

An insight into the antimalarial and antioxidant properties and pharmacognostic standards of the leaves of *Bambusa vulgaris* (Schrad). ex J.C.Wendl.

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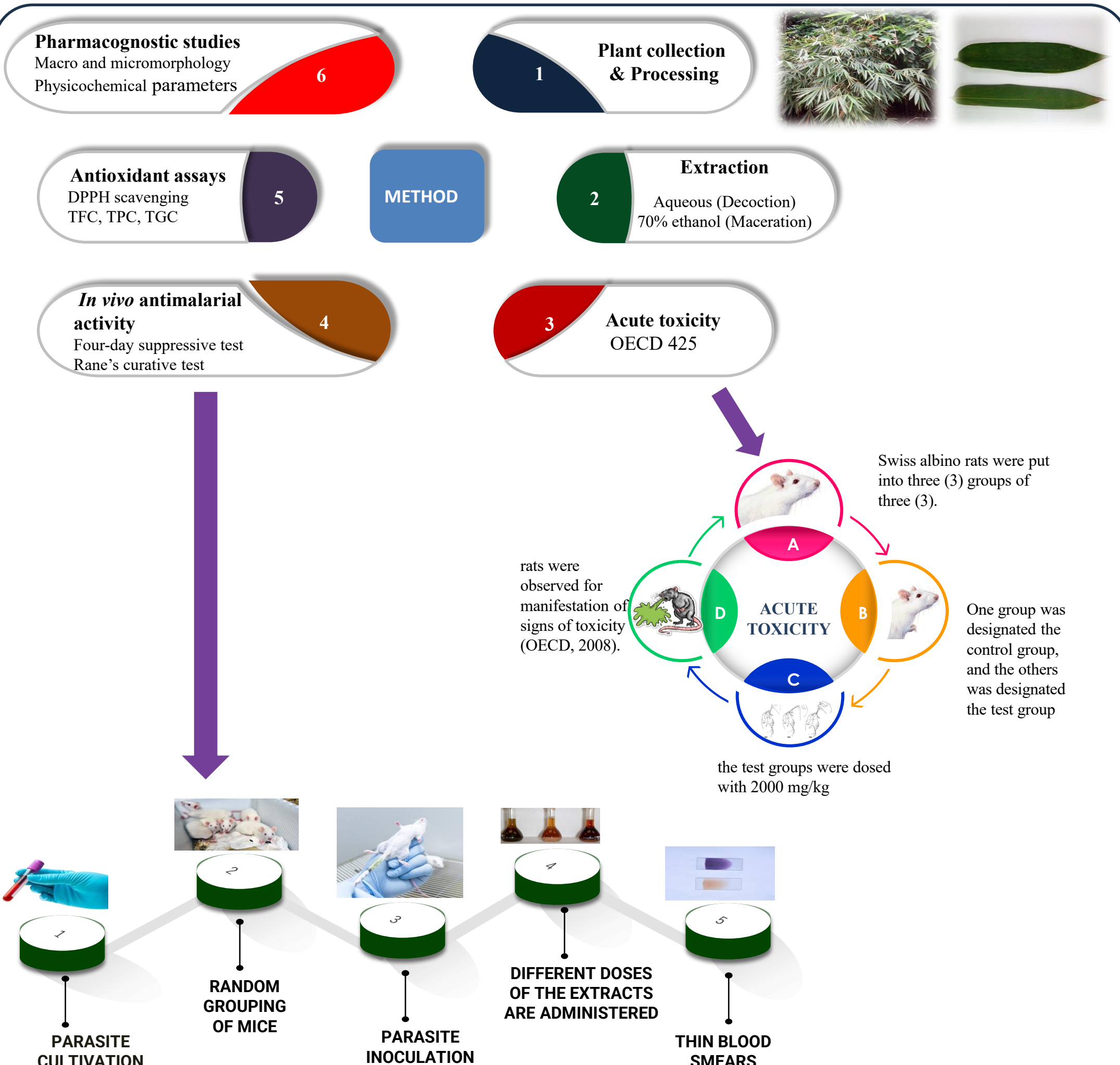
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INTRODUCTION & AIM

- ❑ In many African societies, traditional medicine, which largely employs medicinal plants, forms a substantial part of their healthcare practices, leading to the development of elaborate folkloric knowledge in the use of medicinal plants (WHO, 2023).
- ❑ However, the translation of this practice to formulating scientifically and clinically accepted products is hindered by a lack of scientific evidence on the safety, efficacy and quality of medicinal plants.
- ❑ This underscores scientific investigations to validate medicinal plants, such as *Bambusa vulgaris* (Schrad). Ex J.C. Wendl, utilised in Ghana for treating malaria (Komlaga, 2015), which remains endemic in the country (WHO, 2024).
- ❑ This study, therefore, aimed to investigate the *in vivo* antimalarial efficacy of aqueous (BVA) and hydroethanolic (BVE) leaf extracts of *B. vulgaris* against *Plasmodium berghei*-infected mice, alongside their antioxidant activity and pharmacognostic standards

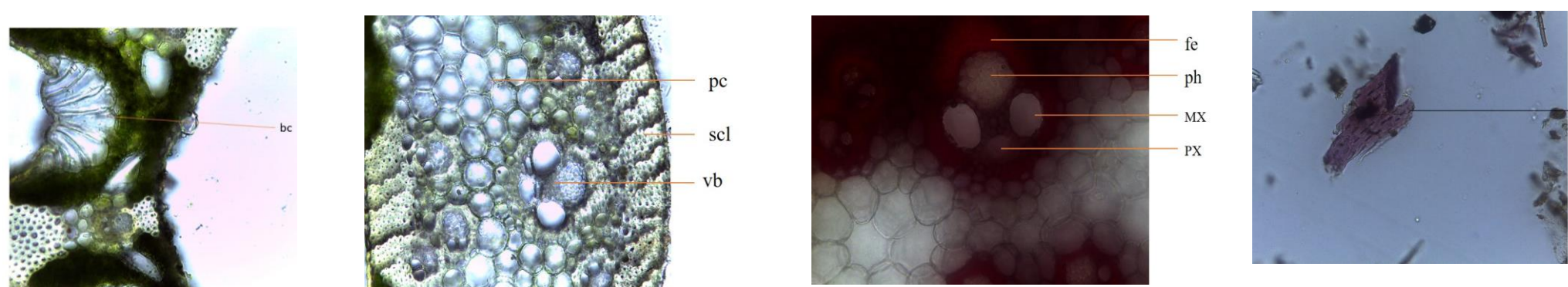
METHOD



RESULTS & DISCUSSION

PHARMACOGNOSTIC STANDARDS

- The leaves are simple, sessile, and linear with parallel venation, an entire margin, and an aristate apex.
- Microscopic examination revealed pyramidal bulliform cells, collenchyma layers, and closed, collateral vascular bundles scattered in the ground tissue.



RESULTS & DISCUSSION

Acute toxicity test

The animals showed no gross physical and behavioural changes such as rigidity, sleepiness, diarrhoea, abnormal secretion and hair erection for 24 h. All the rats survived the 2-week experiment, and the LD₅₀ was estimated to be >2000 mg/kg body weight.

In vivo antimalarial assay

In the four-day suppressive test, BVE exhibited parasitaemia suppression and an ED₅₀ of 90.68 ± 1.53% at 400 mg/kg and 177.83 ± 16.36 mg/kg, respectively. BVA, similarly, provided a suppression and an ED₅₀ of 84.98 ± 1.62% and 281.84 ± 22.31 mg/kg. In the curative test, BVA achieved a % suppression of 63.15 ± 1.53 at 400 mg/kg and an ED₅₀ of 234.42 ± 10.28 mg/kg (Table 1). Both extracts prolonged the survival (Table 1) and prevented the body weight loss (Figure 1A) and reduced haematocrit (Figure 1B) of experimental mice.

Table 1: Percentage suppression and median survival time of mice in the antimalarial assay.

Dose (mg/kg)	BVA		BVE	
	Suppressive test	Curative test	Suppressive test	Curative test
	% Suppression	MDST	% Suppression	MDST
NC	0.00 ± 0.00	7	0.00 ± 0.00	8.5
100	67.66 ± 2.01 ^a	16	37.49 ± 1.82 ^a	17
200	68.46 ± 1.85 ^a	22	47.53 ± 1.60 ^a	20.5
400	84.98 ± 1.62 ^a	25	63.15 ± 0.97 ^a	27.5
PC (4mg/kg)	97.00 ± 0.25 ^a	30	92.45 ± 0.70 ^a	29.5

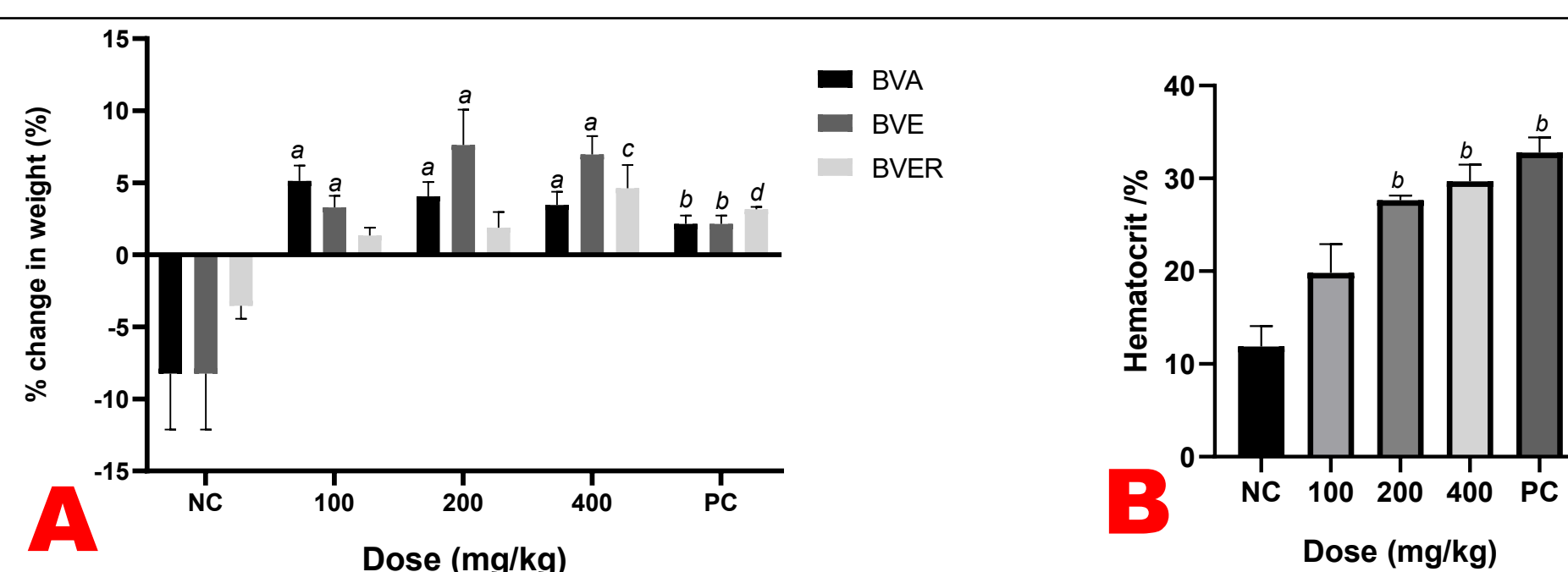


Figure 1: Effect of BVA on body weight and body temperature of mice in Rane's test. n = 5. Values are significantly different at ^ap < 0.0001, ^bp < 0.001, ^cp < 0.005, ^dp < 0.05.

Antioxidant assays

Both extracts demonstrated a dose-dependent increase in free radical scavenging activity. BVE, however, exhibited a greater antioxidant activity with an IC₅₀ of 851.3 µg/mL, compared to 1552 µg/mL, as determined by BVA (Figure 2A). BVE exhibited significantly (p<0.0001) higher TFC and TPC levels than BVA. BVA showed a higher GSH level than BVE (Figure 2B).

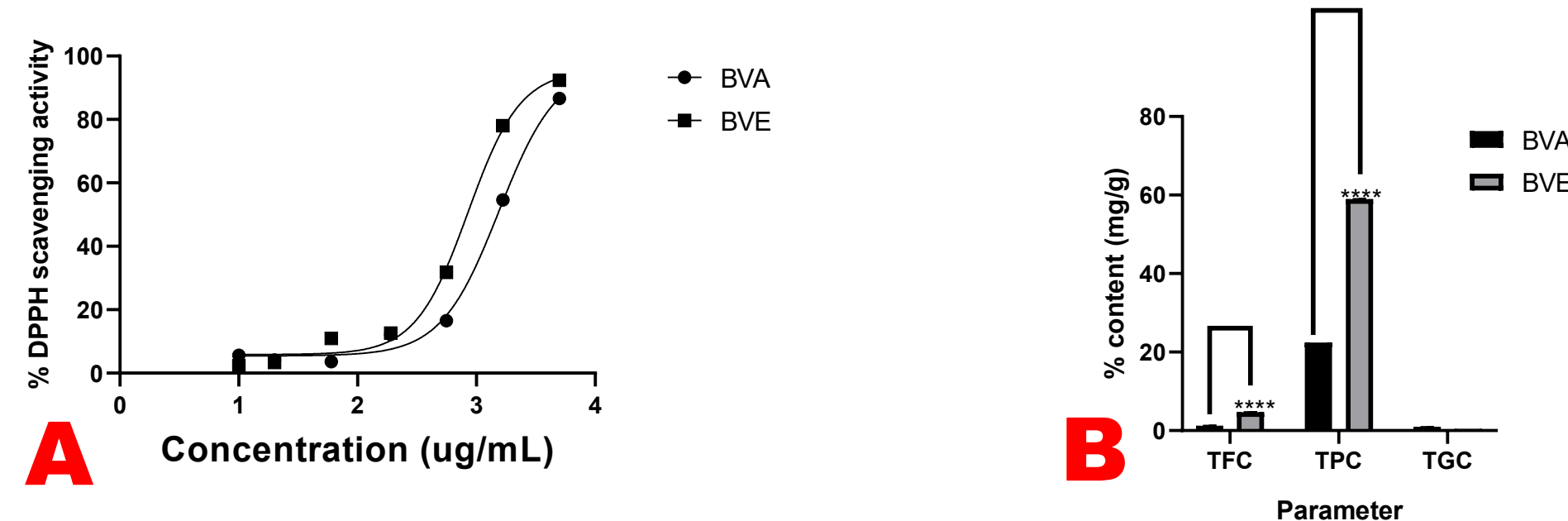


Figure 2: DPPH radical scavenging activity (A) and TFC, TPC, and TGC (B) of BVA and BVE.

CONCLUSION

- The aqueous and hydroethanol extracts of the leaves of *Bambusa vulgaris* demonstrate antimalarial activity and exhibit antioxidant properties.
- Pharmacognostic standards have been established that are suitable for the development of a monograph for *B. vulgaris* leaves.
- These results validate the traditional use of *B. vulgaris* for malaria treatment in Ghana and provide standard parameters for its quality control.

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