

## Short Article

## Toxicity and Phytochemical Activity of R-Mixture Formulated By Naturopathic Medical Student as Anti-Malarial Product

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**Abstract:** *Aim:* This paper addresses the toxicity, microbial and phytochemical and physicochemical studies of R-Mixture, an herbal product formulated by one student studying Naturopathic and Holistic Medicine at Nyarkotey College of Holistic Medicine, Tema community, 7, Ghana for Malaria treatment. *Method:* Six (6) samples of R-Mixture were sent to the Kwame Nkrumah University of Science and Technology, KNUST, Ashanti region, Ghana to the Department of Herbal Medicine for analysis. *Result:* The Product, R-Mixture have been established for quality control purposes and is safe in laboratory animals. *Conclusion:* The Product is safe for use in Ghana.

**Keywords:** R-Mixture, Health, Toxicity, Herbal, Product.

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## METHODOLOGY & FINDINGS

**Table 1** Acute Toxicity

Animal Species	No. of animals/group	Route of administration	Doses administered	No. of death Recorded	Approx. Lethal dose	Duration of study
Sprague-Dawley Rats	18 males, 3 groups (n=6)	oral	0, 6.06 and 12.12g/kg	No deaths recorded	Above 12.12 g/kg	48h

### REMARKS

A volume of 750ml of the mixture was evaporated to dryness to obtain a semi-solid mass (Yield=5% w/v) this was reconstituted by dissolving in distilled water (2g/ml). Rats were treated with 0, 6.06 and 12.12g/kg of the test product and observed over 48hours for signs of toxicity.

None of the animals died during the study period and no signs of toxicity attributable to the test

product treatment were observed. The lethal dose (LD50) of the product was estimated to be above 12.12g/kg (**Table 1**).

### CONCLUSION

The results indicate that the LD50 of the extract from R-Mixture was greater than 12.12g/kg body weight in rats. Which can be regarded as of low toxicity in the rats.

**Tab 2- Phytochemical And Physicochemical Studies**

<b>R – MIXTURE</b>	
NAME	R - Mixture
INDICATION	Not stated
ACTIVE INGREDIENTS	Not stated
DATE OF MANUFACTURE	Not stated
DATE OF EXPIRY	Not stated
BATCH NUMBER	Not stated
PRODUCED BY	REDEEMER HERBAL CLINIC AND RESEARCH CENTRE LTD.
<b>1.ORGANOLEPTIC PROPERTIES</b>	
Form	Liquid
Colour	Brown
Taste	Bitter
Odour	Characteristic
<b>2. PHYSICOCHEMICAL PROPERTIES</b>	
Ph	5.39
Dry weight per Ml	0.2176g
Specific gravity/Ml	0.9998
<b>3. PHYOCHEMICAL PROPERTIES</b>	
Reducing sugars	Positive
Saponins	Positive
Alkaloids	Not detected
Flavonoids	Positive
Phytosterols	Positive
Terpenoids	Positive
Tannins	Positive

**Tab 3.**

<b>4. FOURIER-TRANSFORM INRARED FINGERPRINT OF R – MIXTURE</b>
<b>Sample preparation:</b> About 20Ml of the herbal mixture was evaporated to dryness.
<b>Instrumentation:</b> A small amount of the dried mixture was placed on the sample area of the Bruker Fourier transform infrared (FT-IR) spectrometer and scanned between 4000-400cm <sup>-1</sup> with a resolving power of 4cm <sup>-1</sup> and a cumulative scanning limitation of 24times.
<b>Results:</b> Principal peaks appeared at wavenumbers 3335.43 (broad), 1609.46 (weak) and 1027.12 (strong) cm <sup>-1</sup>
<b>Comments:</b> Fourier-Transform Infrared (FT-IR) Fingerprint of R – Mixture has been established for reference.

**Tab 4**

<b>Microbial Analysis of R-Mixture</b>
<b>Microbial Test Protocol-(BP Level of Microbial Contamination)</b>
1. Assessment of total viable count of aerobic bacteria and fungi)
2. Test for specific harmful organisms.

## Test Results

### Level of Microbial Contamination

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1. The total aerobic viable count of sample (BP 2018 Specification- $\leq 1 \times 10^5$ cfu/mL)	2.76x10 <sup>2</sup> cfu/mL
2. Test for Escherichia coli- MAC /37°C/48hrs (BP 2018 Specification- Nil/ML)	None detected
3. Test for Staphylococcus aureus-MSA/37°C/48hrs (BP 2018 Specification- Nil/ML )	None detected
4. Test for Salmonella spp. BSA/37°C/48hrs (BP 2015 Specification - Nil/mL)	None detected
5. Test for Pseudomonas aeruginosa PCA/37°C/48hrs (BP 2015 Specification - Nil/mL)	None detected
6. Test for Yeast and Moulds - SB/25°C/5days (BP 2015 Specification - $\leq 1.0 \times 10^5$ cfu/mL)	2.56 x 10 <sup>2</sup> cfu/mL

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## REMARKS

1. The bacterial load obtained for aerobic viable count was within the acceptable limit.
2. The fungal load was also within the acceptable limit (BP 2015).
3. No harmful microorganisms were detected.

## DISCUSSION

The product R-Mixture contains important phytochemicals such as: saponins, Flavonoids, Tannins and Alkaloid is the only phytochemical absent in the product (**Tab 2**). it is safe to be used and has successfully passed the toxicological and microbial analysis conducted.

None of the laboratory rats died in the process (**Table 1**). Toxicity of Herbal products are a subject of both local and international interest in the health sector as more patients turned to these remedies for their health. Toxicity of herbal products Pharmacovigilance for complementary medicines is at the gestational stage (Barnes, J. 2003). Data are lacking in several areas relevant to safety. Standard pharmacovigilance tools have additional limitations when applied to investigating safety concerns with complementary

medicines. It is therefore paramount for all herbal medicinal products to get tested and approved by the FDA in Ghana before commercialization.

## CONCLUSION

The Product, R-Mixture is safe and has successfully passed the toxicological and microbial analysis conducted at the Kwame Nkrumah University of Science and Technology, KNUST, Ashanti Region, Ghana.

**Conflict of Interest:** None

### Acknowledgement

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## REFERENCES

1. Barnes, J. (2003). Quality, efficacy and safety of complementary medicines: fashions, facts and the future. Part II: Efficacy and safety. *Br J Clin Pharmacol*, 55(4), 331-40.