

Comparative Assessment of Phytochemical Constituents of *Raphia Vinifera* P.Beauv and *Raphia Hookeri* G. Mann & H. Wendl.

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Abstract: This study involved the comparative analysis of the phytochemical constituents of the fruits of *Raphia vinifera* and *Raphia hookeri*. The fruits were obtained from the Wilberforce Island, Bayelsa State, Nigeria. The fruits were processed and pulp obtained and analyzed for Alkaloids, Saponins, Flavonoids, Glycosides, and Tannins concentration following standard methods for the quantitative determination of phytochemicals in plants. Results showed that Alkaloid, Saponin, Tannins, Flavonoids and Glycosides content were 21.58±0.08%, 5.30±0.14%, 7.23±0.27%, 7.09±0.24% and 0.08±0.00%, respectively for *Raphia hookeri*, and 22.00±0.34%, 0.35±0.49%, 4.61±0.00%, 1.99±0.04% and 0.10±0.00%, respectively for *Raphia vinifera*. There were significant variations ($p < 0.05$) between *Raphia hookeri* and *Raphia vinifera* with respect to flavonoids, saponin, and tannins. Also no significant variation ($p > 0.05$) exist in the alkaloid content of both plants (*Raphia hookeri* and *Raphia vinifera*). The study showed that *Raphia hookeri* possess significantly higher phytochemicals compared to *Raphia vinifera* for most of the parameters studied. This suggests that *Raphia hookeri* may confer more potent pharmacological properties than *Raphia vinifera*. Based on the finding of this preliminary investigation into the medicinal properties of *Raphia hookeri* and *Raphia vinifera*, there is the need for research to focus on the specific medicinal properties of the fruit pulps.

Keywords: Medicinal plant, Phytochemicals, *Raphia hookeri* and *Raphia vinifera*

1. INTRODUCTION

Several palm trees belonging to different genera including *Elaeis*, *Borassus*, *Raphia*, *Eremospatha*, *Phoenix*, *Calamus*, *Podococcus*, *Hyphaene*, *Ancistrophyllum*, *Sclerosperma* and *Oncocalimuns* are found in Nigeria (Obahiagbon, 2009; Okon and Okorji, 2014; Oluwaniyi *et al.*, 2014; Oduah and Ohimain, 2015). The genus *Raphia* is one of the largest palm that is African, especially in West Africa. In addition, *Raphia* (*Raphia* sp) palms are among the most diverse and geographically wide spread palms (Kigigha *et al.*, 2015a). *Raphia* palm are frequently spelled as “Raffia” (Oduah and Ohimain, 2015; Ohimain *et al.*, 2012, 2015) or “*Raphia*” (Obahiagbon and Osagie, 2007; Obahiagbon, 2009) in literatures.

Raphia palm is one of the palms that is found in the wild in the freshwater zone in many areas in the Niger Delta region of Nigeria (Oduah and Ohimain, 2015). According to Oduah and Ohimain (2015), *Raphia* palm is used for building construction, production of brooms, baskets, ropes and construction of fish, crab and turtle traps by the indigenous people of areas that they are found in the Niger Delta. The authors further reported that palm wine and locally fermented gin are produced from the *Raphia* palm.

There are several species of *Raphia* palm, but some the commonest are *Raphia vinifera* and *Raphia hookeri*. *Raphia hookeri* is found from Gambia through the Guinea forest zone of West Africa to Cameroon, Gabon and Congo and possibly to DR Congo and Angola (Brink, 2011). *Raphia hookeri* have been widely reported in fresh water zone in the Niger Delta region of Nigeria. Furthermore, *Raphia vinifera* is distributed from Benin eastwards to DR Congo, and it has been grown in Nigeria and Cameroon (Jiofack Tafokou, 2011). *Raphia hookeri* and *Raphia vinifera* are the

most commonly studied *Raphia* palms (Karamoko *et al.*, 2012; Ohimain *et al.*, 2012; Oduah and Ohimain, 2015; Obahiagbon, 2009; Obahiagbon and Osagie, 2007).

Several studies have been carried out with regard to *Raphia* palm in the Niger Delta including the effect of aqueous root extracts of *Raphia hookeri* in increasing metabolic clearance (MCR) rate of ethanol in rabbits (Akpan and Usuh, 2004), the use of mesocarp of *Raphia* palm to stupefy and catch fishes (Ohimain *et al.*, 2015), physicochemical characteristics and productivity of *Raphia* palm (Oduah and Ohimain, 2015).

The search for plants with medicinal properties has increased. Authors have attributed the pharmacological properties of medicinal plants to their bioactive and phytochemical constituents (Epidi *et al.*, 2016a,b; Izah and Aseibai, 2018; Izah *et al.*, 2018a –e; Izah, 2018; Kigigha *et al.*, 2018a,b). As such, the presence of phytochemicals in a plant provides preliminary information about its therapeutic properties. To this effect, authors have studied the phytochemical constituents of the pulp and seed of *Raphia hookeri* (Ogbuagu, 2008), leaf and epicarp of *Raphia hookeri* (Abimbola *et al.*, 2018) and fruits of *Raphia hookeri* and *Raphia farinifera* (Oluwaniyi *et al.*, 2014). This present study is aimed at a comparative assessment of the phytochemical constituents of *Raphia vinifera* and *Raphia hookeri*.

2. MATERIALS AND METHODS

2.1. Plant Collection and Identification

The fruits of *Raphia vinifera* and *Raphia hookeri* were obtained from the wild in freshwater forest zone in Wilberforce Island, Nigeria. The *Raphia* palms (*Raphia vinifera* and *Raphia hookeri*) were identified by a certified taxonomist. The fruits were processed and the pulps obtained were dried prior to quantitative phytochemical determination.

2.2. Phytochemical Analysis

The quantitative phytochemical analysis was carried out based on well-established standard procedures in literature viz: alkaloids (Harborne, 1973), flavonoids (Boham and Kocipal-Abyazan, 1994), tannins (Oluwaniyi *et al.*, 2014), Saponins were determined according to the method described by Okwu (2005) and cyanogenic glycoside by Alkaline Titration Method (AOAC, 1984).

2.3. Statistical Analysis

SPSS version 20 was used for the statistical analysis. Data were expressed as mean \pm standard deviation; Student t-test was carried out at $p = 0.05$ to show significant variation between *Raphia hookeri* and *Raphia vinifera* with respect to their phytochemical contents (flavonoids, saponins, glycosides, alkaloids and tannins).

3. RESULT AND DISCUSSION

Table 1 presents the phytochemical contents of the pulp of *Raphia hookeri* and *Raphia vinifera* fruits. The saponins contents in *Raphia hookeri* and *Raphia vinifera* were $5.30 \pm 0.14\%$ and $0.35 \pm 0.49\%$, respectively. There were significant variations ($p < 0.05$) in phytochemical contents between *Raphia hookeri* and *Raphia vinifera*. In this study the concentration of saponins were higher in the *Raphia hookeri* compared to *Raphia vinifera*. This suggests that *Raphia hookeri* may have a superior effect in possible pharmacological properties the plant may confer. Basically, saponins have been reported to have expectorant and cough suppressant potentials (Kigigha *et al.*, 2015b; Okwu, 2005; Osuntokun and Oluwafoise, 2015; Epidi *et al.*, 2016a, b). Authors have reported saponins contents of 0.36% and 0.23% in pulp and seed of *Raphia hookeri* (Ogbuagu, 2008). Oluwaniyi *et al.* (2014) reported 0.87%, 2.25% and 0.79% of saponins in shell, pulp and seed of *Raphia hookeri*. In *Raphia hookeri*, saponins have been reported in leaf and epicarp (Abimbola *et al.*, 2018) and aqueous root extract (Akpan and Usuh, 2004)

The tannins content in *Raphia hookeri* and *Raphia vinifera* were $7.23 \pm 0.27\%$ and $4.61 \pm 0.00\%$, respectively. There is significantly higher value in *Raphia hookeri* than in *Raphia vinifera*. Oluwaniyi *et al.* (2014) reported 0.00%, 0.60% and 0.00% of tannins in shell, pulp and seed of *Raphia hookeri*. Akpan and Usuh (2004) reported the presence of tannins in aqueous root extract of *Raphia hookeri*. Like many other phytochemical constituents, tannins play essential role in healing wounds, varicose

ulcers, hemorrhoids, frostbites and burns (Okwu and Okwu, 2004; Doherty *et al.*, 2010; Kigigha *et al.*, 2015b; Osuntokun and Oluwafoise, 2015; Youkparigha *et al.*, 2019a,b). In addition, tannins have anti-inflammatory and anti-diuretic activity.

The flavonoids content in *Raphia hookeri* and *Raphia vinifera* were $7.09 \pm 0.24\%$ and $1.99 \pm 0.04\%$, respectively. There is significantly higher value in *Raphia hookeri* than in *Raphia vinifera*. Oluwaniyi *et al.* (2014) reported 1.28%, 0.00% and 0.00% of flavonoids in shell, pulp and seed of *Raphia hookeri*. Ogbuagu (2008) reported flavonoids level of 0.40% and 0.24% in pulp and seed of *Raphia hookeri*. In *Raphia hookeri*, flavonoids have been reported in leaf and epicarp (Abimbola *et al.*, 2018) and aqueous root extract (Akpan and Usuh, 2004). Like saponins and tannins, the variation observed in the flavonoids concentrations in this study compared to other previous studies may be associated with the plant part used, their maturity status and the characteristics of the environment in which the palm was collected (Izah, 2018). Flavonoids are essential in treating tumours especially in the early stage of development. In addition, authors have widely reported antioxidant, anticarcinogenic and antimicrobial potentials of flavonoids (Kigigha *et al.*, 2015b; Youkparigha *et al.*, 2019a,b; Osuntokun and Oluwafoise, 2015).

Table 1. Phytochemical contents of the pulp of *Raphia hookeri* and *Raphia vinifera* fruits

Phytochemicals	Mean \pm Standard deviation	Mean \pm Standard deviation	t-value	p-value
	<i>Raphia hookeri</i>	<i>Raphia vinifera</i>		
Alkaloid, %	21.58 \pm 0.08	22.00 \pm 0.34	-1.698	0.232
Saponin, %	5.30 \pm 0.14	0.35 \pm 0.49	13.599	0.005
Tannins, %	7.23 \pm 0.27	4.61 \pm 0.00	13.782	0.005
Flavonoids, %	7.09 \pm 0.24	1.99 \pm 0.04	29.544	0.001
Glycoside, %	0.08 \pm 0.000	0.10 \pm 0.000	NA	NA

NA=Not applicable

The alkaloid level in *Raphia hookeri* and *Raphia vinifera* were $21.58 \pm 0.08\%$ and $22.00 \pm 0.34\%$, respectively, being not significantly different ($P > 0.05$) between *Raphia hookeri* and *Raphia vinifera*. The values recorded in this study are far higher than the values of 0.5% and 0.35% in fruit pulp and seed of *Raphia hookeri* by Ogbuagu (2008). Alkaloids have been reported in leaf and epicarp (Abimbola *et al.*, 2018) and aqueous root extract of *Raphia hookeri* (Akpan and Usuh, 2004). Alkaloids from medicinal plants have been reported to confer analgesic, antispasmodic and bactericidal activities (Epidi *et al.*, 2016a, b; Doherty *et al.*, 2010; Osuntokun and Oluwafoise, 2015).

The glycoside concentration in *Raphia hookeri* and *Raphia vinifera* were $0.08 \pm 0.00\%$ and $0.10 \pm 0.00\%$, respectively. The glycoside content in the *Raphia vinifera* was slightly higher than that of *Raphia hookeri*. Akpan and Usuh (2004) reported the presence of cardiac glycoside and cyanogenic glycoside in aqueous root extract of *Raphia hookeri*. Basically, glycosides possess analgesic, antipyretic, and anti-inflammatory activities (Youkparigha *et al.*, 2019a,b). In addition, some types of glycosides have been reported to play defensive roles in plants against pathogens (Aberoumand, 2012).

4. CONCLUSION

The study focused on the comparative analysis of phytochemical constituents of fruit pulp of *Raphia vinifera* and *Raphia hookeri* from Wilberforce Island, Nigeria. The study showed that *Raphia hookeri* possessed significantly higher quantities of phytochemicals compared to *Raphia vinifera*. An indication that *Raphia hookeri* may confer more potent therapeutic properties than *Raphia vinifera*.

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