

Comparative analysis of *Chrysobalanus icaco* and *Ixora coccinea* from Adazi-Nnukwu, Anambra State, Nigeria

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Abstract

This study presents a comparative evaluation of the phytochemical and proximate compositions of two ornamental and medicinal plant species, *Chrysalides cacao* and *Ixora coccinea*, collected from Adazi-Nnukwu, Nigeria. Using standard gravimetric and AOAC methods, we analyzed phytochemical constituents including tannins, alkaloids, flavonoids, saponins, cardiac glycosides, cyanogenic glycosides, steroids, anthocyanins, phytates, and phenols, as well as nutritional components such as protein, fat, fiber, moisture, ash, and carbohydrate. *C. coco* showed higher levels of alkaloids (10.14%), steroids (4.25%), and moisture (66.24%), while *I. coccinea* had greater flavonoid (10.91%), carbohydrate (18.05%), and cardiac glycoside (5.22%) contents. Both species exhibited important ethnobotanical values, including edible uses, medicinal applications, and environmental relevance. These results highlight the need for conservation efforts to ensure the sustainability of these plant species in southeastern Nigeria.

Keywords: *Chrysobalanus icaco*; *Ixora coccinea*; Phytochemical analysis; Proximate composition; Medicinal plants; Nigeria

1. Introduction

Medicinal plants have long served as essential resources in traditional healthcare systems and modern pharmaceutical development. *Chrysalides' coco* (cocoplum) and *Ixora coccinea* (jungle geranium) are two prominent ornamental and medicinal plant species valued for their therapeutic, nutritional, and aesthetic benefits. Despite their wide use, comparative scientific studies on these species within the Nigerian context remain limited. This study investigates and compares their phytochemical and proximate compositions to validate their traditional uses and identify their potential for pharmaceutical and nutritional applications.

2. Materials and Methods

- **Study Area** Plant samples were collected from Adazi-Nnukwu, Anaocha Local Government Area of Anambra State, Nigeria (latitude 7.02741°, longitude 6.10657°).
- **Sample Collection and Preparation** Fresh branches of *C. icaco* and *I. coccinea* were harvested and processed for laboratory analysis. Samples were air-dried, ground, and subjected to both phytochemical and proximate evaluations.
- **Phytochemical Analysis** Qualitative and quantitative phytochemical analyses were carried out using standard methods described by Harborne (1993) and Obadoni and Ochuko (2001). Parameters measured included tannins, alkaloids, flavonoids, saponins, cardiac glycosides, cyanogenic glycosides, steroids, phytates, phenols, and anthocyanins.

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- **Proximate Analysis** Moisture, ash, fat, fiber, protein, and carbohydrate content were determined using AOAC (1990) procedures. Carbohydrate content was derived by difference.
- **Statistical Analysis** All quantitative data were obtained in duplicate and expressed as mean values. Descriptive statistics were computed for each parameter. Due to the limited sample size and experimental nature of this undergraduate study, formal inferential statistical tests (e.g., t-tests or ANOVA) were not conducted. However, comparative interpretations were drawn based on observed differences between the mean values of the two plant species. Future studies are recommended to incorporate replication and hypothesis testing for statistical validation.

3. Results

Table 1 Phytochemical Composition *C. icaco* had higher alkaloids (10.14%) and steroids (4.25%) than *I. coccinea* (7.45% and 3.42% respectively), while *I. coccinea* showed higher flavonoids (10.91%) and cardiac glycosides (5.22%)

Parameters	<i>Ixora coccinea</i>	<i>Chrysobalanus icaco</i>
Tannin	3.080	3.813
Alkaloids	7.447865	10.13917
Flavonoids	10.90819	9.530792
Saponins	4.955401	3.672457
Phytate	0.552	0.457
Cardiac Glycoside	5.218688	3.219416
Cyanogenic Glycoside	0.648	0.540
Steroid	3.421	4.254
Anthocyanin	3.264	3.542

Table 2 Proximate Analysis

Parameters	<i>Ixora coccinea</i>	<i>Chrysobalanus icaco</i>
Moisture content%	61.523	66.236
Fat content%	0.799	0.650
Ash content%	3.848	3.190
Fibre content%	5.629	8.113
Protein content%	10.15	11.2
Carbohydrate content%	18.053	10.611

Table 3 Comparative Presentation of the Botanical Attributes of *Ixora coccinea* and *Chrysobalanus icaco*

Comparison	<i>Ixora coccinea</i>	<i>Chrysobalanus icaco</i>
Common Family	Rubiaceae	Chrysobalanaceae
Height	1.2-1.8m	1-6m
Flower Colour	Yellow, red, orange, pink, ivory	White
Fruit Colour	Red, purple, Rose	Black, red, violet
Leaf Shape	Ovate	Elliptic
Growth Form	Perennial	Perennial
Habit	Oval or rounded	Rounded
Type	Broadleaf evergreen	Shrub

Table 4 Comparative Presentations of Utility Indices of *Ixora coccinea* and *Chrysobalanus icaco*

Parameters	<i>Ixora coccinea</i>	<i>Chrysobalanus icaco</i>
Food	Yes	Yes
Medicine	Wounds, skin ulcers, hiccups, Nausea, Anorexia	Gallbladder diseases, Kidney problems
Fuel wood	Yes	Yes
Aesthetics	Beautification, Showy purposes	Beautification, Landscape designing, Showy purposes
Edible uses	Yes	Yes
Environmental uses	Air purification	Air purification

4. Discussion

The significant differences observed between the two species support their varied ethnobotanical uses. The higher alkaloid and protein content in *C. coco* align with its use in traditional remedies for kidney and gallbladder issues. The elevated flavonoid and cardiac glycoside levels in *I. coccinea* support its use in skin treatment and cardiovascular applications. The nutritional values observed also make both species viable dietary supplements.

5. Conclusion

This study confirms that *C. coco* and *I. coccinea* possess significant phytochemical and nutritional properties. Their conservation is crucial in light of environmental degradation in southeastern Nigeria. Future research should focus on bioassay-guided fractionation to identify active compounds.

Compliance with ethical standards

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Disclosure of conflict of interest

The author wish to declare that there were no conflicts of interest

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