

# “BULUNG BONI” (Caulerpa lentillifera) AND “BULUNG SANGU” (Gracilaria verrucosa) BALINESE SEAWEED UTILIZATION AND HEALTH BENEFITS

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**“BULUNG BONI” (*Caulerpa lentillifera*) AND “BULUNG SANGU”  
(*Gracilaria verrucosa*) BALINESE SEAWEED UTILIZATION  
AND HEALTH BENEFITS**

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**ABSTRACT**

In Bali there are several types of seaweed that are generally consumed as vegetables and salad by the local people and known by local names of *jukut* and *rujak bulung boni*, or *bulung sangu*. *Jukut* and *rujak bulung boni*, or *bulung sangu* is a very harmonious combination of food, a potential source of nutrients, and antioxidants. A key problem associated with *bulung boni* and *bulung sangu* is that they are very difficult to find in the market, especially *bulung boni* since if it is exported abroad, the price is almost the same as the price of shrimp. Therefore, this study was conducted to review *bulung boni* (*Caulerpa lentillifera*) and *bulung sangu* (*Gracilaria verrucosa*) Balinese seaweed utilization and health benefits.

*Bulung boni* and *bulung sangu* have potential nutrient and antioxidants content such as carotenoids, vitamins (A,C,E), fatty acids (omega 3 and 6), carbohydrates, minerals (I, Zn, Fe, Cu, Na, K, Mg, Ca, P and Cr), amino acid and chlorophyll. Carotenoids have important biological function as an antioxidant, and immunostimulatory which can prevent diseases, antiinflammatory, antistress, antiaging, and protect the skin from the harmful effects of ultraviolet radiation. The results of several research stated that total carotenoids and iodine of *bulung boni* is higher than *bulung sangu*, and that *bulung boni* has significant potency as antistress, anticancer, antiinflammatory, antistroke and antipathogenic bacteria. They also have significant roles as normolipidemic, antidiabetic, antiaterosclerotic, antiosteoporotic, and antiaging.

**Keywords :** *Caulerpa lentillifera*, *Gracilaria verrucosa*, antioxidant, health benefits.

**INTRODUCTION**

Seaweed has potential nutrient and antioxidants content such as carotenoids, vitamins, fatty acids, carbohydrates, minerals, and other essential substances (El-Baky *et al.*, 2007). In Bali there are several types of seaweed that are generally consumed as vegetables and salad

by the local people and known by local names as *jukut* and *rujak bulung boni* (*Caulerpa lentillifera*), or *bulung sangu* (*Gracilaria verrucosa*) (Suprpto, 2014; Widhiaanugrah, 2016).

Since ancient times Balinese people have been consuming seaweed as fresh vegetable. Balinese women believe that consuming *jukut bulung* (seaweed vegetables) and *rujak bulung* (seaweed salad) will keep them look young for longer. Therefore, *jukut bulung* and *rujak bulung* emerged as one of the most favorite traditional snacks for women in Bali (Sri Andani, 2014). Ways of making *jukut* and *rujak bulung boni* or *bulung sangu* are shown in Figure 1 and 2.

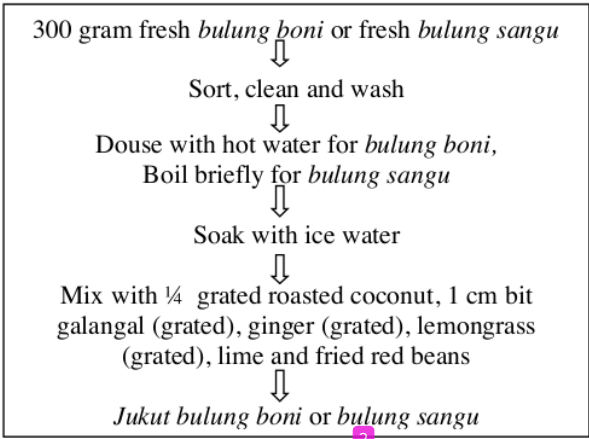


Figure 1 Flow Chart of the Process of Making *Jukut Bulung Boni* or *Bulung Sangu* (Suprpto, 2014; Widhiaanugrah, 2016).

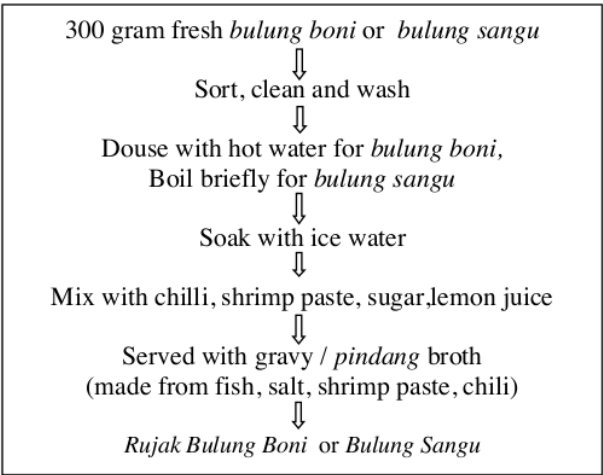


Figure 2 Flow Chart for Processing *Rujak Bulung Boni* or *Bulung Sangu* (Suprpto, 2014; Widhiaanugrah, 2016).

*Jukut* and *rujak bulung boni*, or *bulung sangu* is a very harmonious combination of food, a potential source of nutrients, and antioxidants (Farida & Amalia, 2009; Julyasih *et al.*, 2013; Wiraguna *et al.*, 2013). A key problem associated with *bulung boni* and *bulung sangu* is that they are very difficult to find in the market, especially *bulung boni* since if it is exported abroad, the price is almost the same as the price of shrimp. Therefore, this study was conducted to review *bulung boni* (*Caulerpa lentillifera*) and *bulung sangu* (*Gracilaria verrucosa*) Balinese seaweed utilization and health benefits.

### **Health Benefits of Consuming *Jukut* and *Rujak Bulung Boni* or *Bulung Sangu***

The growing risk of health hazards in the modern world and the use of expensive drugs which are not free from toxic side effects compel us to pay more attention to the preventive measures to be adopted to combat the diseases. The best prevention could be the propagation of food, which is rich in antioxidants and which consists of several secondary metabolites favouring the health conditions. Antioxidants are compounds that protect cells against the damaging effects of reactive oxygen species. Antioxidants can cancel out the cell-damaging effects of free radicals (Winarsi, 2007).

Seaweed has potential nutrient and antioxidants content such as carotenoids, vitamins, fatty acids, carbohydrates, minerals, and other essential substances (El-Baky *et al.*, 2007). Consumption of *bulung boni* and *bulung sangu* has been associated with reduced cancer risk, diabetes risk, heart disease risk, osteoporosis risk. Research suggests that the antioxidant content in *bulung boni* is higher than *bulung sangu* (Limantara & Rahayu, 2008).

Carotenoid in the seaweed is an antioxidant compound which can help decrease the free radical which is harmful for human health (Darmawati *et al.* 2016). Carotenoids have important biological function as an antioxidant, and immunostimulatory which can prevent diseases, antiinflammatory, antistress, antiaging, and protect the skin from the harmful effects of ultraviolet radiation (Myers, 2005; Wiraguna *et al.*, 2013). According to Julyasih *et al.* (2009) the highest content of carotenoids in seaweed is found in *bulung boni*, in addition to vitamins A, C and E.

Mineral contents in *bulung boni* are I, Zn, Fe, Cu, Mn, Na, K, Mg, Ca, P and Cr (Wiraguna *et al.*, 2013; Limantara & Rahayu, 2008). According to Maslukah *et al.* (2010) and Utama (2015) the highest content of iodine (I) in seaweed is found in *bulung boni*. Essential nutrients in *bulung sangu* is trace element, mainly iodine (Chaidir, 2007). According to Riskedas (2013), households which consume enough iodised salt is only 77%.

Iodium deficiency results in physical and mental disorder, goiter, low IQ, laziness and sluggishness and low learning ability in children (Yuniastuti, 2008).

Besides high in iodium, seaweed is also high in fiber. According to Chaidir (2007) the amount of iodium contained in seaweed *bulung sangu* is 29,94 ppm (% dw) and 9,76 % of dietary fiber (% ww). Fiber is essential in overcoming the problem of nutrition, resulting in degenerative diseases such as coronary heart disease, cancer, diabetes mellitus, hypertension, and others.

Polyunsaturated fatty acids (PUFA) are the major fatty acids of *bulung boni* and *bulung sangu*. Typical *n*-3 and *n*-6 PUFA such as 18:3*n*-3, 18:4*n*-3, 20:5*n*-3, 18:2*n*-6, and 20:4*n*-6 are found in significant amount in all these two species of seaweed. All two extracts exhibited potent antimicrobial activity against human food pathogenic bacteria and anti-inflammatory activity (Thilaghavani & Charles, 2014).

The fatty acid compositions of *Gracilaria verrucosa* were determined. Arachidonic and eicosapentaenoic acids (EPA) predominated among the fatty acids. EPA biosynthesis from arachidonic or from  $\alpha$ -linolenic acids in *Gracilaria verrucosa* are discussed (Khotimchenko *et al.*, 1991). EPA can prevent blood platelets. Platelets in the blood in large quantities will interfere with blood flow and is the major cause of heart attacks and strokes (Utari, 2011).

According to Yusasrini *et al.* (2016) *bulung boni* can significantly increase the secretion of insulin so it has the potential to be developed as an antidiabetic agent. *Bulung boni* can raise the level of HDL, so it will also be beneficial for people with diabetes (Julyasih *et al.*, 2013).

Research results showed that the composition of the pigment in *bulung boni* chlorophyll a (26.817%), chlorophyll b (12.906%), as well as xantofil (41.546%) (Kusumastuti, 2008). Chlorophyll as food can help the absorption of nutrients, clean the circulatory system, maintain the acid-base balance of the body, reduce bad breath and maintain healthy digestive system, increase endurance, energy sources, help repair tissue and help the liver in producing red blood cells (Limantara & Rahayu, 2008).

*Jukut* and *rujak bulung boni*, or *bulung sangu* is a very harmonious combination of food, a potential source of nutrients, and antioxidants (Farida & Amalia, 2009; Julyasih *et al.*, 2013; Wiraguna *et al.*, 2013). Functional food of *Jukut* and *rujak bulung boni*, or *bulung sangu* is a combination of food (food combining diet) is very compatible, increase the effectiveness of the absorption of nutrients and bioactive substances it contains, so as to increase the efficacy of the antiatherogenic (Farida & Amalia, 2009). They synergize in

increasing the activity of bioactive substances it contains, mainly equally nutritious and are a source of antioxidants, which act as antiinflammatory and antiatherogenic, thus providing hope in the prevention of CHD (coronary heart disease) (Farida & Amalia, 2009; Winarsi, 2007).

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