

AmaXhosa IKS-Inspired Ru(II) Complex: A Concept for Umhlonyane Guided Anticancer Design

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Introduction

Modern drugs like cisplatin heal cancer but cause kidney failure and hearing loss- too toxic for rural clinics with few hospitals.

In Hogsback, Eastern Cape Province in South Africa^a, elders use umhlonyane (*Artemisia afra*/African Wormwood) ash for digestive problems, fever, inflammation, infection, respiratory relief and stomach pain. However, the active chemical principle is unknown, so this IKS cannot be standardized into safer medicine. .

Hypothesis

We hypothesize sulfur compounds in plant ash bind metals to form active complexes [1, 2]. This study models that interaction using Ruthenium-Sulfur complexes to bridge IKS wisdom with drug discovery for a resilient future. The aim of this study is to model sulfur-metal binding from Hogsback umhlonyane ash using ruthenium-thiourea complex as a step towards developing safer anticancer IKS-informed medicine for resilient African communities.

Methodology

Column A: IKS Source

Column B: Lab Model Today

Column A: IKS Source: umhlonyane (*Artemisia afra*/African Wormwood)

Sample Collection: Hogsback elders to guide harvest

Donor 1: Sulfur compounds in plant of umhlonyane (*Artemisia afra*)

Preparation: Plant burned → collection of ash and weight of ash

Reason: Contains S-compounds in ash

Stage:Phase 2: Future work

Method: Complex with Ru²⁺ after confirmed model.

Column B: Lab Model-Thiourea CS(NH₂)₂

Laboratory Foundation/Helper: 2,2-bipyridine

Donor 2: Pure sulfur donor from thiourea

Reagent: Commercial reagent grade of thiourea CS(NH₂)₂

Preparation: Dissolved in water/ethanol

Reason: Simple S-donor mimics plant S atom.

Stage: Phase 1 : This study in this poster.

Method: Synthesized Ru²⁺ -thiourea complex →Test S-binding stability.

Equation of reaction

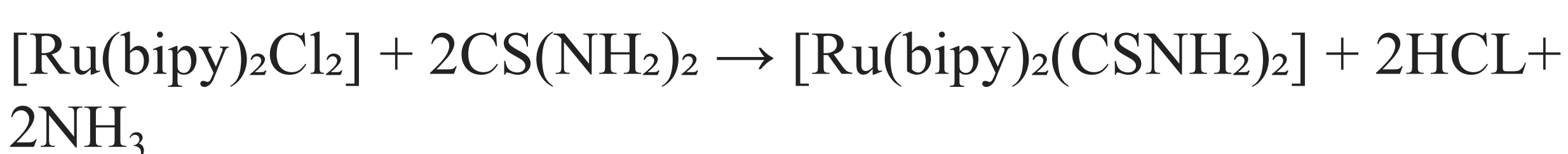


Table 1: Hogsback Practice UFH Model Today Future Drug

Hogsback Practice	UFH Model Today	Future Drug
Ash + umhlonyane paste	Ru-thiourea complex	Ru-umhlonyane drug
Sticks, dries, and heals	Ru-S bond stable	Light-activated therapy
Generations of use	Lab-tested and controlled	Less kidney damage versus platinum

Design Principle

Here, Cognitive Load Theory (CLT) was used to simplify the comprehension, engagement, understanding, and application of Ru-NS complex.

Conclusion

Model proven: Ru-thiourea complexes form stable Ru-S bonds, confirming sulfur from imlonyane ash can bind metals.

IKS validated: Elder use of umhlonyane ash for cancer-related sores has chemical basis in S-metal binding.

Future impact: This Phase 1 model sets stage for **Phase 2:** test real umhlonyane extract against cancer cells to develop safer, IKS-informed medicine for rural communities.

From Hogsback elders' fire → to Ru-S bond → to future anticancer medicine. We proved Ru can bind S from umhlonyane model. 2. This explains why elders' ash works.

Next step is test real plant on cancer cells. Poster bridges fire + chemistry + hope. Ru-S binding model confirms sulfur from imlonyane ash can form stable complexes. This validates elder wisdom and opens path to safer anticancer medicine from indigenous knowledge.

Computational docking will assess DNA intercalation; electrochemical studies will evaluate E_{1/2} for ROS modulation relevant to cancer selectivity.

References

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