

# Determination of anti-nutritional factors that present in underutilised legumes

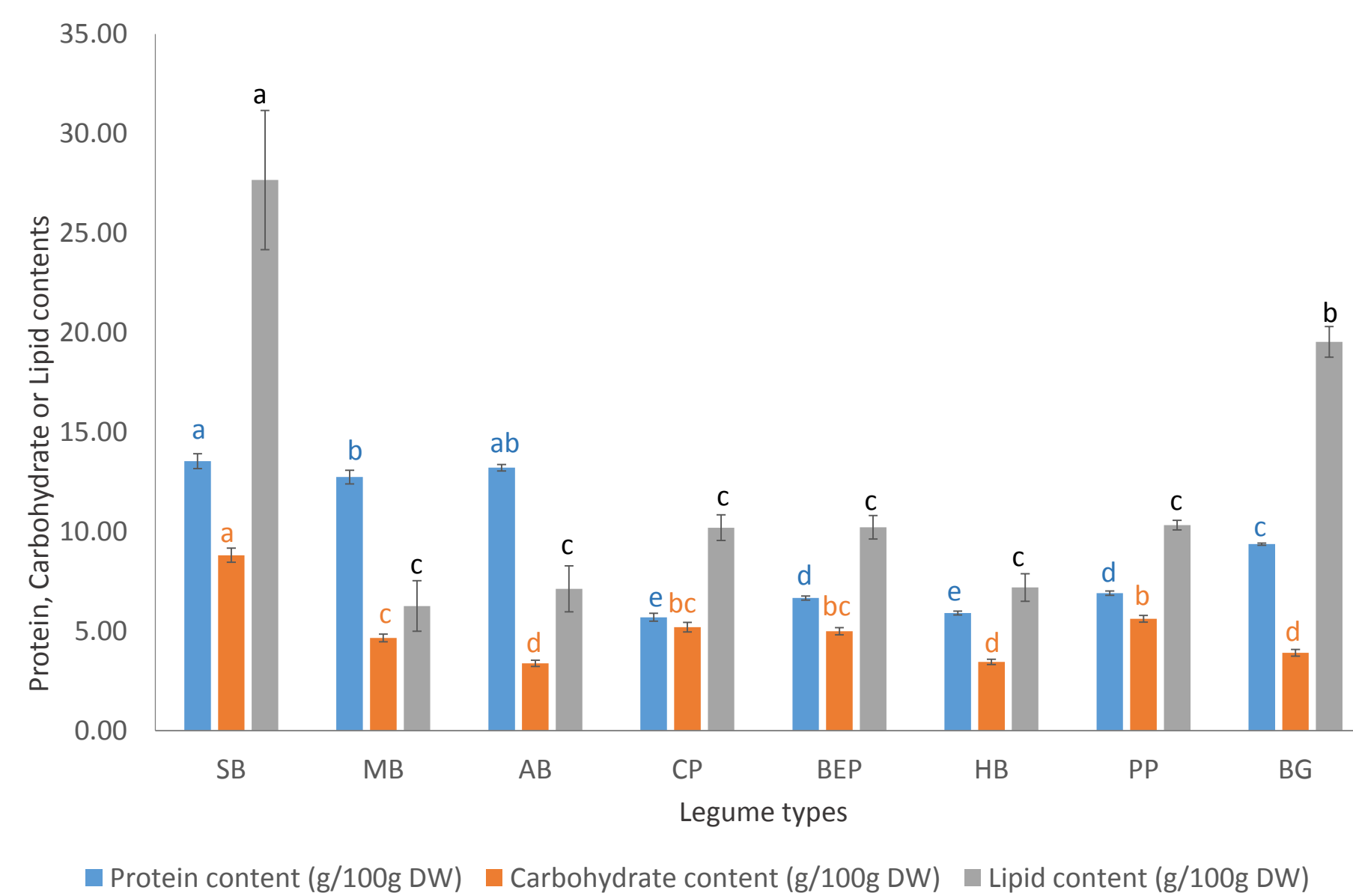
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## Introduction

Aquaculture provides a solution for the increasing world demand of protein source, but the world supply of fish meal and fish oil to produce traditional aquafeed is finite. Hence the urgency to ensure the sustainability of aquaculture industry has triggers the researchers to investigate on the potential of using plant-based aquafeed, such as underutilised legumes, as a potential alternative source to traditional aquafeed. However, legumes might contain anti-nutritional factors (ANFs) that might reduce the ability of fish to digest, utilise and absorb nutrients. Prior to application of underutilised legumes as potential aquafeed, this study was carried out to determine the types of ANFs present in underutilised legumes. The outcome of this study could provide substantial base-line information to allow future application of processing methods to reduce ANFs in legumes.

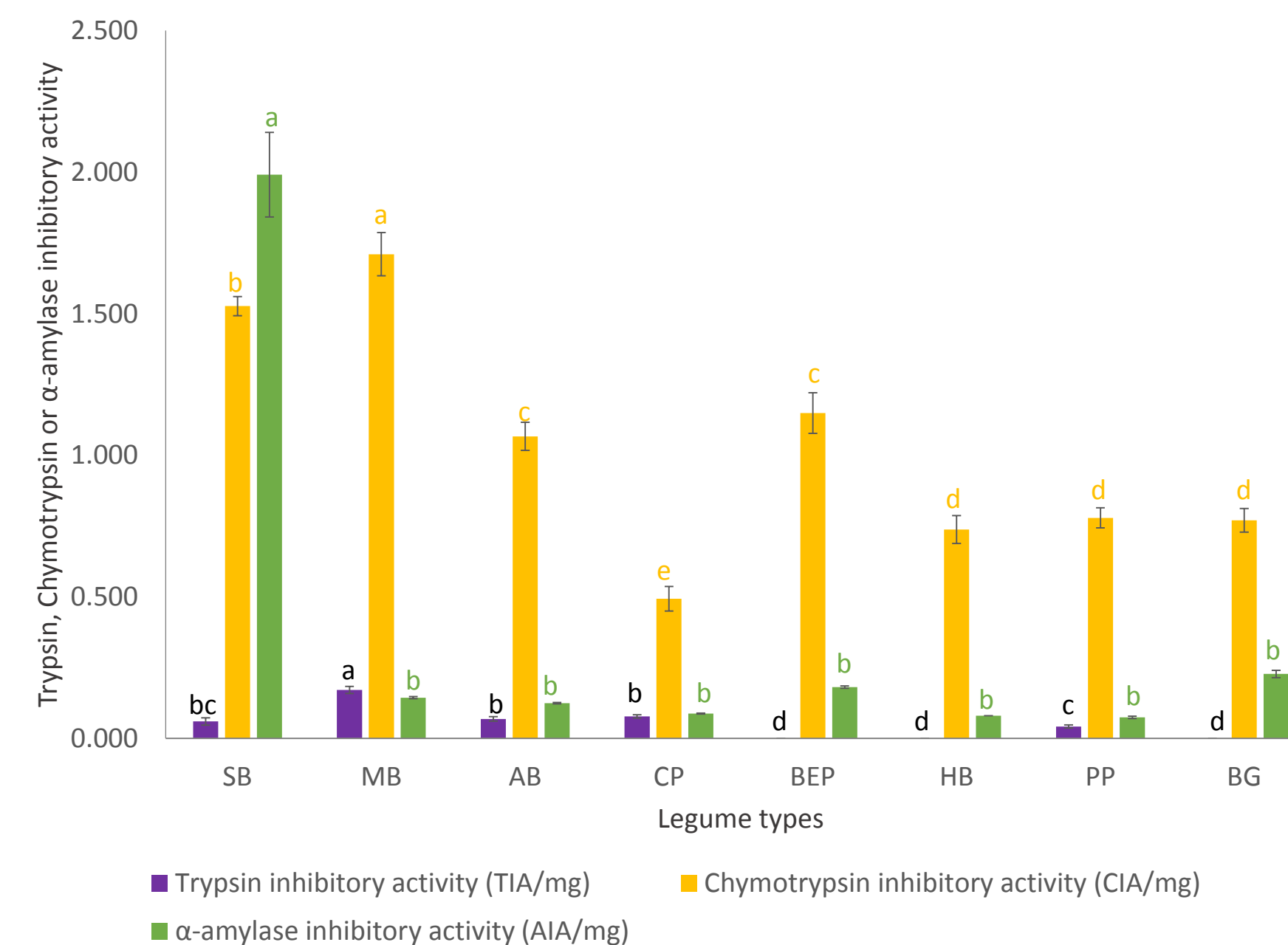
## Results & Discussion



Note:  
Superscripts with same colour represented values are significantly different at  $p < 0.05$  for that particular assay

Figure 1: Nutritional compositions for various underutilised legumes

Protein content of SB was the highest followed by AB and MB. Carbohydrate content of SB was significantly higher than the rest of the tested legumes followed by PP. The lipid content was found to be greater in SB followed by BG.



Note:  
Superscripts with same colour represented values are significantly different at  $p < 0.05$  for that particular assay

Figure 2: Anti-nutritional factors composition for various underutilised legumes

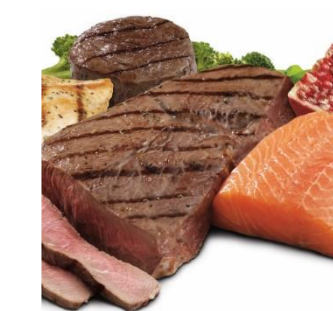
Trypsin inhibitory activity of MB was higher than the tested legume while there is no detectable activity in BEP, HB and BG. Chymotrypsin inhibitory activity of MB was highest followed by SB.  $\alpha$ -amylase inhibitory activity of SB was the highest.

## Methodology



### Legumes used:

Bambara groundnut (BG), Mung bean (MB), Adzuki bean (AB), Chickpea (CP), Black-eyed pea (BEP), Hyacinth bean (HB), Pigeon pea (PP) & Soybean (SB; as control)



### Determination of nutritional compositions:

Protein content (Bradford method)

Carbohydrate content (Phenol-sulfuric acid method)

Lipid content (Soxhlet method)



### Determination of ANFs:

Trypsin inhibitory activity (Kakade *et al.*, 1974)

Chymotrypsin inhibitory activity (Sathe & Salunkhe, 1981)

$\alpha$ -amylase inhibitory activity (Deshpande *et al.*, 1982)

## Conclusion

Underutilised legumes are good alternative sources to commercial legume (SB) in terms of protein and carbohydrate contents. They contain ANFs that could affect the digestion of protein and carbohydrate. Hence, it is essential to explore various processing methods that could be used to reduce or eliminate these ANFs prior to application as plant-based aquafeed in the next stage of the study.

## Acknowledgement

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## References

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