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Feasibility study and sensory test of turmeric tamarind traditional drink with various processing

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Abstract. Turmeric tamarind traditional drink as anti-oxidant, good for health, and has a potency to developed. The objectives of this study are to determine the feasibility and the favorite level of consumer towards two turmeric tamarind traditional drink which processed differently. Feasibility depended on sensory test and microbe's contamination according to a quality standard of BPOM and complemented with an anti-bacterial test. The anti-bacterial test is determined by a diameter of inhibition zone towards *E coli* and *B subtilis*. Consumer's favorites level is determined by organoleptic test to 40 testers. Sensory test results to form, odor, taste, and color are normal. TPC first traditional drink $6,9 \times 10^2$ col/gr and TKK $\leq 1,0 \times 10$ col/gr, TPC second traditional drink $2,0 \times 10^1$ col/gr and TKK $\leq 1,0 \times 10$ col/gr; all tests toward *E coli*, *Salmonella SP*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *shigella sp* negative/gr; inhibiting capabilities towards *B.subtilis* and *E coli* of first traditional drink > second traditional drink. Inhibiting capabilities towards *B.subtilis* > *E coli*. All parameters comply with BPOM standard. Most of the tester love the first method turmeric tamarind traditional drink.

1. Introduction

Turmeric tamarind traditional drink are one of traditional medicine that more favorable by people today [1]. According to Head of National Agency of Drug and Food Control (BPOM) said that traditional medicine is ingredients of herbs, animal, minerals, galenic or mixing of these ingredients that is heredity has been used as medicine and practical conformity with the norm in the community [2] This statement categorizes turmeric tamarind traditional drink as internal medicine.

Nowadays development of traditional drink is rising. A lot programs in TV and newsprint that gave information about the importance to consume traditional drink. Traditional drink almost gave contraindication for the consumer and has lower price than others medicine (chemical). Back to nature is precise if proclaimed by the government.

Basic ingredients of turmeric tamarind traditional drink are turmeric, tamarind, sugar, and salt. There are some add more with young tamarind's leaves, temulawak, kedawung's seed, and lime juice. Types of sugar that used as sweetener that commons are palm sugar but some uses white sugar even cyclamate (artificial sweetener).

The benefits of turmeric tamarind traditional drink have proved naturally by our ancestors. Curcumin is active content that found in turmeric. As active substance, curcumin is strong anti-oxidant which protect cells from degradation that caused by free radicals [3].



Since that time, curcumin has been reported to have activity for the following indications: anti-inflammatory, anti-HIV, antibacterial, antifungal, nematocidal, antiparasitic, antimutagenic, antidiabetic, antifibrinogenic, radioprotective, wound healing, lipid lowering, antispasmodic, [4] antioxidant, [5] immunomodulating, anticarcinogenic, [6] and Alzheimer's disease [7].

Tamarindus indica (tamarind) contains of chemical substance saponin, flavonoida, and tannin. Could be used traditionally in wound healing, snake bite, abdominal pain, cold, inflammation, diarrhea, helminth infection, and fever. It may also play a role as anti-microbial, anti-diabetic, anti-inflammatory and effects on the control of satiety, playing a potential role in the treatment or prevention of obesity and other chronic diseases [8].

In the Indian subcontinent, Africa, Pakistan, Bangladesh, Nigeria and most of the tropical countries. *T. indica* is preferred to be used for abdominal pain, diarrhea and dysentery, some bacterial infections and parasitic infestations, wound healing, constipation and inflammation. It is a rich source of most of the essential amino acids and phytochemicals, and hence the plant is reported to possess antidiabetic, antimicrobial, antivenomics, antioxidant, antimalarial, cardioprotective, hepatoprotective, antiasthmatic, laxative and anti-hyperlipidemic activity. *T. indica* has ameliorative effects on many diseases [9]. Palm sugar is one of natural sweetener that gave sweet taste and tasty the medicine according to BPOM standard [2].

The method of the processing turmeric tamarind traditional drink is varied. Some of the methods are: a. Turmeric sliced in small pieces mixed with tamarind and sugar, then brewed with boiled water; b. Turmeric shredded, boiled up, add sugar, salt, and tamarind. After boiling, soluble sugar is filtered; c. Turmeric is peeled, sliced in small piece, blended, directly filtered, boiled up add palm sugar, lemon grass and tamarind; d. Turmeric is peeled, sliced, boiled up with palm sugar and salt. Various microbes that could be found in the traditional drink such as *E. coli*, *Bacillus sp*, *Salmonella sp*, *Staphylococcus sp*, *Pseudomonas aeruginosa*, and *Shigella sp*. These contaminants could be in the product by several factors such as unclean processing equipment, ingredients, and water that not comply with the standard, imperfect processing, and contaminated packaging [10].

Turmeric tamarind was produced by the author in homemade scale industries for three years. Subjected consumers are lecturers, students, and public community. Basic ingredients are turmeric, tamarind, palm sugar, and salt. A marketing strategy that used are by order, deposited in an honest canteen, and campus expo. Two methods have performed, the first method is peeled turmeric, sliced, boiled up, blended, filtered, and missed with other ingredients. The second method is peeled turmeric, sliced, blended, filtered, boiled up and mixed with other ingredients.

This turmeric tamarind traditional drink product has big opportunities to be developed. Therefore, a producer has to provide security for the consumers. According to Head of BPOM No.12 year 2014 about quality standard traditional medicine stated that traditional drink should comply with four aspects such as: a. Organoleptic, observation has done towards form, taste, odor, and color; b. Microbe contamination, includes Total Plate Count (TPC) $\leq 1,0 \times 10^4$ col/gr, Total Kapang Khamir (TKK) $\leq 1,0 \times 10^3$ col/gr, *E. coli* Negative/gr, *Salmonella sp* Negative/gr, *Staphylococcus aureus* Negative/gr, *Pseudomonas aeruginosa* Negative/gr, and *Shigella sp* Negative/gr; c. Not use any preservatives, fragrances, and dyw coloring, and; d. Should use the natural sweetener that being suggested.

This turmeric tamarind traditional drink that is produced and start to develop has been tested according to a quality standard of BPOM. In the beginning, this traditional drink was processed using two methods that were filtered performed before boiled up. This method leaves out tainted on the equipment. Therefore, has tried to boil the turmeric before blended and filtered. Based on observation during making process this traditional drink, traditional drink that collected fresher yellow and leaves less tainted on the equipment.

Comments from the consumers for these two traditional drinks which being filtered before boiled or boiled before filtered are same that was: delicious, has strong turmeric taste, and fresh. Producers should obtain the certainty of turmeric tamarind traditional drink quality and determine the best methods to process next turmeric tamarind traditional drink.

Problems Formulation: a) How are the feasibility of turmeric tamarind traditional drinks with differences in two processing method? b) How are the favorite level of consumers towards turmeric tamarind traditional drink with differences in two processing method?

Objectives of this study are: 1) To determine the feasibility of both turmeric tamarind traditional drink with differences in two processing method. 2) To determine the favorite level of consumers towards turmeric tamarind traditional drink with differences in two processing method.

2. Methods

This study including descriptive qualitative study that uses analysis system. This study consists of 3 (three) phases: processing of traditional drink; microbe's contamination test, organoleptic test; and analysis of data. Processing of turmeric tamarind traditional drink uses two methods. The first method which was used is: peeled turmeric is rinsed then sliced in small pieces, boiled it up, blended it, filtered it out and mixed with tamarind stewed water, coconut sugar and salt. The second method which was used is: peeled turmeric is rinsed then sliced in small pieces, directly blended using water, filtered it, boiled it up, and mixed with stewed tamarind water, coconut sugar and salt.

Microbe's contamination test such as Total Plate Count (TPC), Total Kapang Khamir (TKK), *E. coli*, *Salmonella sp.*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Shigella sp* and complemented with an anti-bacteria test. Contamination test procedures begin with sterilization of the equipment; making of any specific media and sterilization; dilution of traditional drink series and inoculation; incubation; observation and determine the amount microbe's colony; and analysis of observation the results according to BPOM quality standards [1]. Anti-bacteria test performed by dripped the turmeric tamarind traditional drink sample to the pit that created in each media which has inoculated by *E coli* and *B subtilist* bacteria. The capability of turmeric tamarind traditional drink to suppress the bacteria growth is determined by the diameter of inhibition zone.

Sensory test with organoleptic technique to determine the feasibility of traditional drink is focused on 4 (four) aspects according to BPOM quality standards such as odor, taste, color, and shape. Sensory test to determine consumer's favorite level toward turmeric tamarind traditional drink is focused on 8 (eight) aspects such as color, consistency, aroma, turmetic taste, tamarind taste, blended taste of turmeric tamarind and sweet, and blended taste of sourness and sweet. An instrument which used is questionnaire in the form of the favorite scale with categories from the likest to the most hateful. 40 persons participate as a tester with details 14 persons are the lecturer, 14 persons are students, and 12 persons are common people. The data were analyzed by descriptive percentage.

3. Results and discussion

According to the microbe's contamination test which performed by BPOM, was recognized that in 2 (two) traditional drink which difference in processing method there were bacteria and khamir. Detail results are shown in Table 1.

Table 1. Results of microbe's contamination test for turmeric tamarind traditional drink using first and second method

No.	Types of Microbe's Test	Turmeric Tamarind Traditional Drink		Standard
		1	2	
1.	Total Plate Count (TPC)	6.9×10^2 col/gr	2.0×10^1 col/gr	$\leq 1.0 \times 10^4$ col/gr
2.	Total Mold and Yeast (TMY)	$\leq 1.0 \times 10$ col/gr	$\leq 1.0 \times 10$ col/gr	$\leq 1.0 \times 10^3$ col/gr
3.	<i>E coli</i>	Negative/gr	Negative/gr	Negative/gr
4.	<i>Salmonella SP</i>	Negative/gr	Negative/gr	Negative/gr
5.	<i>Staphylococcus aureus</i>	Negative/gr	Negative/gr	Negative/gr
6.	<i>Pseudomonas aeruginosa</i>	Negative/gr	Negative/gr	Negative/gr
7.	<i>Shigella sp</i>	Negative/gr	Negative/gr	Negative/gr

On Table 1 shown that first turmeric tamarind traditional drink, which processed by peeled the turmeric, rinsed, sliced, boiled up, blended, filtered, and mixed with tamarind stewed water, coconut sugar, and salt, still contaminated by bacteria in the amount of 6.9×10^2 col/gr. Second turmeric tamarind traditional drink, which processed by peeled turmeric, rinsed, sliced, directly blended, filtered, boiled up, and mixed with tamarind stewed water, coconut sugar and salt, still contaminated by less bacteria in the amount of 2.0×10^1 col/gr. After confirmed with BPOM quality standard in the amount of $\leq 1.0 \times 10^4$ col/gr, these 2 (two) traditional drinks were complied with the BPOM standard. Bacteria contamination in the traditional drink could be from turmeric that not clean enough during rinse process, filter fabric that being used, or even from the water.

Total Kapang Khamir (TKK) for these 2 (two) turmeric tamarind traditional drink were same in the amount of $\leq 1.0 \times 10$ col/gr. The BPOM quality standard in the amount of $\leq 1.0 \times 10^3$ col/gr. Therefore, even in these 2 (two) traditional drink there were kapang khamir the amount is far lower than quality standard and complied with the BPOM standard.

In all petri dish which had contents of selective medium for microbe *E. coli*, *Salmonella Sp*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, dan *Shigella sp* test, not shown any bacteria growth (negative). This was due to the characteristics of curcumin itself which purposed as anti-bacterial [11].

The results of inhibition capabilities test for first and second processing method apparently could suppressed the growth of *B.subtilis* and *E. coli*. Bacteria that are shown in Table 2.

Table 2. Inhibiting capabilities of turmeric tamarind traditional drink against *B.subtilis* dan *E. coli*

Turmeric Tamarind Traditional Drink	Average diameter of inhibition zone (mm)	
	<i>B. subtilis</i>	<i>E. coli</i>
First processing method (I)	16.54	6.92
Second processing method (II)	15.32	6.90

Growth inhibiting capability of *B.subtilis* and *E. coli* bacteria for first method traditional drink is better than second method. This was shown in average diameter of inhibition zone for first method traditional drink and second method traditional drink respectively, 16.54 mm > 15.32 mm for *B. subtilis* and 6.92 mm > 6.90 mm untuk *E. coli*. This was because turmeric content in first method traditional drink is higher than second method traditional drink. Inhibiting capabilities of turmeric tamarind against *B. subtilis* is better than *E. coli*. The average diameter of inhibition zone for *B. subtilis* is 15.32 mm – 16.54 mm whereas *E. coli* 6.90 mm - 6.92 mm.

Since that time, curcumin has been reported to have activity for the following indications: anti-inflammatory, anti-HIV, antibacterial, antifungal, nematocidal, antiparasitic, antimutagenic, antidiabetic, antifibrinogenic, radioprotective, wound healing, lipid lowering, antispasmodic, [4] antioxidant, [5] immunomodulating, anticarcinogenic, [6] and Alzheimer's disease [7].

Here, we report an unusual presentation of bacteraemia and mediastinitis due to co-infection with *Bacillus subtilis* and *Bacillus licheniformis*, which were identified by 16S RNA gene sequencing, in a patient with an oesophageal perforation. therefore, isolation of these organisms from blood cultures do not always indicate infection [12-13]

Species of genus *Bacillus* is a common contaminant in laboratory, therefore isolation of this organism from blood culture rarely indicates an infection [14]. Both turmeric tamarind traditional drink are free from some disease-causing microbes. Thus these traditional drinks could provide security for the consumers.

According to organoleptic test results were shown that: both traditional drinks have the unique odor, normal taste, yellow color, and in liquid form. These show the standard condition for turmeric tamarind traditional drink. Based on those results above, both turmeric tamarind herbal drink (first and second method) comply with the standard parameter that being tested.

Sensory test with organoleptic results to determine the consumer's favorite level for turmeric tamarind traditional drink are shown in Table 3.

Table 3. Tester's favorite level for both turmeric tamarind herbal drink

Types of Test	Herba drink	Love (%)	Like (%)	Normal (%)	Hate (%)
The yellow color	I	65	32.5	2,5	0
	II	20	27.5	52,5	0
The consistency	I	63	32.5	5.0	0
	II	13	47.5	37.5	2.5
The aroma	I	58	35.0	7.5	0
	II	20	32.5	47.5	0
The turmeric taste	I	58	30.0	10.0	2.5
	II	25	62.5	10.0	2.5
The tamarind taste	I	35	50.0	12.5	2.5
	II	40	37.5	17.5	5
The sweetness	I	33	47.5	17.5	2.5
	II	25	42.5	32.5	0
The blended taste of turm tamarind and sweet	I	60	25.0	10.0	5
	II	28	40.0	30.0	2.5
The blended taste of sour and sweetness	I	40	40.0	15.0	5
	II	30	47.5	20.0	2.5

According to Table 3 above is shown that 65% tester love the yellow color of first method traditional drink whereas only 20% tester love with the second method. These results prove that first method which is turmeric was boiled first before blended and filtered could soften the parenchyma tissues so more cell's content that extracted. More cell's content that extracted also affect to the consistency and aroma of the first method traditional drink. This was proved by tester's opinion which 63% tester love first traditional drink's consistency and only 13% that love second traditional drink's consistency. 58% tester love aroma and tumeric taste of first traditional drink. Tester that love aroma and turmeric taste of second traditional drink only 20% and 25% respectively. Traditional drink that processed using second method tends to have sour aroma as 40% tester's opinion. In general, blending taste between turmeric, tamarind, and sweet from first traditional drink more favorite than second traditional drink, as shown that 60% > 28% respectively. There were approximately 2,5%-5% tester that gave hate response for both traditional drink. After asked further, these testers actually hate traditional drink.

4. Conclusion

According to this study and discussion results can be concluded that both turmeric tamarind traditional drink are comply with the quality standard. Most of the consumer love turmeric tamarind traditional drink that processed use first method which are peel the turmeric, rinsed it, sliced it in small pieces, blended, filtered, and mixed with stewed tamarind water, coconut sugar, and salt.

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