Alley cropping of tomato improves fruit quality and profitability: experience from plain land ecosystem of Bangladesh

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1. Introduction

- A central goal of agroforestry practices is to ensure productivity, profitability while maintaining ecosystems sustainability.
- Alley cropping is one of the most popular agroforestry system practiced around the world where trees and crops are combined together for triumphing ecological and economic benefits. Traditionally smallholder farmers of Bangladesh grow vegetables in between the alleys of fruit and timber yielding trees for income generation.
- Previous researches focused on identifying tree-crop combination only in terms of production. But it is also necessary to assess the profitability and nutritional quality of crops produced in different ecosystems.

2. Materials and methods

Study area

Agroforestry Research Field (25˚ 13'latitude and 88˚ 23' longitude, and about 37.5 m above sea level); Hajee Mohammad Danesh Science and Technology University, Bangladesh

Fig.1 Litchi-Tomato alley cropping system in Dinajpur, Bangladesh

Treatments

- ❑ Sole cropping of tomato
- ❑ Tomato cultivation in the alleys of Litchi (*Litchi chinensis*) tree

Design

- ❑ Randomized complete block design with three replications

Management practices

Management practices such as weeding, fertilization, irrigation, crop protection measures etc were performed during appropriate stages of tomato production. Management practices were also carried out for litchi production.

3.Results

Yield and Profitability

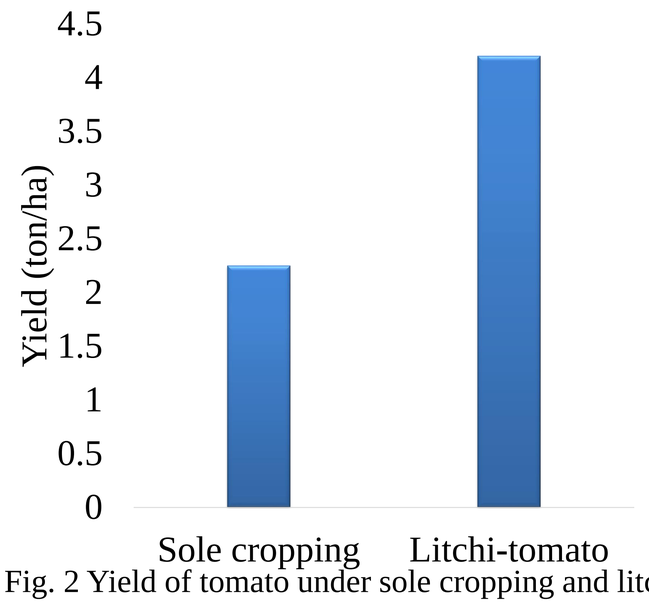

Fig. 2 Yield of tomato under sole cropping and litchi-tomato intercropping

✓ Tomato production was higher in sole cropping than intercropping.

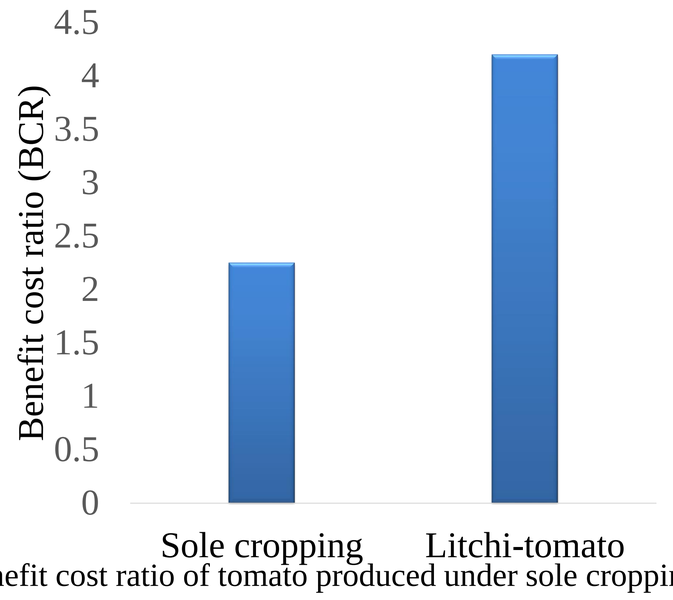

Fig. 3 Benefit cost ratio of tomato produced under sole cropping and alley cropping.

✓ BCR was higher in alley cropping than sole copping of tomato

Fruit quality

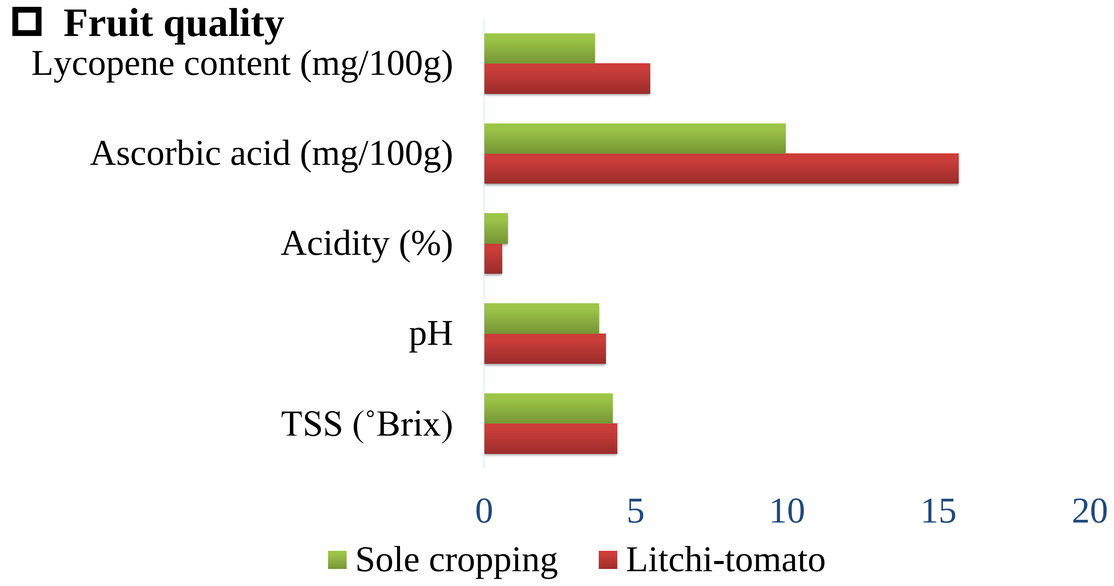

Fig. 4 Quality parameters of tomato produced under sole cropping and alley cropping

✓ Lycopene content, ascorbic acid, pH and TSS content were significantly (P<0.01) higher in alley cropping where as acidity (%) were significantly (P<0.01) higher in sole cropping than tomato alley cropping

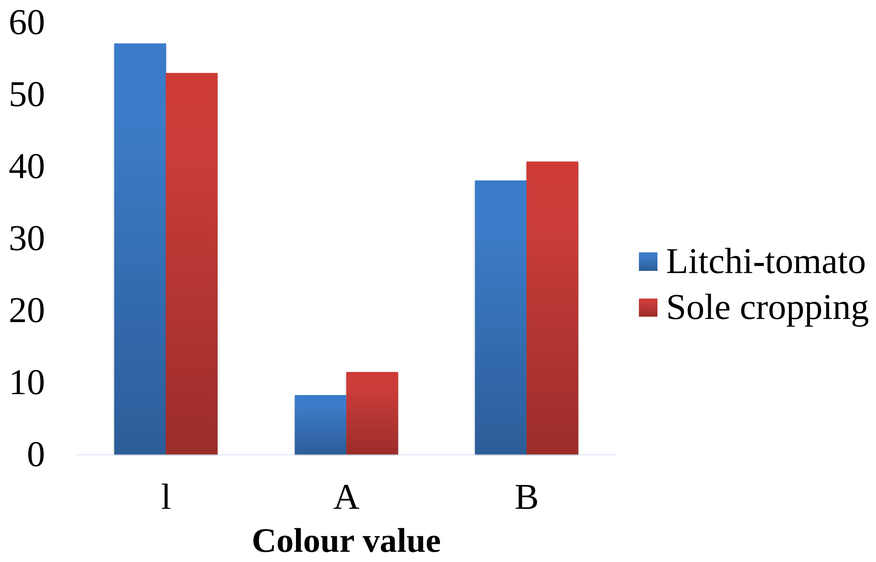

Fig. 5 Fruit colour of tomato grown in alley cropping and sole cropping

✓ Fruit colour (A and B) was highest in sole cropping and colour (l) was highest in alley cropping of tomato

4.Conclusions

- ❑ Alley cropping of tomato can provides higher profitability despite of low yield was mainly due to the income from litch fruit.
- ❑ Fruit quality of tomato was enhanced by partial shade in alley cropping. Tomato plants received 40-50% total light which has improved fruit quality.
- ❑ The findings from this study are valuable for the farmers and policymakers as litchi-tomato alley cropping system ensures production upholding nutritional quality and profitability.

5.References

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