

Intervention Of Sea Grapes Powder Drink on Changes In Hemoglobin Levels In Adolescent Females At MAN 1 Banyuwangi

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ARTICLE HISTORY

Received [30 July 2026]

Revised [11 September 2026]

Accepted [14 September 2026]

Keywords:

Anemia, Sea Grapes, Hemoglobin, Adolescent Girls, Iron.

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ABSTRACT

Introduction: Anemia among adolescent girls remains a public health issue driven by high iron requirements during growth and blood loss associated with menstruation. Sea grapes (*Caulerpa racemosa*) known to contain iron and vitamin C represent a potential functional food alternative to help meet iron needs. This study aims to analyze the iron and vitamin C content of sea grape powder and to determine the effect of a sea grape powder drink intervention on hemoglobin levels among adolescent girls at MAN 1 Banyuwangi. **Method:** This study employed a quasi-experimental design with a pretest-posttest control group structure. A total of 46 respondents were divided into a treatment group and a control group. The treatment group was administered 12 grams of sea grape powder drink daily for 7 days, while the control group received iron-folic acid tablets. Hemoglobin levels were measured before and after the intervention using an EasyTouch Hb device. The iron and vitamin C content of the sea grape powder was analyzed in the laboratory, while hemoglobin level data were analyzed using statistical tests appropriate for the data distribution. **Results and Discussion:** Laboratory analysis results indicate that sea grape powder contains 29.92 mg/100 g of iron and 34.45 mg/100 g of vitamin C. However, the administration of a sea grape powder drink for seven days did not result in a significant change in hemoglobin levels among adolescent girls ($p > 0.05$). The mean hemoglobin level in the treatment group shifted from 13.34 g/dL to 13.03 g/dL, whereas in the control group, it remained at 12.67 g/dL both before and after the intervention. **Conclusion:** A 7-day intervention using a sea grape powder drink did not result in a significant effect on hemoglobin levels among adolescent girls. Future studies are recommended to employ a longer intervention duration and a larger sample size, as well as to control for factors influencing hemoglobin levels, such as nutrient intake, menstrual cycles, and adherence to the intervention.

INTRODUCTION

Anemia remains a public health challenge in Indonesia, particularly among adolescent girls. Adolescent girls are at higher risk of developing anemia than adolescent boys due to increased iron requirements during growth spurts and blood loss associated with menstruation. Iron deficiency is the primary cause of anemia, leading to reduced concentration, lower academic performance, and decreased productivity, as well as an increased risk of future pregnancy complications. In addition to iron, vitamin C plays a crucial role in enhancing non-heme iron absorption, thereby contributing to hemoglobin formation

Sea grapes (*Caulerpa racemosa*) represent a potential functional food for preventing anemia. As a type of green seaweed, sea grapes contain various nutrients such as iron, vitamin C, protein, and minerals along with bioactive compounds beneficial to health. However, their high water content results in a short shelf life; consequently, processing them into powder form is necessary to make the product more practical, durable, and convenient to consume.

While studies indicate that consuming *Caulerpa* species can increase hemoglobin levels, research regarding the use of powdered sea grape drinks among adolescent girls remains limited. Therefore, this study aims to analyze the iron and vitamin C content of sea grape powder and to evaluate the impact of a powdered sea grape drink intervention on hemoglobin levels among adolescent girls at MAN 1 Banyuwangi

RESEARCH METHODS

This study employed a quasi-experimental design with a pretest-posttest control group structure. It was conducted at MAN 1 Banyuwangi, involving 46 adolescent girls divided into a treatment group and a control group. The treatment group received 12 grams of sea grape powder drink daily for seven days, while the control group received blood-supplementing tablets in accordance with the standard program. Hemoglobin levels were measured before and after the intervention using an EasyTouch Hb device. The iron and vitamin C content of the sea grape powder was analyzed in a laboratory, while hemoglobin level data were analyzed using statistical tests appropriate for the data distribution, with a significance level of 95% ($p < 0.05$).

RESULTS

Laboratory analysis results indicate that sea grape powder contains 29.92 mg/100 g of iron and 34.45 mg/100 g of vitamin C. During the study, the mean hemoglobin level in the treatment group changed from 13.34 g/dL to 13.03 g/dL, whereas in the control group, it remained at 12.67 g/dL both before and after the intervention. Statistical analysis shows that the administration of the sea grape powder drink for 7 days did not have a significant effect on changes in hemoglobin levels among adolescent girls ($p>0.05$).

Table 1. Changes in Hemoglobin Levels

Group	Pre test Mean $\pm$ SD	Post test Mean $\pm$ SD	Δ	P ₁
Treatment	13,30 $\pm$ 2,01	13,03 $\pm$ 1,42	-0,27	0,506
Control	12,67 $\pm$ 1,84	12,66 $\pm$ 1,65	-0,01	0,328
P ²	0,280	0,426		

Source: Primary Data, 2026

DISCUSSION

Hemoglobin levels are one indicator used to assess anemia. In this study, hemoglobin levels were measured using an EasyTouch Hb device before and after administration of a sea grape powder drink. Additionally, the iron and vitamin C content of the sea grape powder, used as the intervention, was analyzed. Laboratory analysis revealed that the sea grape powder contained an average of 29.93 mg of iron per 100 grams and 34.45 mg of vitamin C per 100 grams. These values indicate that sea grape powder has the potential to be a functional food source of iron and vitamin C, which play a role in hemoglobin formation. (1).

However, statistical analysis showed that administering the sea grape powder drink for 7 days did not significantly impact hemoglobin levels in adolescent girls ($p>0.05$). This finding is likely due to the relatively short duration of the intervention, which was not able to optimally increase hemoglobin levels. Furthermore, changes in hemoglobin levels are influenced by various factors, such as adequate daily iron and vitamin C intake, tea or coffee consumption, which can inhibit iron absorption, the menstrual cycle, the status of iron reserves in the body, and respondent compliance with the intervention during the study. (2).

The results of this study differ from previous research, which reported that administering 200 grams of seaweed (*Caulerpa* sp.) for 7 days to pregnant women with anemia significantly increased hemoglobin levels. This discrepancy in results is likely due to differences in respondent characteristics, baseline hemoglobin levels, the type and dosage of the intervention, and differences in physiological needs between pregnant women and adolescent girls. Furthermore, the duration of the intervention and factors affecting iron absorption are also suspected to contribute to the differences in results. (3).

CONCLUSIONS AND RECOMMENDATIONS

Based, Research Research findings indicate that sea grape powder drink contains iron and vitamin C, suggesting potential as a functional food. However, the administration of 12 grams of sea grape powder drink daily for seven days did not yield a significant effect on hemoglobin levels among female students at MAN 1 Banyuwangi.

Future research should employ a longer intervention period and a larger sample size. Additionally, it is recommended to control for factors influencing hemoglobin levels such as dietary patterns, iron and vitamin C intake, menstrual cycles, consumption of foods or beverages that inhibit iron absorption, and iron status. to allow for a more comprehensive evaluation of the intervention's effectiveness.

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