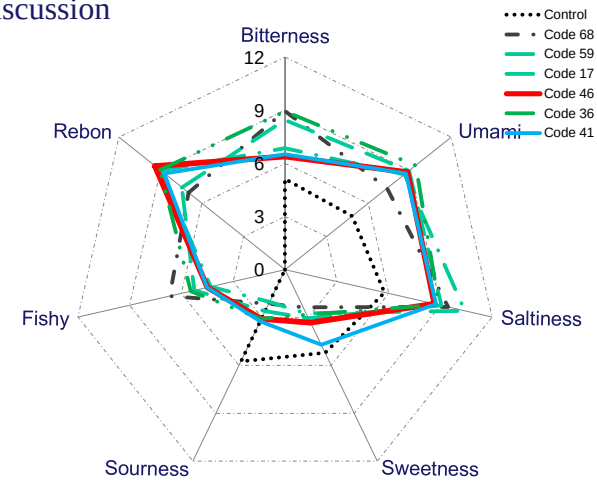

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Compound	Control	Sample 68		Sample 59		Sample 17		Sample 46		Sample 36		Sample 41	
	FAA	FAA	RC	FAA	RC	FAA	RC	FAA	RC	FAA	RC	FAA	RC
Asp	0,12	0,25	2,11	0,29	2,47	0,25	2,18	0,19	1,61	0,43	3,69	0,28	2,39
Glu	0,20	0,38	1,89	0,49	2,43	0,36	1,81	0,64	3,20	0,73	3,68	0,82	4,12
Asn	0,28	0,21	0,77	0,25	0,91	0,31	1,11	0,23	0,81	0,23	0,82	0,27	0,98
His	0,06	0,06	1,00	0,08	1,28	0,08	1,42	0,11	1,87	0,07	1,24	0,11	1,87
Gly	0,01	0,08	6,34	0,11	9,51	0,20	16,78	0,28	23,44	0,24	19,65	0,25	20,82
Arg	0,62	0,55	0,89	0,66	1,07	0,79	1,27	0,58	0,93	0,54	0,87	0,71	1,15
Ala	0,04	0,25	6,67	0,29	7,79	0,58	15,72	0,76	20,66	0,80	21,71	0,82	22,14
Val	0,04	0,10	2,25	0,17	4,03	0,22	5,17	0,26	6,06	0,21	4,95	0,29	6,73
Met	0,01	0,02	2,10	0,05	6,17	0,05	6,25	0,08	9,56	0,10	11,88	0,08	9,36
Phe	0,05	0,07	1,48	0,11	2,44	0,17	3,78	0,21	4,68	0,17	3,83	0,21	4,63
Iso	0,01	0,05	3,37	0,11	7,31	0,16	11,14	0,19	13,18	0,18	12,13	0,22	14,87
Leu	0,03	0,08	2,95	0,20	7,06	0,33	11,78	0,39	14,05	0,32	11,71	0,44	15,79
Lys	0,07	0,14	1,93	0,23	3,15	0,39	5,30	0,39	5,28	0,44	5,99	0,43	5,79
Total	2,01	2,89	1,44	3,97	1,98	5,24	2,61	5,26	2,62	5,85	2,91	6,09	3,03

Sour***MSG*/** | Sour**Bitter* | Bitter*** | Sweet*** | < Threshold

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Spearman's correlation of 6 *ST* flavor (QDA, 11 trained panelists)

Spearman's	Bitterness	Umami	Saltiness	Sweetness	Sourness	Fishy	Rebon
Bitterness	1,000	-,051	,256*	-,573**	-,244*	,775**	-,456**
Umami	-,051	1,000	-,155	,208	,252*	-,180	,404**
Saltiness	,256*	-,155	1,000	-,496**	-,595**	,123	-,171
Sweetness	-,573**	,208	-,496**	1,000	,690**	-,405**	,287*
Sourness	-,244*	,252*	-,595**	,690**	1,000	-,164	,359**
Fishy	,775**	-,180	,123	-,405**	-,164	1,000	-,567**
Rebon	-,456**	,404**	-,171	,287*	,359**	-,567**	1,000

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CONCLUSION:

- Different *terasi* => siginificant variations *ST flavor*
- Alanine, glycine, isoleucine, leucine, and methionine increased chili sauce FAA
- Asn, arg: prominent in base *sambal*; not significant different among *ST*
- *Thr, Cit, Tyr, Trp, Ser, Gln < threshold*
- *Rebon* correlated to glycine, citrulline, alanine, valine, phenylalanine, isoleucine, leucine, lysine and total FAAs
- Umami correlated to glutamate and alanine
- Aroma might interfere and mask the other tastes of *ST.*

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