

Effects of different bio-fertilizers and mulching materials on growth, yield, and post-harvest quality of cauliflower in Kailali, Nepal

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Introduction

- Bio-fertilizers such as Azotobacter and PSB are products derived from living microorganisms, capable of atmospheric nitrogen fixation and converting insoluble phosphorus in soil into soluble forms for easy plant uptake (Kumar et al., 2015).
- Mulching is a crucial component of organic farming, playing a vital role in weed control, soil conservation, and regulating the temperature of the soil.
- Furthermore, mulching adds essential nutrients for plants to the soil during decomposition, optimizing its physical, chemical, and biological qualities and elevating crop quality and quantity (Bhardwaj, 2013).

Research questions

- What is the effect of various mulching materials and bio-fertilizers on the growth, production, and post-harvest quality of cauliflower?
- What is the combined effect of bio-fertilizers and mulching materials on the growth, yield, and post-harvest quality of cauliflower?

Methodology

- Research site: Lisbeli, Chure RM-5, Kailali
- Research design: Two factorial Randomized Complete Block Design (RCBD) with 16 treatment combinations and three replications
- Research duration: September 2023 – January 2024

Treatment application

- Bio-fertilizers were applied through root dipping of cauliflower seedlings.
- Bio-fertilizers, Azotobacter, and PSB (Phosphorus Solubilizing Bacteria) were used at the rate of 250 ml/liter of water (Islam, Chatterjee, & Datta, 2014).
- Before transplanting cauliflower seedlings, the roots of the seedlings were dipped in bio-fertilizer solution with jaggery for about 10 minutes (Sharma, Regar, Ola, & Shivran, 2018).
- Black plastic mulch was applied before transplanting cauliflower seedlings. A black plastic mulch of 25 micron thickness was spread uniformly on the respective plots of size 2m* 2m and holes of 1 * 1 inch were made at a spacing of 60*45 cm.
- Two sorts of organic mulches such as paddy straw and sawdust were spread evenly on the respective plots to maintain the thickness of 5 cm and 2 cm respectively (Singh & Singh, 2019). These mulches were applied seven days after transplanting, once the seedlings were established.

Key findings

The growth, yield, and post-harvest quality of cauliflower were statistically affected by different bio-fertilizers and mulching materials while their combined effect was found to be insignificant. .

Figure 1 Plant spread of cauliflower affected by bio-fertilizers

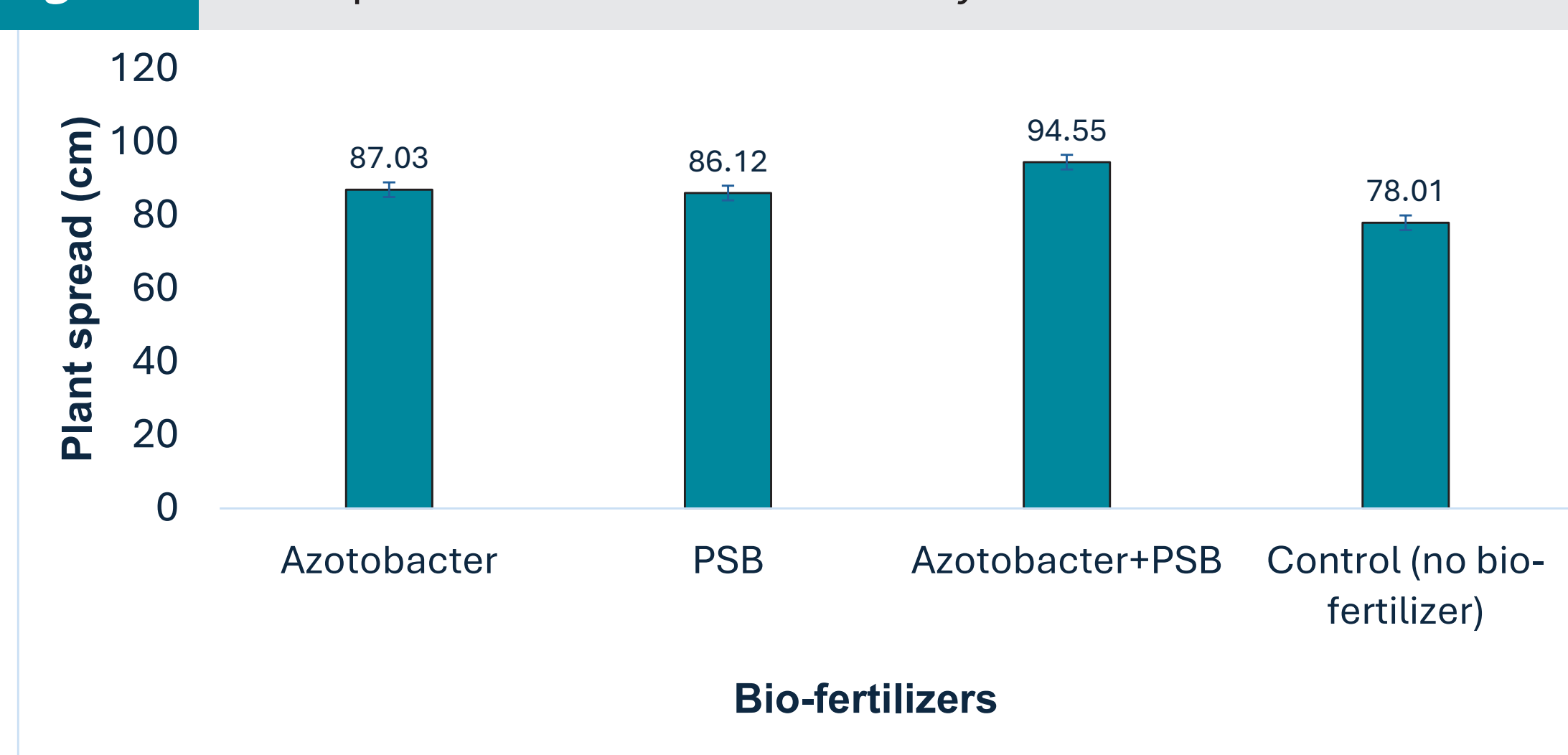


Figure 2 Plant spread of cauliflower affected by mulching materials

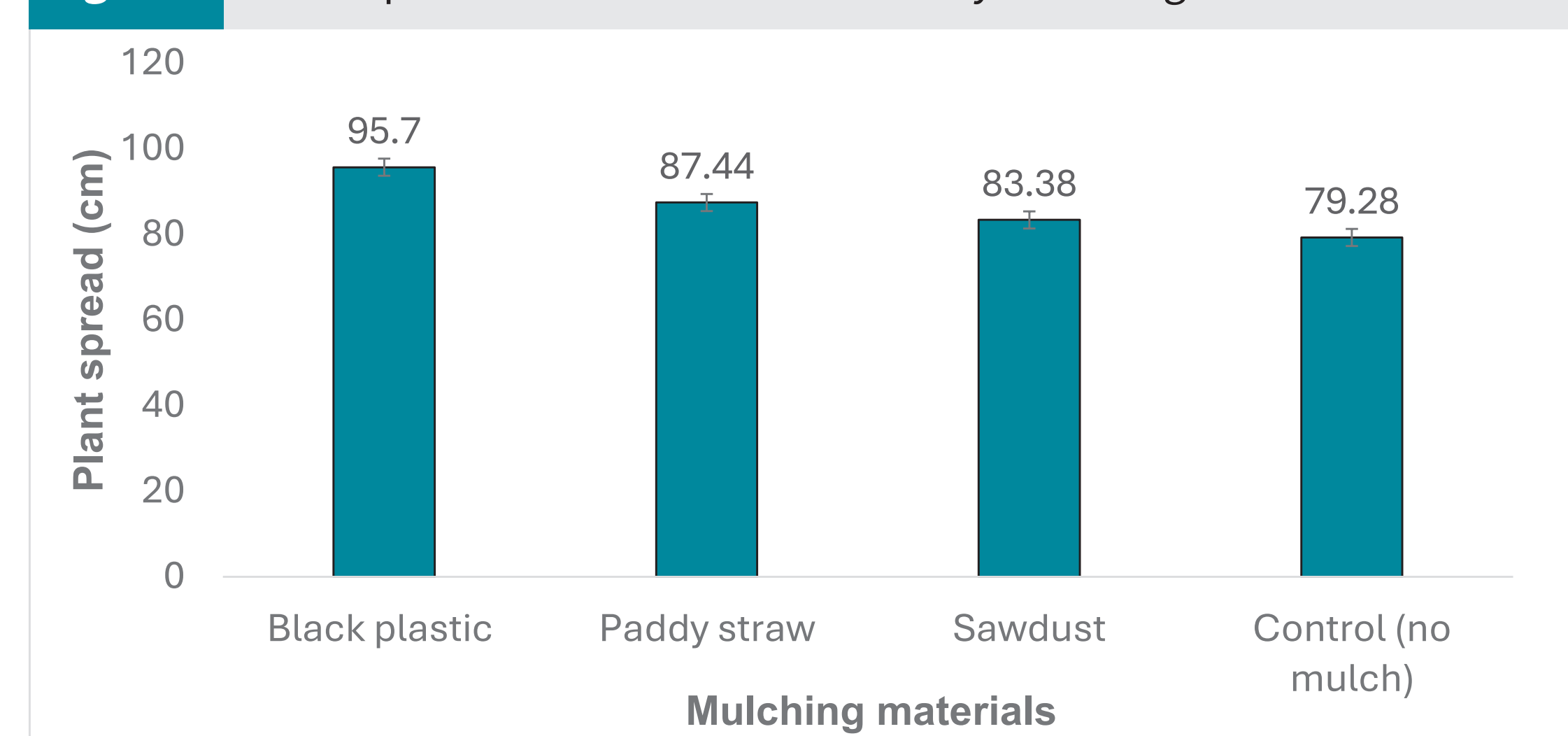


Figure 3 Economic yield of cauliflower affected by bio-fertilizers

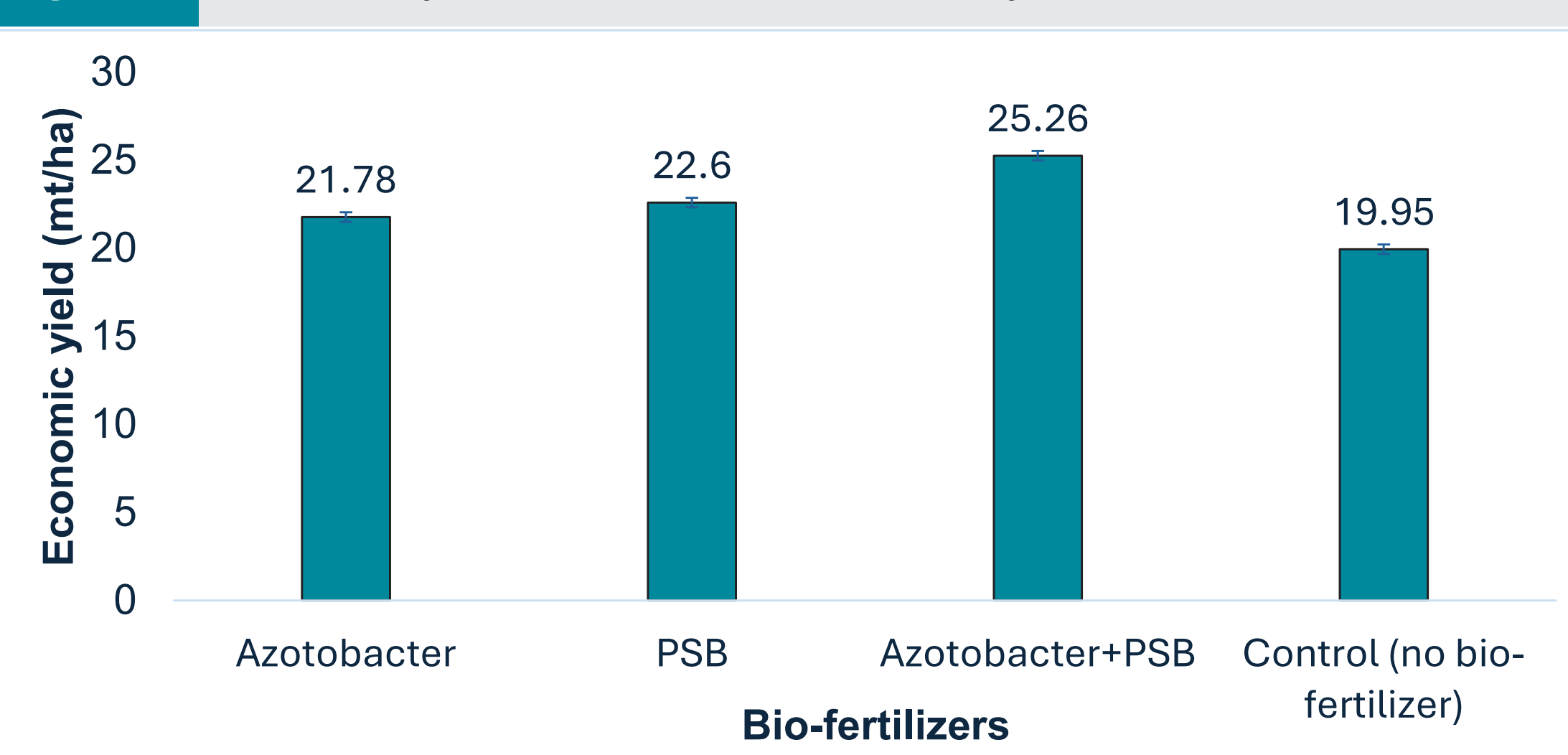


Figure 4 Economic yield of cauliflower affected by mulching materials

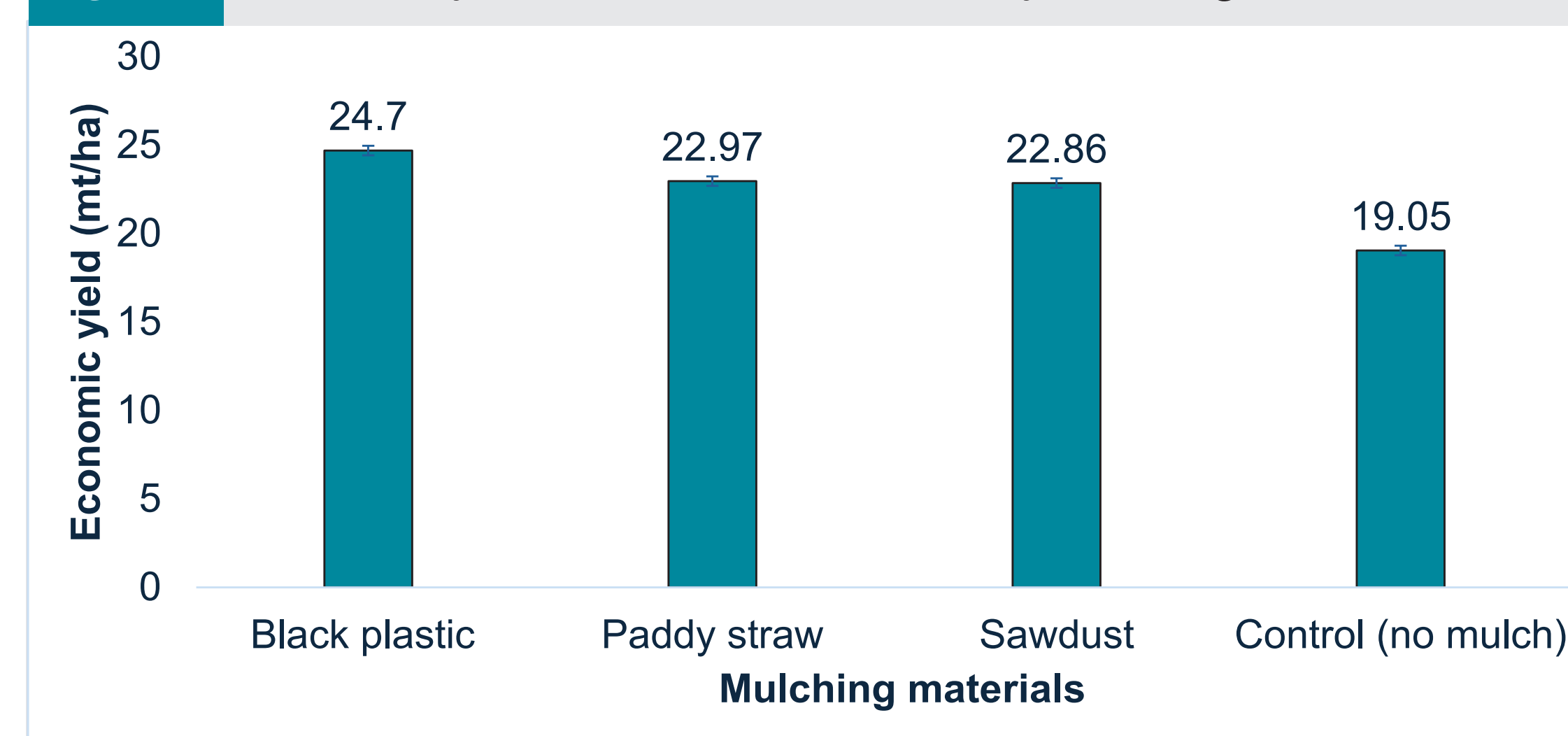


Figure 5 Vitamin C content of cauliflower affected by bio-fertilizers

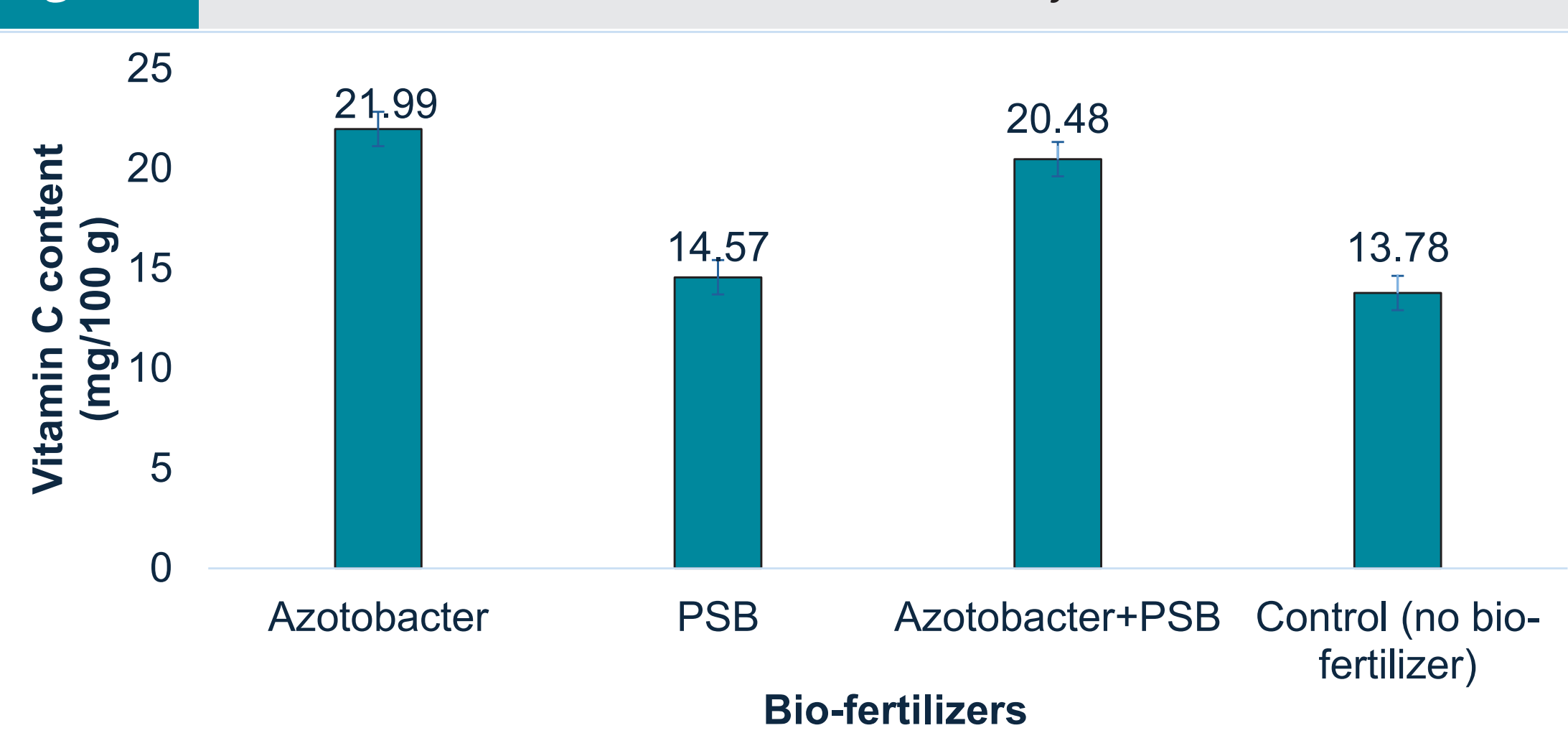
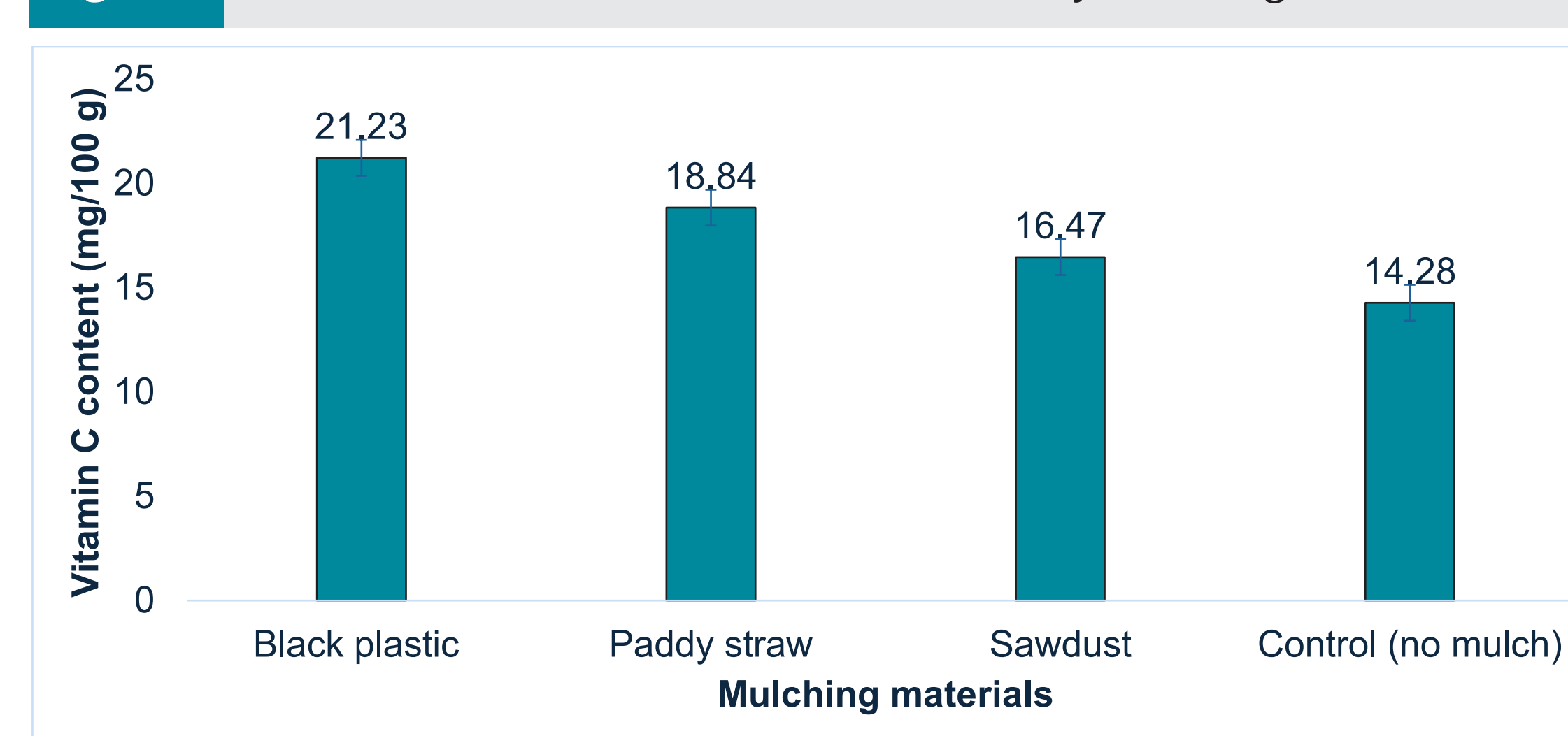


Figure 6 Vitamin C content of cauliflower affected by mulching materials



Conclusion

Compared to other bio-fertilizers, the combined application of Azotobacter and PSB produced superior growth, a higher yield, and an increased vitamin C content. Regarding mulching materials, black plastic mulch, and paddy straw mulch resulted in better growth, yield, and post-harvest quality. Therefore, based on the research findings, the combined application of Azotobacter and PSB in addition to paddy straw mulch is a better option for boosting the growth, yield, and post-harvest quality of cauliflower.

