

# STUDY ON FUNCTIONAL INGREDIENTS AND CLAIMS OF READY TO DRINK (RTD) FRUIT JUICE IN MODERN RETAIL

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## ABSTRACT

Fruit juice is well known as a healthy food. The purpose of fruit juices consumption is not only for refreshment, but also for gaining health benefits. The aim of this research is to identify health-related claim in juice and the functional ingredient used to meet the regulation on claim requirement. The research is conducted by collecting RTD (ready to drink) juice in modern retail. All the information on the label is recorded, identified, and classified based on regulation document, then processed and analyzed statistically. The result shows that 70% of product samples provide claim on the label. Claim on vitamin C is the most used claim for RTD fruit juice. As many as 52% of products with claim, has vitamin C – related claim. After vitamin C, the next popular claims are claims regarding dietary fiber (11%) and vitamin A (10%). Among all the products with claims, 63% of them provide more than one nutrient claims. They combine two or more nutrients content as the claim (e.g. vitamin C and vitamin A, fiber and vitamin C, etc.). There were 20% of RTD fruit juice enriched or fortified by functional ingredients, mostly in vitamin premix. The juice industry can still provide claims, without fortification or enrichment, if they are able to maintain their nutritional content to meet regulatory requirements regarding claims.

**Keywords:** *Claim; nutrient; regulation; RTD juice; vitamin.*

## ABSTRAK

Sari buah (jus) merupakan produk yang dikenal menyehatkan. Konsumen mengonsumsi sari buah tidak hanya untuk mendapatkan kesegaran, tetapi juga untuk memperoleh manfaat kesehatan. Riset ini bertujuan untuk mengidentifikasi jenis klaim terkait kesehatan pada produk sari buah dan ingredien fungsional yang digunakan untuk memenuhi persyaratan regulasi dalam pemberian klaim. Penelitian dilakukan dengan mengumpulkan sampel produk sari buah siap minum di ritel modern. Semua informasi dalam label dicatat, diidentifikasi, dan diklasifikasi berdasarkan regulasi. Kemudian diolah dan dianalisis secara statistik. Hasilnya menunjukkan 70% sampel memberikan klaim dalam label kemasannya. Klaim terkait vitamin C adalah yang paling sering ditemukan. Sebanyak 52% dari produk berklaim mengandung klaim terkait vitamin C. Setelah vitamin C, klaim lain yang populer adalah terkait serat pangan (11%) dan vitamin A (10%). Menariknya, 63% produk berklaim memberikan klaim terkait lebih dari satu jenis zat gizi. Produk tersebut mengombinasikan dua atau lebih kandungan gizi sebagai klaim, seperti vitamin C dan vitamin A, serat pangan dan vitamin C, serta lainnya. Terdapat 20% produk sari buah siap minum yang difortifikasi atau diperkaya oleh ingredien fungsional dari luar. Industri sari buah tetap dapat memberikan klaim, tanpa fortifikasi atau pengayaan, jika mereka mampu menjaga kandungan gizinya untuk memenuhi persyaratan regulasi tentang klaim.

**Kata kunci:** *Klaim, regulasi; sari buah siap minum; vitamin; zat gizi.*

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## INTRODUCTION

Indonesia as a tropical country, has a bright prospect for fruit industries. Many variants of fruit are produced and potentially to be developed to the many kinds of high economic value products, including juice beverages (Kemenperin, 2009). Fruits are good sources for several active components and phenolic compounds to support health and reduce the risk of chronic diseases. Fruit juice consumption is associated with several health benefits, including to lower cardiovascular disease risk and obesity (Clemens *et al.*, 2015) and to improve intestinal microbiota (Henning *et al.*, 2017).

Juice market is growing very well in the global market. Juice consumption keeps growing, with the main market in China, France, Germany, the United Kingdom, and the United States. Other countries, including Indonesia, are also expected to have a large annual growth in juice market in the future (Anonym, 2019). Anonym (2018) stated that fruit juice is one of the best segments in beverage industry. This product is consumed by all of consumer levels of any background, education, and job (Rahmawati, 2013). In Indonesia, juice beverage can be easily found. The products can be obtained at both traditional and modern market. Market of fruit juice in Indonesia has an enormous potential. It will develop continuously since the increasing of health awareness. Ready to drink (RTD) juice becomes more popular, because of their convenience. The increasing of human activity is the main factor of its popularity. Currently, RTD juice product is served in many types of packaging and variant (Rahmawati, 2013). Fadlillah *et al.* (2019) reported that in market, fruit juice products can be found in some types of packaging such as PET (polyethylene terephthalate), carton, and PP (polypropylene). Not only in packaging type, RTD juice products are available with many flavors. Regarding flavor, orange juice is the one which dominates the market, followed by guava, mango, and other fruits.

There are two major ingredients in juice formulation. Firstly, are fruit and water, and secondly is sweetener. In its development, the fruit

juice ingredients become more varied for some reasons, include the big interest from the consumers for health promoting juice (Buech, J., 2018) and the interest of the producers to enhance the shelf life of the products. Moreover, the consumers request for the better taste and healthier products also contribute to the development of the fruit juice products. Those factors encourage more variants of ingredients to be used, such as preservative, flavoring, vitamin, mineral, fiber, etc. (Taylor, 2016). A good understanding of the juice product in the market is very useful for industries, consumers, researchers, and regulation institution. Thus, this research is aimed to provide better knowledge regarding the fruit juice products. The research is conducted to analyze the type of RTD fruit juice in the retail modern; identify the claim of the products; analyze the strategy of the fruit juice industries to meet the claim requirement; and identify the addition of functional ingredient in the formulation.

## MATERIALS AND METHOD

Materials for this research are ready to drink (RTD) fruit juices that are collected from modern retail in Bogor. Then, all the RTD fruit juices found in supermarket and minimarket are bought to be analyzed. Regulation documents such as Regulation of the Minister of health for food additive and some technical regulation of Indonesia National Agency of Drug and Food Control/ *Badan Pengawas Obat dan Makanan* (NADFC/ BPOM) for food category, claim, food additive, and others were also used to identify label information.

All the information on the label of products were recorded, identified, classified, and categorized based on the regulation from Minister of Health and NADFC. Samples were collected based on juice definition on food category (BPOM, 2016a). Claim information was classified based on regulation of NADFC; Food additive was identified by using regulation of Minister of health for food additive. Then, all the information analyzed statistically by using Microsoft Excel to understand the correlation of each other.

## RESULTS AND DISCUSSION

Fruit juice is defined as a liquid processed from the edible part of fruit that is washed, crushed, purified (if needed), with or without pasteurization and packaged to be consumed directly. The basic characteristics of fruit juice are the ethanol level no more than 0,5%, except for certain fruits; it is allowed to be added by juice concentrate from the same fruit; and is also allowed to be added by sugar, to a maximum concentration of 50 g/kg (BPOM, 2016a). Fruit juice category could be identified from the label. BPOM (2018) requires

food industries to provide the name of the product on the label, together with the net weight, name and address of the producer or importer, date and production code, and also the expiration date. The total collected sample from modern retail in Bogor is 82 products. Based on database on NADFC website, there are many of registered fruit juice products, both domestic and import products (BPOM, 2019), but not all the products are available in the market. Some of them are no more exist. Amongst all samples, 70% of fruit juice products provide nutrition or health claim on the label (Figure 1).

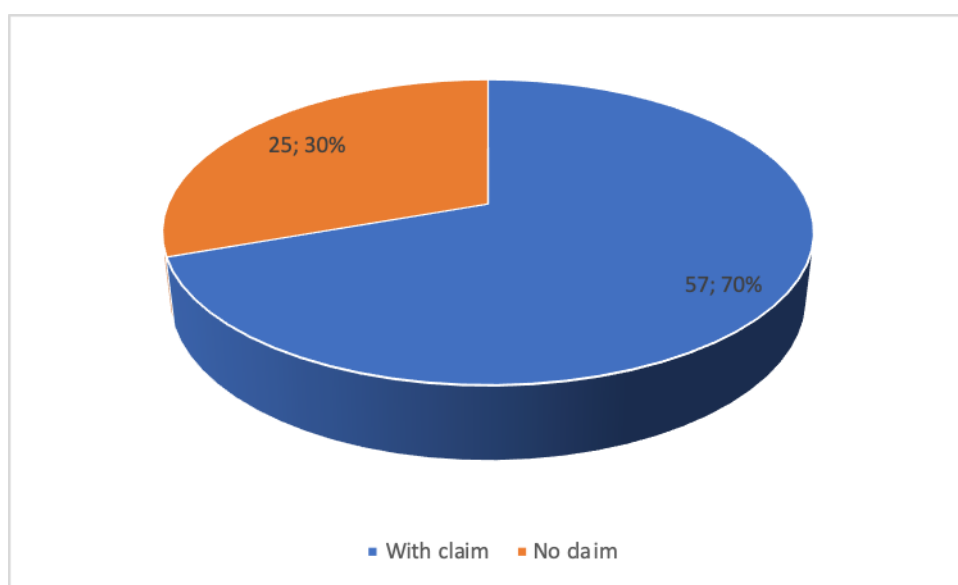


Figure 1. Percentage of fruit juice products with or without the claim

Claim is defined as any description that state and suggest both directly or indirectly, regarding certain characteristics of a food about the origin, nutrient content, nature, production, processing, composition or others quality factors (BPOM, 2016b). Nutrition and health claims on food are useful for consumers to select products according to their needs. Fadlillah *et al.* (2015) reported that claim information is the most considered to be in the label by consumers with age of 15 – 24 years old. Health claims may also contribute to the improvement of the industrial competitiveness. The type of claim significantly influences on the product credibility and purchasing intention (Hoefkens and Verbeke, 2012). Moreover, healthy

choice label increases positive impact to the desire of buying (Yang, 2014).

Most of the fruit juice products in this study claim a single nutrition or health function. However, there are some of claimed products provide more than one of nutrient content. Around one third of claimed products offer two or more excellences in nutrition (Figure 2). This phenomenon can be understood, because fruit as main juice raw material is rich in various vitamins, minerals, and fiber. Fruits contain energy and nutrients in a great number (Slavin and Lloyd, 2012). Nevertheless, during processing, the nutrient could be reduced or lost, so that not all of the nutrients can be claimed at the end products.

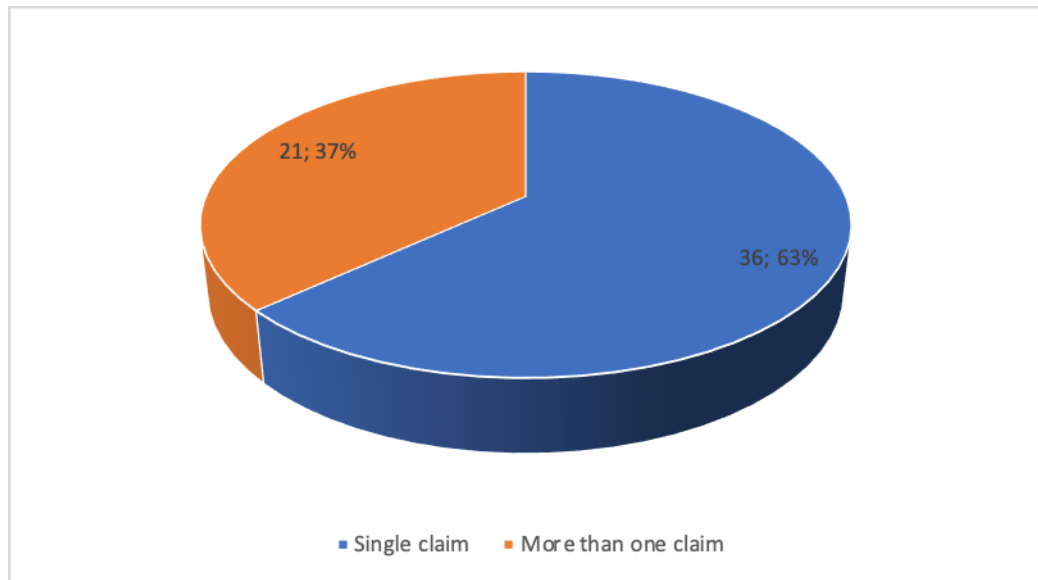


Figure 2. Number of claims in fruit juice products

Vitamin-related content is the most used as claims. There are 43% of claimed products regarding vitamin C-related, followed by fiber-related content (11%), vitamin A (10%), and others (completely, see in Figure 3). Fruit juice contributes to the nutrient intake (Bellisle *et al.*, 2018). The nutrient

content of fruit juice varies. It depends on the raw material used. Fadlillah *et al.* (2019) stated that the most used raw materials for fruit juice products in Indonesia are orange and guava. Orange juice is also the most consumed fruit juice around the world (Chanson-Rolle *et al.*, 2016).

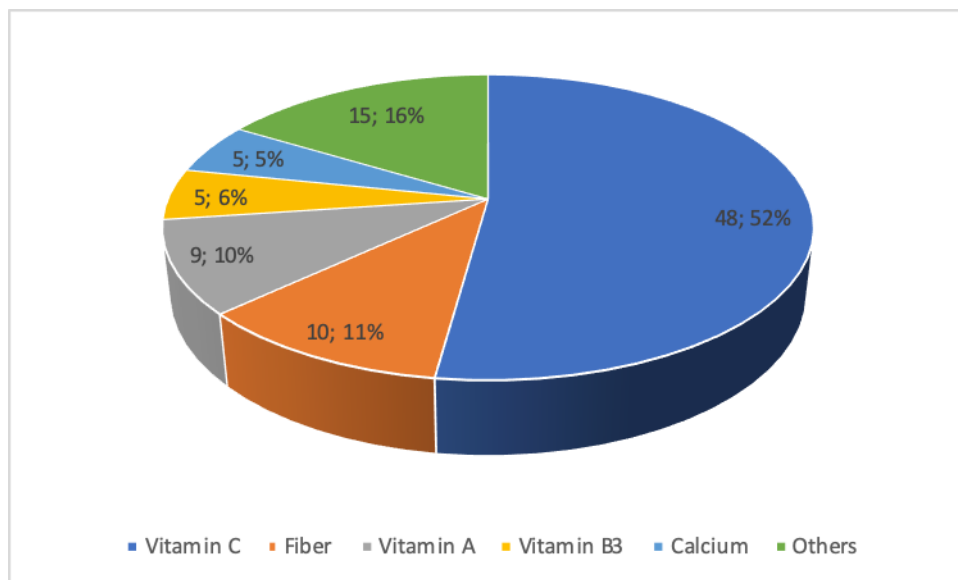


Figure 3. Nutrition-related claims in fruit juice products

Naturally, vitamin C or ascorbic acid is found in fruits. Orange or citrus is rich in vitamin C (Slavin and Lloyd, 2012). Chanson-Rolle *et al* (2016) also stated that, orange juice consumption will contribute to several micronutrients' intakes, including vitamin C. Guava is also high in vitamin

C (Ali *et al.*, 2014). Guava is an affordable source of vitamin C for society (Sinha, 2014). Based on the fact, orange and guava become the most used raw material in fruit juice, so it is logical, if vitamin C is the micronutrient that is the most often found as claim in fruit juices. Commercial fruit juices are

often enriched with vitamin. The enrichment is conducted, because of the benefit popularity of this nutrition (Baba et al., 2016). Rodriguez-Bernaldo *et al.* (2009) reported that fruit juice is a good vehicle for vitamin C. It is relative stable during storage.

Fiber-related claim is also popular in fruit juice, after vitamin C. Naturally, fruit contribute to the fiber intake, and it is very useful to support health including to lower cardiovascular diseases risk and obesity (Slain and Lloyd, 2012). Food industry have to maintain the fiber content of the fruit juice during the processing. Clemens *et al.* (2015) stated that fiber level in juice product decreased. Some of the industries modify their process to minimize the loss of fiber during juice processing. The other method is by enriching the juice with the additional fiber (Thongsombat *et al.*, 2007).

Claim statement must comply with the regulation requirement. Figure 4. shows that 80% of the products are made without the addition of functional ingredients from outside. It means that producers maintain nutrient content in the raw material to meet the regulation requirement. Nutrient degradation is affected by condition of processing, storage and cooking. It is highly variable depend on the commodity (Rickman *et al.*, 2007). Barrett and Lloyd (2011) stated that nowadays, there are some advanced technologies that provide opportunity for juice producers to retain the nutrient optimally. Those advanced processing includes high-pressure processing and some electric method, such as microwave, pulsed electric fields, ohmic processing, and others. For example, to retain vitamin A and vitamin C in the fruit juices, without causing any risk in food safety, producers can use high pressure processing (HPP). Vitamin A and C relatively are unaffected by HPP.

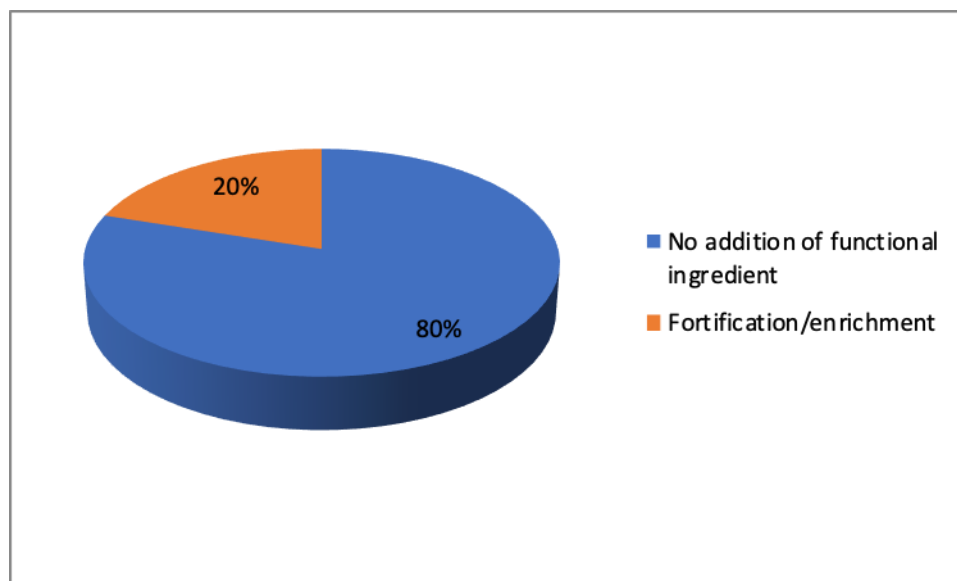


Figure 4. Percentage of fruit juice products with fortification or enrichment

The other method to improve the nutritional quality is by conducting fortification or enrichment. There are 20% of products in this study that are fortified or enriched. Fortification is defined as the practice to improve or increase the content of micronutrient, such as vitamin and mineral (including trace elements) in food. The main purpose of fortification is to improve the nutritional quality status of society (WHO, 2018). Enrichment is similar with fortification, but this term is more to

improve the nutrient content of food that is lost during processing (PP, 2004). Juice also can be used as vehicle to deliver a certain nutrient. There are 45% fortified juices in the United States. They added in the nutrient into the products that include calcium, vitamin A, D, E, and others (Hyde *et al.*, 2012).

Figure 5 shows the comparison between fortified/enriched products and unfortified/enriched

products. The comparison states that not all fortified products provide claim. Vice versa, to

provide claim, producer does not always have to fortify or enrich their products.

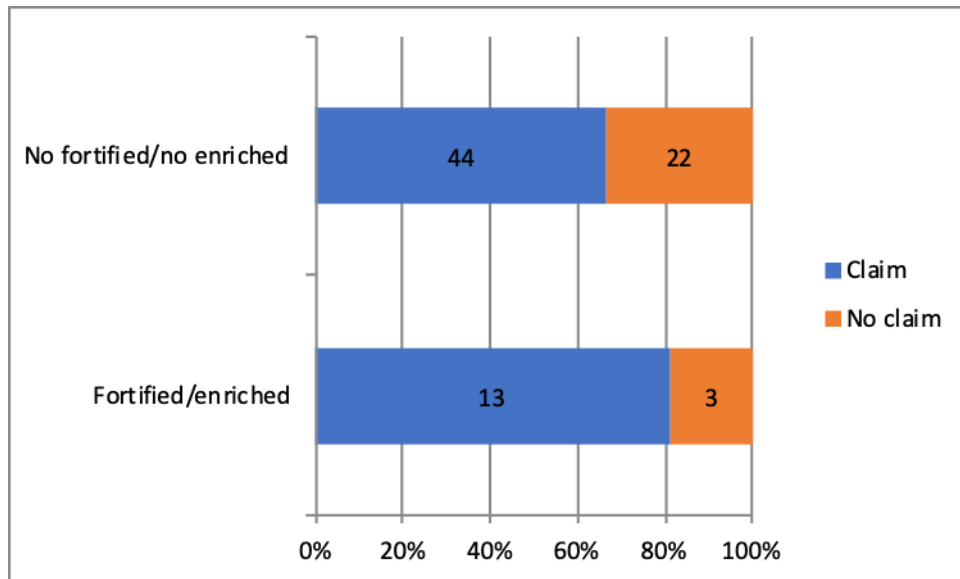


Figure 5. Comparison product with or without claim between fortified/enriched and no fortified/no enriched

From the fortified/enriched fruit juice, the vitamin content is mostly in the form of vitamin premix (35% of the fortified/enriched fruit juice) and mineral (23%). Guinot *et al* (2012) stated that vitamin and mineral premix is the most significant solution to reduce the cost for large-scale food

fortification programs. Addition of micronutrient in premixes will be more convenient, accurate and economical than trying to add the individual nutrients separately. Besides premix, there are also single addition of vitamin B3 and vitamin B12 in samples (Figure 6).

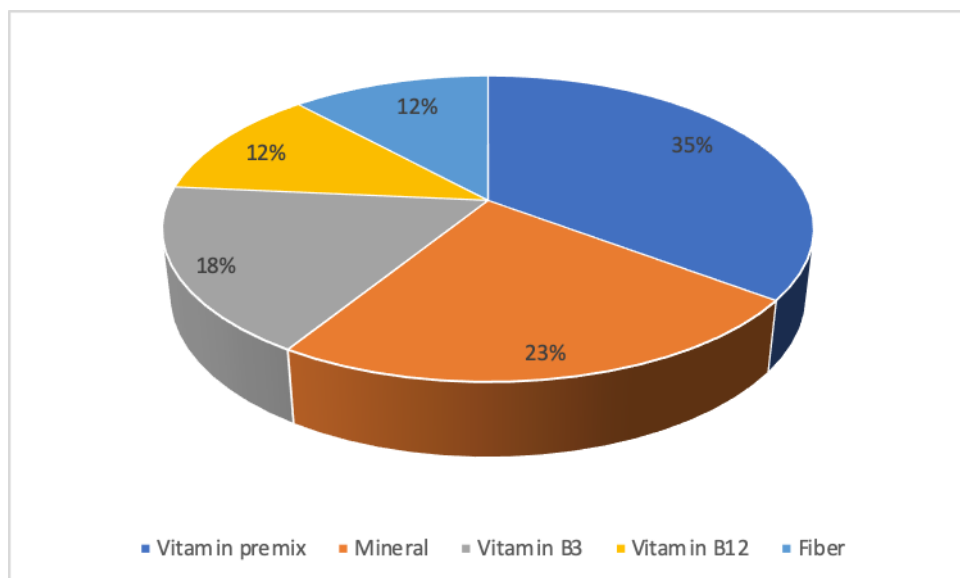


Figure 6. Type of functional ingredients added to the fruit juice products

BPOM (2016b) divided claim into some categories, they are nutrition claim, healthy claim, and other claims. Definition of nutrition claim is that all the description that state, show, or imply that food has a certain nutrition character, including content of energy, protein, fat, carbohydrate, vitamin, and mineral. There are several types of nutrition claim, include claim of nutrient content, and claim of nutrient comparison.

Healthy claim is that all the description that state, recommend, or imply that there is correlation between the food or its ingredient and the health. There are three types of health claim, they are claim of nutrition function, claim of other function, and claim of lowering risk of a disease (BPOM, 2016b).

Among the samples with claims which are studied, the most claims provided is nutrition claim. There are 68% of claimed products have claims of “source of” or “contain” certain nutrient and 29% of claimed products have claims of “high” or “rich” in certain nutrient claim. There is also health claim for the nutrient function (see Figure 7). To be clearer, Table 1 shows the claim statement on the label. Some of the products provide more than one claim. For example, there are products that claims are not only high in vitamin C content, but also high in fiber content. Other products claim to contain other nutrients, such as vitamin B3, vitamin B6, vitamin E, mineral Ca, and mineral Zn.

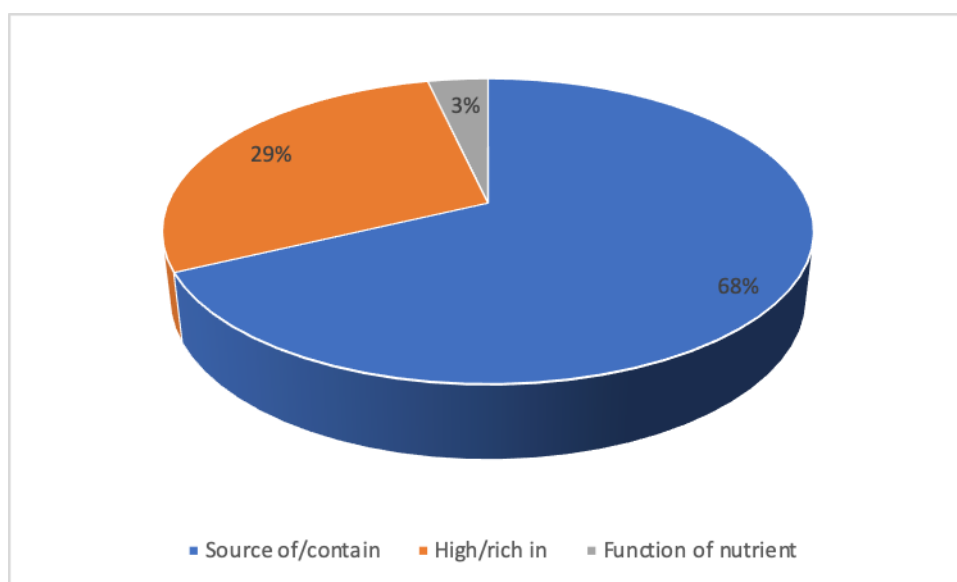


Figure 7. Type of claims in fruit juice products

Not all products can provide claim. There is regulation to be fulfilled before the claim is approved. Nutrition claim with the statement of “source of” contained micronutrient, the product must comply to 15% of ALG (*Acuan Label Gizi* or nutritional label reference) for the respective micronutrient content per 100 g for solid product, or 7,5% of ALG per 100 ml for liquid product. To the fruit juice products to claim “high” or “rich”, the product must contain twice as many “source of” the respective micronutrient (BPOM, 2016b).

For dietary fiber, producers can claim their products as “source of” dietary fiber, if they can proof that the content of the fiber in the product is no less than 3 g per 100 g (in solid product) or 1,5 g per 100 kkal (in liquid product). The value increases if they claim as “high” fiber or “rich” in fiber. For this claim, the content of fiber must be no less than 6 g per 100 g (in solid product) or 3 g per 100 kkal (in liquid product) (BPOM, 2016b).

Health claim that provide function of nutrient on the label is approved if the content of the nutrient meets the minimal requirement of “source of”



claim. There are two types of nutrient function claims in fruit juices studied. Firstly, is about the role of calcium in bone formation and teeth

maintenance. Secondly, is the claim about function of dietary fiber to maintain digestion health

Table 1. Some of claim statements on the label

Type of claims	Category of claim	Claim on the label
Source of nutrient	Nutrition claim	<i>Sumber vitamin C</i> , source of vitamin C
		<i>Mengandung vitamin C</i> , contain vitamin C
		<i>Sumber nutrisi (B3, B6, E, Ca, Zn)</i> , Source of nutrient (B3, B6, E, Ca, Zn)
		<i>Mengandung vitamin A, vitamin B12, vitamin C</i> ; Contain vitamin A, vitamin B12, vitamin C
		<i>Mengandung vitamin C, B3, dan B6</i> ; Contain vitamin C, B3, and B6
High/rich in nutrient	Nutrition claim	<i>Tinggi vitamin C</i> , High vitamin C
		<i>Tinggi serat</i> , High fiber
		High calcium, high vitamin C, high vitamin D; <i>Tinggi kalsium, tinggi vitamin C, dan tinggi vitamin D</i>
		<i>Tinggi serat, dan tinggi vitamin C</i> ; High fiber and high vitamin C
		<i>Memenuhi 100% AKG vitamin C</i> ; Meet 100% of RDA
Function of nutrient	Healthy claim	<i>Kaya vitamin A dan C, tinggi serat</i> : Rich in vitamin A and C, high fiber
		<i>Berisi kalsium yang telah berperan dalam pembentukan dan pemeliharaan tulang dan kepadatan gigi</i> ; Contain calcium with role for bone formation and teeth maintenance
		<i>Dengan serat inulin yang membantu menjaga fungsi pencernaan</i> ; With inulin fiber which maintain the function of digestion

## CONCLUSION

Most of the RTD fruit juices in the modern retail provide claim on the label. Nutrition claim is the most often found, including “source” or “contain” certain nutrient claim and “high” or “rich” claims. The others are health claims, that describe the function of certain nutrient. Most of claimed fruit juices do not add in any functional ingredients from the outside, and only 20% of claimed products are fortified.

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