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Ginger Honey as Preconception Supplement for Women: Analysis of Ginger Honey Content

Riska Yasmin[1], Andi Nilawati Usman[2], Indah Raya[3], Andi Dirpan[4], Rezki Puspitaningsih[5], Fendi Fendi[6]

[1,2]Department of Midwifery, Graduate School, Hasanuddin University, Indonesia
[3]Department of Chemistry, Faculty of Mathematics and Natural Science, Hasanuddin University, Makassar, Indonesia
[4]Department of Agricultural Technology, Faculty of Agriculture, Hasanuddin University, Makassar, Indonesia
[5]Department of Midwifery, Health Polytechnic of Samarinda, Samarinda, Indonesia
[6]Research Institution and Community Service, Wuna Agricultural Science University, Indonesia
E-mail: andinilawati@pasca.unhas.ac.id[1], nilawatiandi@gmail.com

Abstract: The results showedof ginger honey product found in 100 ml contains89 grams carbohydrates, 1,31 grams of protein, 13,5 01 µg/g iron, 3289,2 µg/g of potassium, as much calcium 517,15µg/g, 0,3 mg of manganese, 2,9 mg of fat content, and 2,74% of vitamin A. Ginger honey also contains 3,9% sucrose, 67% glucose, HMF 48,34 mg/kg, Copper (Cu)<0,01 µg/g, lead (Pb)<0,01 µg/g, Arsenic<0,01 µg/g, Acidity 36 ml NaOH/kg, an ash content of 0,3%, and 14,6% of water content
Ginger honey supplement meets Indonesia National Standart for honey and ginger consumption and safe to be used as a supplement for preconception women

Keywords: Ginger honey; Preconception, Supplement, Nutrition, Women

1. INTRODUCTION

Ginger honey is a mixture of trigone so honey and ginger extract which have been processed in laboratory test [1], [2]. Generally, honey contains so many benefits for health. Various vitamins such as ascorbic acid, niacin, riboflavin; minerals content, calcium, copper, iron, magnesium, manganese, phosphorus, potassium, and zinc are found in honey [3]. Honey an antioxidant since its flavonoid and phenolic content havea prevention effect of neurological function degradation, inflammation, and aging [4]. A previous study stated honey's component has an immunity effect to improve oocyte quality and fertility [5]. Another herbal often used as complementary medicine is ginger (Zingiber officinale var Amarum). Ginger has flavonoid, phenolic, terpenoid, atsiri oil compound which beneficial as anti-bacterial [6]gingerol, shogaol, zingerone, and paradol in ginger can repress oxidation process in the body and has hypolipidemia effect [7],g as well as ethanol in ginger, can prevent oxidative

stress in mice based on their response to free radical invasion as antioxidant include superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) [8]. As basic research, this study aims to determine the nutritional and quality of the ginger honey product of a mixture of ginger and honey before it is consumed by women as a supplement for preconception.

2. MATERIALS &METHODS

This study is laboratory research. The mixture of ginger honey is 100 ml: 50 ml (honey:ginger extract)

Time and place of research

This research was conducted in July 2020 in Makassar, South Sulawesi. The sample of ginger is extracted and combined inthe Biopharmacy Laboratory of Hasanuddin University and its content is tested in Makassar Health Laboratory Centre

Tools and Materials

The equipment used in this research was a glass bottle, digital scale, honey refractometer, magnetic stirrer, pyrex, stopwatch, analytic scale. The materials are ethanol 70%, aquadest, ginger extract, and Trigona sp honey.

Research Stage

Honey is obtained from Halal Centre and Forestry Faculty of Hasanuddin University. Ginger is obtained from Camba, South Sulawesi. Ginger is extracted by maceration process after washed, thinly sliced, dan dried for 7 days in undirect sunlight [9]

Test Parameter

The quality of ginger honey product aims to determine the nutritional component such as vitamins, minerals, protein, fat, carbohydrate, glucose, and water. Water in percent (%) and glucose in percent (Brix %) is measured by honey refractor. NaOH 0,1 N solution for acidity level testing

Hydroxymethylfulfural (HMF) Test

Hydroxymethylfulfural testing using a spectrophotometer with a wavelength of 284 nm and 336 nm to determine the quality of honey expressed in mg/kg units according to SNI 2018.

Data Management

The data is presented ina quantitative table

Honey		**Ginger/100 g**	
Content	**Level**	**Content**	**Level**
Carbohydrate	82,4 g	Carbohydrate	10,1 g
Sucrose	Max 5% b/b	Protein	1,5 g
Glucose	Min 65% b/b	Phosporus	39 mg
Water	Max 22% b/b	Iron (Fe)	4,3 mg
Protein	0,5 g	Ash	3,70 g
Phosporus	1,9-6,3 mg	Thiamine	0,02 mg
Iron (Fe)	0,06-1,5 mg	Niacin	0,8 mg
Acidity	50 ml NaOH/kg	Fat	1,0 g
Ash	Maks 0,5% b/b	Water	86,2 g
Manganese	0,02-0,4 mg	Calcium	21 mg
Riboflavin	0,02 mg	Potassium	57,0 mg
Fat	0,1 g		
Hydroxymethylfulfural	Max 50 mg/kg		
Cooper (Cu)	Max 5,0 mg/kg		
Lead (Pb)	Max 2,0 mg/kg		
Arsenic	Max 1,0 mg/kg		

Table (1): Criteria of Honey Quality based on SNI 2004 and SNI 2018, and Chemical Composition of Ginger based on Ministry of Health, 2000

Table 1 showed various nutritional components in 100 ml of honey and 100 g of dried ginger. This requirement is National Indonesian Standart for consumption eligibility.

3. RESULT& DISCUSSION

Table (2): Result of Ginger Honey Content

Content	**Level**
Carbohydrate	89 g
Sucrose	3,9 % b/b
Glucose	67 % b/b
Water	14,6 % b/b
Fat	2,9 mg
Protein	1,31 g
Irom (Fe)	13,5 µg/g
Acidity (pH)	36 ml NaOH/kg
Ash	0,3 % b/b
Manganase	0,3 mg
Calsium	517,15 µg/g
Potassium	3289,2 µg/g

Hydroxymethylfulfural	48,34 mg/kg
Cooper (Cu)	<0,01 µg/g
Lead (Pb)	<0,01 µg/g
Arsenic	<0,01 µg/g

Based on nutritional and quality test result (Table 2) of ginger honey in Makassar Laboratory Centre showed in 100 g of product contains carbohydrate 89 g, glucose 67%, protein 1,31g, iron 13,5 µg/g, vitamin A 2,78 %, fat 2,9 mg, potassium 3289,2 µg/g, and calcium 517,15 µg/g. The quality test showed HMF value 48,34 mg/kg with the maximum level is 50 mg/kg, sucrose 3,9% w/w (max 5% w/w) , lead (max 2,0 mg/kg), copper (5,0 mg/kg) and arsenic (max 1,0 mg/kg) contamination value <0,01 µg/g, and acidity level is 36 ml NaOH/kg with 50 ml NaOH/kg as maximum limit.

High consumption of carbohydrate in women can lead to obesity condition and infertility [10], but chronic energy deficiency (CED) with <23,5 cm MUAC also put women and baby in risks such as abortus, low-birth weight, a congenital defect, and asphyxia [11]. In preconception women require 1.326,8 kcal [12]. According to table 2, ginger honey has 89 g carbohydrate, sucrose 3,9% w/w, and glucose 67% w/w, the value of those compounds is in line with a previous study which stated that high glucose and fructose in honey can delay gastric emptyingto prevent someone to feel hungry in a short time [13] honey administration for 20 g may require 3 % of carbohydrate requisite daily [14].

Furthermore, ginger honey contains 1,31 g/100 ml protein. Protein has many roles in pregnancy such as the development of the fetus, placenta, adipose tissue, uterus tissue, and mammary tissue [15], maintain bone structure with 0,88-1,52 g/kg/day [16].

Iron 13,5 µg/g in ginger honey is expected to contributeto anemia condition in women. Ginger which contains ascorbic acid, amino acid, and organic acid assists the absorption of iron and triggers the erythropoietic system to form red blood cells [17]. The ginger honey sample contains 517,15 µg/g calcium which has an anti-inflammatory effect such as osteoarthritis, and rheumatic through its gingerol and shogaol compounds [18], another mineral in ginger honey, 3289,2 µg/g potassium has a role as antihypertensive by decreasing intravascular volume, reabsorption sodium, and sodium excretion [19].

In the quality test of ginger honey, Hydroxymethylfulfural (HMF) value showed 48,34/kg, HMF is a fraction from sucrose and fructose with maximum lever 50 mg/kg according to National Standart of Indonesia if its value is more than that it is surely has been mixed with other additives (fake) [20]. HMF level in honey is also affected by storage time and temperature of storage. The lower the storage temperature the lower the HMF level, and the longer honey is stored the higher the HMF level [21]. The contamination of lead, copper, and arsenic is tested as well to complete the quality test of the ginger honey product with the result each of it <0,01 µg/g which meet the National Standart of Indonesia 2018. Contamination of those materials can lead to brain and vascular toxication, respiratory infection, nausea and vomiting, anemia, and blindness [22]. High-level contamination is one of the main cause of infertility, lead and arsenic was found in human follicular fluid and affect sensitivity ovarium to gonadotropin hormones [23].

The acidity level is the major mark to determine honey quality, ginger honey sample showed 36 ml NaOH/kg (max 50 ml NaOH/kg). The acidity of the sample is affected by ester which

forms organic acid such as oxalate acid, glycolic acid, lactic acid, and citric acid and gives characteristics of its flavor and aroma. The higher honey acidity indicatesthe fermentation process and fraction of alcohol to form organic acid [24]. Most stingless bee honey (Trigona sp) has a higher acidity level compare to other honey since the fermentation process [25].
The fermentation process is influenced by the water level in honey, low water levels show higher honey quality. The low water level can prevent honey from damaging the process and fermentation [26]. The water level is also affected by a humid environment and affect the thickness, weight, maturity, and flavor of honey [25]. Ater level in ginger honey showed 14,6% w/w with a maximum level of 22% w/w. This result is in line with a previous study that Trigona sp honey has a lower water level compared to other honey [27]

4. CONCLUSION

1- Ginger honey is a mixture of Trigona sp honey and ginger extract with a 2:1 ratio. It is safe for consumption

2- Each nutritional compound and quality of the ginger honey product is not reaching the maximum limit and meets the requirements of the National Standart of Indonesia. The various nutritional compound in ginger honey is safe to be used as a supplement for preconception women.

5. RECOMMENDATIONS

1- It is expected for the next researcher to do another nutritional test of ginger honey content such as vitamin C, vitamin E, riboflavin, and thiamin

2- Health workers start to use ginger honey as a supplement for preconception women

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