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Biological Activity of Fruits, Leaves, Trunk Bark and Seeds of *Tetrapleura tetraptera* Used in Vaginal and Intestinal Infections

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Abstract

Traditional medicine treats various diseases, in particular vaginal and intestinal infections, usually using plant species. This study aims to study the photochemistry, the antiradical activity and the antimicrobial activity of *Tetrapleura tetraptera.* Qualitative phytochemical analyzes were performed using standard colorimetric methods. Flavonoids were quantified relative to the reference molecule. The antiradical activity was evaluated by the phosphomolybdate reduction method and the iron reduction method. The antimicrobial activity was carried out using the agar diffusion method. *Tetrapleura tetraptera* species showed phytochemical compositions with bioactive potentials. Extracts of fruits, leaves, trunk bark and seeds of *Tetrapleura tetraptera* have been shown to be rich in phenolic compounds, alkaloids, tannins and reducing sugars. These extracts also have flavonoid contents with values from 71.470 ± 2.258 to 147.196 ± 1.529 µg ER/mg ES. The extracts showed antiradical activity with contents ranging from 81.093 ± 1.736 to 128.695 ± 4.589 mg EAA/g ES for the phosphomolybdate reduction method and from 200.500 ± 0.000 to 322.167 ± 21.213 µmol Eq FeS04/mg ES for the method of iron reduction. Antimicrobial tests have shown that these tested extracts variously inhibit the growth of the germs used apart from strains of *Klebsiella pneumoniae* and *Klebsiella oxytoca*. The minimal inhibitory

concentrations varied from 3.125 to 50 mg/ml and the minimal bactericidal concentrations also varied from 3.125 to 50 mg/ml. The species *Tetrapleura tetraptera* has several phytochemicals. It has good antiradical activity and has shown antimicrobial activity on certain strains.

Keywords: *Tetrapleura tetraptera*, vaginal infection, intestinal infection, antimicrobial activity, Togo.

1. Introduction

Over the years, plants, not only provide shelter for humans and animals, but also serve as an indispensable source of medicine.

Phytotherapy is an ancient medical discipline used worldwide. This traditional medicine, based on the use of medicinal plants for the treatment of numerous diseases, continues to be used, and in recent years, its popularity has only increased (Létard et *al.*, 2015).

Research has shown that synthetic substances that cause side effects in patients can often be replaced with other natural substances derived from medicinal plants. The plant under study, *Tetrapleura tetraptera*, is a popular medicinal plant and spice in Ghana and has proven effective in managing countless health problems. This tree is very common in West Africa. Its fruit, commonly known as four-sided, is used in traditional medicine and is recognized for its numerous benefits on human health (Ebana et *al.*, 2016). According to traditional healers, it has several virtues and is used to treat vaginal and intestinal infections. It could help combat blocked fallopian tubes, cervical inflammation, and painful periods. It is also said to treat infertility and treat cysts, myomas, and fibroids.

To verify the efficacy of this plant, a scientific approach is required to prove its traditional use. This study therefore aims to determine the basic phytochemical constituent and biological activities including antimicrobial activity and radical scavenging activity of different parts of the *Tetrapleura tetraptera* plant.

2. Materials and Methods

2.1 Materials

2.1.1 Plant material

The plant material consists of the various parts (fruits, leaves, trunk bark, and seeds) of *Tetrapleura tetraptera*. These plant organs (*Tetrapleura tetraptera*) were collected in the maritime region of Togo, more precisely in the Gulf prefecture. Identification was performed at the Faculty of Sciences at the University of Lomé by Dr. Sodjinou. The plant material was then cut and dried at room temperature (25°C) for two weeks in the LaSBASE laboratory. Finally, the leaves, seeds, fruits, and dried bark were each ground using a Moulinex (Universal mixer, model: 1030 W) to obtain a fine powder.

Source: Canon EOS R6

Figure 1: The different parts of the plant material (Tetrapleura tetraptera)

2.1.2 Microbial Strains

Reference strains: *E. coli* ATCC 25922; *S. pneumoniae* ATCC 49619; *S. aureus* ATCC 29213; *C. albicans* ATCC 10231, *K. pneumoniae* ATCC 700603 and Clinical strains: *E. coli* (1628); *S. pneumoniae* (001); *S. aureus* (0913); *C. albicans* (1134), *K. oxytoca* (1630) or head used in our study. These strains come from the National Institute of Hygiene in Lomé, a reference structure in West Africa and Worldwide.

2.2 Méthods

2.2.1 Hydroethanolic Extraction of Harvested *Tetrapleura Tetraptera* Organs

The hydroalcoholic extraction was performed according to the crude extraction method described by Abu et al. (2010) taken up by Bouyo et *al.* (2025) ; TCHAKONDO et *al.* (2025). A quantity of plants powder from each plant organ (100 g) was macerated in a mixture of 30% H_2O and 70% ethanol. The mixture was stirred electrically for 48 hours at a laboratory temperature of 28 ± 2$^{\circ C}$. The resulting suspension was then filtered through Wattman N°1 paper. The filtrate obtained after filtration was evaporated using a rotary evaporator and then freeze-dried to obtain the dry extracts.

2.2.2 Qualitative and Quantitative Phytochemistry

A summary qualitative phytochemical analysis was carried out using the standard method.

Extracts were analyzed for phenolics, alkaloids, saponosides, triterpenes, coumarins, tannins, reducing sugars and flavonoids. Results are expressed in relative abundance. All tests were performed in comparison with a control. Flavonoid content is estimated according to the method described by Andzi-BarhÃ© et *al.* (2015) taken up by Miwonouko et *al.* (2024); TCHAKONDO et *al.* (2025); Bouyo et *al.* (2025).

The protocol will consist in preparing plant extracts at 1mg/ml in distilled water, aluminum chloride ($AlCl_3$) 2% in distilled water, and rutin at different concentrations of 0; 5; 25; 50; 75; 100; 150; 200 µg/ml in methanol. To do this, vortex 1ml of the 1mg/ml extract solution or 1ml of each rutin concentration with 1ml of 2% aluminum chloride ($AlCl_3$). After 10 min incubation, absorbance will be measured directly with a UV-visible spectrophotometer (METASH UV-5200PC UV/VIS Spectrophotometer) at 415 nm against a blank. Rutin will be used as a standard. The total flavonoid content of extracts will be deduced from the calibration curve established with Rutin (0 - 200 µg/ml) and results will be expressed in microgram equivalent of Rutin per milligram of dry extract (µg ER/mg ES). Three tests will be carried out for each extract.

$$X= (OD +0,0428)/0,0078$$

X: Flavonoid total concentration in µg ER/mg DM

OD: Optical Density

2.2.3 Evaluation of Free Radical Scavenging Activity

- Phosphomolybdate reduction method

A mass of 10 mg of powder was dissolved in 1 ml of ethanol and then the whole was dissolved in 9 ml of distilled water. The final concentration of the extract is 1 mg/ml. The reduction of phosphomolybdate was carried out according to the method described by Prieto et *al.* (1999) modified by Karou et *al.* (2006) ; Bouyo et *al.* (2025) The phosphomolybdate reagent was prepared (100 ml of reagent) from a mixture of 90 ml of 0.6 M sulfuric acid, 5 ml of 0.1% sodium hydrogen phosphate and 5 ml of 1% ammonium molybdate. For the test, 1 ml of each extract was added to 9 ml of the reagent prepared above. The whole was brought to a temperature of 95$^{\circ C}$ in a water bath for 90 min. Then the mixture was cooled to room temperature. Absorbances were measured at the wavelength of 820 nm against a blank consisting of reagent and distilled water. Ascorbic acid was used as a standard antioxidant under the same operating conditions and the results were expressed as milligrams of ascorbic acid equivalent per gram of crude extract. The tests were carried out in three trials.

$$X = (OD +0,0599)/0,0057$$

X : Ascorbic acid concentration in mg AAE/g DM

OD: Optical Density

- Iron reduction method (FRAP: Ferric Reducing Antioxidant Power)

The FRAP method described in Benzie & Strain (1996) taken up by Miwonouko et *al.* (2024) ; Bouyo et *al.* (2025)was used. To 3 ml of the freshly prepared FRAP test reagent in a test tube, we added 100 µl of the different iron II sulfate solutions with concentrations ranging from 0 to 2000 µmol.l^{-1}. The mixture was vigorously shaken with a vortex mixer (Heidolph brand, type REAX 1) and the optical density was read after 5 min with a spectrophotometer at 593 nm (METASH UV-5200PC UV/VIS Spectrophotometer). The absorbance of the TPTZ-Fe^{2+} complex allowed us to plot a calibration curve from the concentration range (0 - 2000 µM) of the iron sulfate solution ($FeSO_4$, $7H_2O$) dissolved in methanol. For the samples of the extracts to be tested, we mixed in the same proportions as for the plotting of the standard curve, the FRAP reagent (3 ml) and the solution of the extract to be tested (100 µl) with a titer of 1 mg/ml. The optical density is read after 5 minutes at 593 nm. The antioxidant capacity of the extracts is measured using the calibration curve by the color change linked to the formation of the complex (Fe^{2+} TPTZ) and expressed in µmol Eq $FeSO_4$/mg of dry matter. The tests were repeated 3 times (n = 3).

$$X= (DO + 0,0331)/0,0002$$

X : Concentration de sulfate de fer en µmol $FeSO_4$/mg ES

DO : Densité Optique

2.2.4 Antimicrobial Test

Sensitivity tests were performed on Mueller Hinton, Sabouraud, and Muller Hinton blood agar. Microorganisms from an 18 to 24 hours culture incubated at 37$^{\circ C}$ were suspended in physiological saline at a turbidity corresponding to Mac Farland 0.5 (approximately 10^8 cells/ml). This suspension was used to inoculate Petri dishes by swabbing. 6 mm diameter wells were made in the agar, and these wells were then inoculated with 50 µL of extract at a concentration of 50 mg/ml. Ciprofloxacin and nystatin were used as positive controls, and sterile distilled water as a negative control. The plates were then left at room temperature for 1 hour for prediffusion, then incubated at 37$^{\circ C}$ for 18 to 24 hours. Antibacterial activity was estimated by measuring the diameter of the inhibition zone around the wells using a graduated ruler. The tests were carried out in three trials and an average was taken over the three determinations (CA-SFM, 2022).

2.2.5 Determination of MIC, MBC, and MFC by the Microdilution Method on Plates

- Determination of the Minimum Inhibitory Concentration (MIC)

The MIC was determined for extracts that were active against the organisms during the solid diffusion test. It was determined by the microdilution test in 96 well microplates (NCCLS, 2003). Bacterial suspensions were diluted with Muller Hinton broth and distributed into 96-well microplates containing a range of hydroethanolic extracts of decreasing concentrations by serial dilutions of 1:2 from a stock solution of each extract. Inocula, determined by colony

counts from control wells without extracts, were approximately 10^5 CFU/ml. The plates were incubated at 37°C for 24 hours. The MIC, determined by eye, was defined as the minimum extract concentration at which no growth visible is observed.

- Determination of CMB and CMF

For the determination of CMB and CMF, a loopful was taken from the wells that showed no visible culture during the MIC determination and inoculated onto nutrient agar for bacteria and Sabouraud for yeasts. After 24 hours of incubation, the lowest concentration of the extract that did not give colonies is considered as the CMB for bacteria or the CMF for yeasts. To determine whether the observed antimicrobial effect is bactericidal, bacteriostatic, fungicidal or fungistatic, the CMB/MIC or CMF/MIC ratio was performed. A CMB/MIC ratio greater than 1 is considered bacteriostatic and a CMB/MIC ratio equal to 1 is considered bactericidal. Similarly, a CMF/MIC ratio greater than 1 is considered fungistatic and a CMF/MIC ratio equal to 1 is considered fungicidal.

2.2.6 Data Analysis

Data relating to phytochemical tests, free radical scavenging activity, and antimicrobial activity were processed using Excel® 2013 version 15.0 software.

3. Results

3.1 Qualitative Phytochemical Analyses

The extracts were analyzed for alkaloids, tannins, flavonoids, saponins, phenols, triterpenes, coumarins, and reducing sugars. The results are shown in Table 1.

Tableau 1 : Résultats de la phytochimie qualitative

Phytochemicals	Fruits	Leaves	Bark	seed
Alkaloids	+++	++	++++	++
Coumarins	-	+	+	+
Flavonoids	+	+	++	-
Phenols	+	+	++	+++
Saponins	+++	-	+++	+
Tannins	+	+	++	++++
Triterpenes	+	+	+++	-
Reducing Sugars	+	+	+	+

Absent (-) ; present (+) ; insignificant (++) ; significant (+++)

The fruit, leaf, trunk bark, and seed extracts tested all contain alkaloids, phenols, tannins, and reducing sugars, but not in the same proportions. All extracts contain flavonoids and triterpenes

except the seeds. Saponins are present in all extracts except the leaves. According to the results, only the fruits do not contain coumarin; however, the leaves, trunk bark, and seeds do.

3.2 Quantitative Chemical Analyses of the Extracts

3.2.1 Flavonoid Content

Flavonoids were quantified relative to the reference molecule (rutin), and the results are reported in Table 2.

Tableau 2 : Results of the flavonoid content assessment

Extracts	Total flavonoid content (µg ER/mg DM)
Fruits	71,47 ± 2,26
Leaves	146,38 ± 2,09
Bark	100,74 ± 2,57
Seed	147,19 ± 1,53

ER: Equivalent to Rutine; DM: Dry Matter

The seed extract contains the highest flavonoid content. The fruit extract contains the lowest flavonoid content.

3.3 Free Radical Scavenging Activity of the Extracts

Free radical scavenging activity was assessed using two methods on all extracts. The results are shown in (Table 3).

Tableau 3: Assay Results (Free Radical Scavenging Activity)

Extracts	Antiradical activity (Phosphomolybdate reduction method) in mg AAE/g DM	Antiradical activity (FRAP method) in mg µmol Eq $FeS0_4$/mg DM
Fruit	81,09 ± 1,74	200,50 ± 0,00
Leaves	128,69 ± 4,59	322,17 ± 21,21
Bark	117,29 ± 9,30	312,17 ± 17,68
Seeds	117,93 ± 10,67	310,50 ± 3,54

AAE: Ascorbic Acid Equivalent; Eq: Equivalent; DM: Dry Matter

According to Table 3, the two methods used in this study to evaluate antiradical activity showed that all extracts had antiradical activity. However, the leaf extracts exhibited better antiradical activity than the other extracts.

3.4 Antimicrobial Activity

3.4.1 Sensitivity Tests

The antimicrobial activity of hydroethanolic extracts was evaluated by the well method. The results are reported in the table 4.

Tableau 4: Antimicrobial test results

Conc.	Extracts	Inhibition diameter (mm)									
		E. coli		*S. aureus*		*S. pneumoniae*		*C. albicans*		*K. oxytoca*	*K. pneumoniae*
		ATCC 25922	N° 1628	ATCC 29213	N° 0913	ATCC 49619	N° 001	ATCC 10231	N° 1134	N° 1630	ATCC 700603
50 mg/ml	Fruit	13,33 ± 1,15	0,00 ± 0,00	10,33 ± 0,58	0,00 ± 0,00	16,25 ± 0,17	0,00 ± 0,00	11,33 ± 1,15	10,00± 2,00	0,00 ± 0,00	0,00 ± 0,00
	Leaves	13,33 ± 1,15	0,00 ± 0,00	12,33 ± 0,58	0,00 ± 0,00	13,00 ± 0,67	0,00 ± 0,00	14,33 ± 0,58	10,67 ± 1,15	0,00 ± 0,00	0,00 ± 0,00
	bark	15,33 ± 0,58	0,00 ± 0,00	14,33 ± 0,58	0,00 ± 0,00	17,50 ± 0,33	11,87 ± 0,08	15,33 ± 1,15	17,17 ± 0,29	0,00 ± 0,00	0,00 ± 0,00
	Seed	14,33± 0,58	0,00 ± 0,00	13,67 ± 0,58	0,00 ± 0,00	12,50 ± 0,33	12,25 ± 0,17	15,33 ± 0,58	11,67 ± 0,58	0,00 ± 0,00	0,00 ± 0,00
	Eeth	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00	0,00 ± 0,00
50 µg/ml	Cip	44,00 ± 1,41	18,50± 0,70	38,25 ± 0,35	25,50± 0,70	42,50± 0,70	33,25 ± 0,35	-	-	15,50 ± 0,70	17,50 ± 0,70
	Nys	-	-	-	-	-	-	33,50 ± 0,70	31,25±0,67	-	-

Eeth: water-éthanol mixure ; Cip : Ciprofloxacin ; Nys : Nystatine

The reference strains were more sensitive than the clinical strains. *S. pneumoniae* (ATCC 49619) was the most sensitive reference strain, with an inhibition diameter of 17.50 ± 0.33 mm with the trunk bark extract. Candida albicans was the most sensitive clinical strain, with an inhibition diameter of 17.17 ± 0.29 mm with the trunk bark extract.

According to our results, neither extract was active against *Klebsiella oxytoca* or *Klebsiella pneumoniae* strains.

Ciprofloxacin and nystatin were used as reference drugs for bacteria and yeasts, respectively. Ciprofloxacin acted on all bacterial strains, with inhibition diameters ranging from 15 to 44 mm. Similarly, nystatin acted on Candida albicans strains with an inhibition diameter of 31.25 mm for clinical strains and 33.50 mm for reference strains

3.4.2 Determination of Minimum Inhibitory Concentrations (MICs) and Minimum Bactericidal or Fungal Concentrations (MBCs or MFCs)

The results of the MICs, MBCs, and MFCs (mg/ml) are shown in Table 5.

Tableau 5: Determination of Minimum Inhibitory Concentrations (MICs) and Minimum Bactericidal or Fungal Concentrations (MBCs or MFCs)

Extracts	Strains	Kind	MIC	MBC or MFC	MBC/MIC
Fruit	*E. coli*	ATCC 25922	6,25	12,5	2
	S. pneumonia	ATCC 49619	6,25	50	8
	C. albicans	ATCC 10231	3,125	12,5	4
Leaves	*S. aureus*	ATCC 29213	25	25	1
	E. coli	ATCC 25922	12,5	25	2
	S. pneumonia	N° 001	12,5	25	2
	C. albicans	ATCC 10231	3,125	12,5	4
		N° 1134	25	25	1
Bark	*S. aureus*	ATCC 29213	3,125	12,5	4
	E. coli	ATCC 25922	6,25	12,5	2
	S. Pneub monia	ATCC 49619	12,5	25	2
		N° 001	6,25	12,5	2
	C. albicans	ATCC 10231	6,25	12,5	2
		N° 1134	6,25	50	8
seeds	*S. aureus*	ATCC 29213	25	25	1
	E. coli	ATCC 25922	6,25	6,25	1
	S. pneumoniae	ATCC 49619	6,25	25	4
		N° 001	6,25	12,5	2
	C. albicans	ATCC 10231	6,25	12,5	2
		N° 1134	12,5	25	2

Minimum Inhibitory Concentrations (MICs) and Minimum Bactericidal or Fungal Concentrations (MBCs or MFCs).

The MIC, MBC, and MFC were determined for the extracts that demonstrated the best activity using agar diffusion techniques. For this purpose, we selected strains with an inhibition diameter greater than 10 mm. To determine whether the observed antimicrobial effect was bactericidal, bacteriostatic, fungistatic, or fungicidal, the MBC/MIC ratio for bacteria and the

MBC/MIC ratio for yeasts were calculated. If the ratio is greater than 1, the antimicrobial effect is considered bacteriostatic or fungistatic, depending on whether the strain is a bacterium or a yeast. Similarly, if this ratio is 1, it is considered bactericidal or fungicidal.

4 Discussion

4.1 Phytochemistry

4.1.1 Qualitative Phytochemistry

Phytochemical tests performed on hydroethanolic extracts revealed that the fruits, leaves, bark, and seeds of *Tetrapleura tetraptera* commonly contain compounds such as alkaloids, phenols, tannins, and reducing sugars. Larbie et *al.* (2020), in their studies on the phytochemistry, antioxidant, and antimicrobial activity of extracts from parts of *Tetrapleura tetraptera*, found that the hydroethanolic extract of the fruits, leaves, and seeds of *Tetrapleura tetraptera* contained alkaloids, tannins, and reducing sugars. According to the results, saponins are found in all extracts except the leaves. Our results are consistent with those of Simon Koma et *al.* (2016), who found that saponins are not present in the leaves. However, our results contradict those of Larbie et *al.* (2020), who found that *Tetrapleura Tetraptera* leaves contain saponins. This difference in results may be due not only to the methods used in the laboratory but also to the chemical compounds that vary depending on the geographical location of the plants (Merghache et *al.*, 2009). According to our results, the seeds do not contain triterpenes or flavonoids. The fruits, leaves, and bark do contain them. The results obtained by Simon Koma et al. (2016) showed that the seeds contained flavonoids but no triterpenes.

4.1.2 Quantitative Phytochemistry

We measured the flavonoid content of *Tetrapleura tetraptera* fruit, leaf, bark, and seed extracts. These extracts contain varying amounts of flavonoids; however, the seed extract contained the most flavonoids. This result is similar to that of Larbie et *al.* (2020), who found that *Tetrapleura tetraptera* seeds had higher flavonoid content than other organs. However, our results are inconsistent with those of Moukette et *al.* (2015), who found that Tetrapleura tetraptera seeds had lower flavonoid content than other organs. Flavonoids play an antioxidant role against the liver, tumors, toxins, viruses, and other microorganisms (E. A. Uyoh et *al.*, 2013).

4.2 Free Radical Scavenging Activity

We evaluated the free radical scavenging activity of the four extracts. The results show that the fruit, leaf, trunk bark, and seed extracts are potential sources of natural antioxidants. These results are similar to those obtained in previous studies by Simon Koma et *al.* (2016) ; Traore et *al.* (2019), which showed that *Tetrapleura tetraptera* leaf and seed extracts have good free radical scavenging activity. This good free radical scavenging activity is thought to be related to the high total phenol content. Polyphenols are considered a major group of compounds that contribute to the antioxidant activities of plants in the form of free radical scavengers due to their hydroxyl groups (Nickavar et al., 2008). Free radicals are unpaired

molecules derived from oxygen and nitrogen. Their production is useful because they can help immune system cells attack bacterial cells, tumor cells, and virus-infected cells (Cai et *al.*, 2006).

4.3 Antimicrobial Activity

Antimicrobial tests were evaluated on reference and clinical strains of certain microbial species involved in vaginal and intestinal infections. According to the results, the various extracts of *Tetrapleura tetraptera* organs, namely fruits, trunk bark, leaves, and seeds, were active against certain germs to varying degrees. The trunk bark extract was the most active extract, with inhibition diameters ranging from 11.87 to 17.17 mm; it acted on several germs, particularly on Candida albicans, where it produced a larger inhibition diameter (17.17 mm). The fruit extract was the least active extract, which did not produce an inhibition diameter on all clinical strains, apart from *Candida albicans*, where it produced a low inhibition diameter (10 mm). The work of Larbie et *al.* (2020) proved that *Tetrapleura tetraptera* trunk bark extracts are more active on microbial strains than fruits and seeds; and that fruit extract is the least active extract. This is confirmed by our results.

However, no inhibition diameter was observed with the reference strain of *Klebsiella pneumoniae* and the clinical strain of *Klebsiella oxytoca.* This shows that these germs are not sensitive to the different extracts tested. Our result contradicts that observed by Simon Koma et *al.* (2016), who found that *Klebsiella pneumoniae* is sensitive to ethanolic extracts from the leaves and seeds of *Tetrapleura tetraptera.* This difference in results could be explained by the fact that we did not use the same solvents. The reference drugs gave very high inhibition diameters compared to the hydroethanolic extracts from the different organs of *Tetrapleura tetraptera* because the reference drugs are pure molecules, while the hydroethanolic extracts are crude extracts.

The lowest minimum inhibitory concentrations (3.125 mg/ml) were obtained with fruit and leaf extracts on the reference strain of *Candida albicans*. A low MIC indicates high sensitivity to hydroethanolic extracts, so we can deduce that the reference strain of *Candida albicans* is sensitive to hydroethanolic extracts from the fruit and leaves of *Tetrapleura tetraptera*. Our results disagree with those of Simon Koma et *al.* (2016), who found that Tetrapleura tetraptera leaf extracts were not active against the *Candida albicans* strain.

5. Conclusion

The species *Tetrapleura tetraptera* was used to perform qualitative and quantitative phytochemistry, antiradical activity, and antimicrobial activity. Qualitative phytochemical tests of this plant revealed the presence of alkaloids, tannins, phenols, and reducing sugars in extracts from the fruit, leaves, bark, and seeds. Quantitative phytochemical tests revealed that the seed extract contains the highest flavonoid content. The antiradical activity performed according to the phosphomolybdate reduction method and the iron reduction method (FRAP) on the different extracts showed that the leaves had better antiradical activity compared to the other extracts. Hydroethanolic extracts from the fruit, leaves, bark, and seeds were also tested

on microbial strains. They were active on certain microbial strains. The trunk extract was the most active extract, giving an inhibition diameter of 17.17 mm on the clinical strain of *Candida albicans*. The *Klebsiella oxytoca* and *Klebsiella pneumoniae* strains were not sensitive to these extracts. Ciprofloxacin and nystatin, tested respectively for bacteria and yeasts as reference drugs, inhibited the growth of all microbial strains. Based on these various results, we can say that the different parts of *Tetrapleura tetraptera*, namely the fruit, leaves, bark, and seeds, are potential bioactive sources for the treatment of microbial infections. Its use in traditional medicine is therefore verified.

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Glossary

ATCC : American Type Culture Collection

CA-SFM : Antibiogram Committee of the French Society of Microbiology

CFU : Colony Forming Units

FRAP: Ferric Reducing Antioxidant Power

INH : National Institute of Hygiene of Lomé

MH : Mueller-Hinton

MIC : Minimum Inhibitory Concentration

MBC : Minimum Bactericidal Concentration

MFC : Minimum Fungal Concentration

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