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Cytotoxic Properties on Cervical and Liver Cancer Cells of Two Plant Recipes from Burkina Faso

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Abstract

Cancer is one of the deadliest diseases in developing countries. In recent years, natural plant-based compounds have been used in the search for drugs to combat numerous diseases, including cancer. In this study, we evaluate the cytotoxic properties of *paanfo tiben 1* and *paanfo tiben 2*, two traditional herbal formulations from Burkina Faso used in the treatment of cancer in Burkina Faso. To this end, the recipes were infused and freeze-dried. The dry extracts obtained were used to determine total phenolics and flavonoids content, assess antioxidant activity using the DPPH, ABTS and FRAP methods, evaluate anti-inflammatory properties by inhibiting 15-LOX, COX 1 and 2, and assess cytotoxic activity on HeLa cervical cancer and HePG2 liver cancer cell lines using the MTT test. The *paanfo tiben 1* recipe showed the highest levels of total phenolics and flavonoids, as well as the best antioxidant activities, with IC_{50} values of 21.020 ± 0.6 µg/ml and 22.94 ± 0.57 µg/ml for DPPH and ABTS, and 165.15 mM EAA/mg dry extract for FRAP. It also exhibited the best cytotoxic activity with IC_{50} values of 112.02 ± 0.025 µg/ml on HeLa

cells and 80.67 ± 6.08 µg/ml on HepG2 cells. On the other hand, *paanfo tiben 2* exhibited the best anti-inflammatory activities through inhibition of 15-LOX and COX 1, with inhibition percentages at 100 µg/ml of 32.523% and 24.717 % respectively. These results could justify the traditional use of these two recipes by traditional health practitioners in the treatment of cancer sufferers in Burkina Faso.

Keywords

Antioxidant, Anti-Inflammatory, Cytotoxicity, *Paanfo Tiben*, Burkina

1. Introduction

Cancer is a disease that poses a major public health challenge worldwide. Once classed as the second leading cause of death in the world, after cardiovascular disease, cancer is now tending to be the leading cause of premature death in the world [1]. Its prevalence is constantly increasing in sub-Saharan Africa, and particularly in Burkina Faso. In sub-Saharan Africa, it is estimated that 801,392 new cases of cancer (4.2% of the world total) and 520,158 cancer deaths (5.2% of the world total) occur in 2020 [2]. These proportions are expected to rise to 34 million cases by 2070, with a 400% increase in cases in low-resource countries [3]. In Burkina Faso, 14,538 new cases and 10,998 deaths were recorded for the year 2022 [4], although this does not reflect its true scale [5]. In Burkina Faso, liver and cervical cancers were respectively the first and fifth most common cancers, with 1,930 and 988 new cases [4]. Current radiotherapy and chemotherapy kill most cancer cells, but relapses due to resistance and treatment failures do occur, not to mention the side effects [6]. For all these reasons, researchers are continuing to explore new therapeutic possibilities. This research is particularly focused on the potential of medicinal plants. Medicinal plants are a valuable source for the development of anti-cancer drugs, as demonstrated by vinblastine and vincristine, two anti-cancer drugs derived from the Madagascar periwinkle, a medicinal plant [7]. In developing countries such as Burkina Faso, the majority of the population uses traditional medicine, which is less expensive than modern medicine. This traditional medicine, based on plants and/or plant combinations, offers treatment for various pathologies, including cancer [8]. Moreover, the development of cancer is closely linked to physiological mechanisms such as oxidative stress and chronic inflammation [9]. In addition, cancer cells have the capacity to multiply indefinitely, evading the mechanisms put in place by the body to regulate the cell cycle [10]. It would therefore be interesting to discover substances that are effective in preventing oxidative stress, reducing inflammation by blocking pro-inflammatory enzymes and inhibiting tumour growth. The traditional recipes based on medicinal plants could be used to treat tumours. In this context, we were interested in *paanfo tiben 1* and *paanfo tibeen 2*, two traditional recipes used by a traditional health practitioner of Burkina Faso. These recipes

are used in the traditional treatment of people suffering from cancer, especially cervical cancer. Our study aims to evaluate *in vitro* the antioxidant, anti-inflammatory and cytotoxic properties of extracts of *paanfo tiben* recipes used in traditional medicine in Burkina Faso.

2. Methods

2.1. Extraction

The two traditional recipes were supplied by a traditional practitioner from Burkina Faso. These recipes are used to treat cervical cancer. The first recipe consists of five plants (*Cochlospermum tinctorium*, *Crateva adansonii*, *Lannea acida*, *Balanites aegyptiaca*, *Vitellaria paradoxa* and ingredients) and the second of a single plant (*Urginea glaucescens* and ingredients). These two recipes are used according to the availability of the constituent species, and given to patients in capsule form. The recipes were used for extraction by infusion, as indicated by the traditional practitioner. 50 g of plant powder from each recipe was placed in a glass bottle and then 500 mL of boiled distilled water was poured into it. The mixture was homogenised and left to infuse for an hour. The infused extract was then filtered and dispersed in 250 mL of distilled water. The filtrate obtained was filtered a second time and centrifuged. The supernatant obtained from the centrifugation was then freeze-dried and the dry extracts obtained were weighed in order to determine the extraction yield according to the formula:

$$\text{Yield}(\%) = (M'/M) * 100$$

M = initial mass of the recipe;

M' = mass of dry extract after extraction and freeze-drying.

The residual moisture content (RMC) was also assessed using watch glasses. The empty mass of the glasses was weighed and one gram of powder was added to the glasses. The watch glasses were placed in an oven for two hours and 30 minutes. After cooling, they were weighed a second time. The RMC was calculated using the following formula:

$$\text{RMC}(\%) = ((P - P')/P) * 100$$

P: Initial weight (g) of plant material;

P' : Final weight (g) of plant material after steaming.

2.2. Phytochemical Assay

2.2.1. Determination of Total Phenolics Content

Total phenolics content was determined using the Folin-Ciocalteu method [11]. Briefly, in 96-well plates, 50 µl of each extract at an initial concentration of 1mg/ml was mixed with 50 µl of Folin-Ciocalteu reagent diluted 1:10. Then 100 µl of Na_2CO_3 (20%) was added. The absorbance was read at 760 nm after 40 minutes of incubation against a blank containing methanol instead of extracts. The same procedure was carried out for gallic acid, the reference compound, but across a range of different concentrations by cascade dilutions in order to estab-

lish the calibration curve. The concentration of total phenolics in each extract was expressed as mg gallic acid equivalent per mg extract (mg GAE/mg), and calculated from the gallic acid calibration curve.

2.2.2. Determination of Total Flavonoid Content

The flavonoids content in the various extracts was determined in a 96-well plate; 100 µl of $AlCl_3$ solution (2%) was added to 100 µl of the extract solution at a concentration of 1mg/ml prepared in methanol. The same procedure was used for quercetin, with concentration ranges diluted by half (from 1 mg/ml) to establish the calibration curve. After 40 minutes incubation, absorbance was read at 430 nm. The concentration of flavonoids in the extracts was deduced from a calibration line established with quercetin and was expressed in mg quercetin equivalent per mg of extract (mg QE/mg).

2.3. Antioxidant activity

2.3.1. ABTS (2,2'-Azinobis-(3-Ethylbenzothiazoline-6-Sulfonic Acid)) Method

Spectrophotometric analysis of the activity of extracts to trap ABTS+ cations was determined using the method of [12]. The ABTS+ solution was prepared by dissolving 10 mg of ABTS in 2.6 mL of distilled water. Next, 1.7212 mg of potassium persulphate was added and the mixture was kept in the dark at room temperature for a minimum of 12 hours. The mixture was then diluted with ethanol to give an absorbance of 0.70 ± 0.02 at 734 nm. The dry extracts were weighed and dissolved in ethanol at a concentration of 1 mg/mL. In a 96-well plate, 50 µL of ethanolic extract solution was added to 100 µL of freshly prepared ABTS+ solution with a blank consisted of 50 µL of ethanol and 100 µL of ABTS solution. The mixture in the 96-well plates was then protected from light at room temperature for 15 min and the concentration was read at 734 nm in a spectrophotometer, with trolox as the reference compound. Each test was performed in triplicate and the experience was repeated three times. Inhibition percentages were calculated using the following formula:

$$\text{Inhibition}(\%) = \left[\left(\text{Blank Absorbance} - \text{Sample Absorbance}\right)/\left(\text{Blank Absorbance}\right)\right] * 100$$

Inhibition percentages were then used to calculate the concentration that allowed inhibition of 50% of ABTS (IC_{50}).

2.3.2. DPPH (2,2-Diphenyl-1-Picrylhydrazyl) Method

The ability of recipes to trap DPPH radicals was determined using the method described by [13]. The extracts and quercetin were dissolved in methanol at a concentration of 1 mg/mL. A cascade dilution of the extracts was performed in a 96-well plate to obtain a volume of 100 µL of extract in each well. 200 µL of a DPPH solution (4 mg/100 mL in methanol) was then added. The blank consisted of 100 µL of methanol and 200 µL of DPPH solution. Absorbances were read at 490 nm using a spectrophotometer after 30 min incubation at room temperature. Each test was performed in triplicate and the experiment was repeated

three times. The 50% DPPH radical inhibitory concentration (IC_{50}) was determined using the percentage inhibition corresponding to each concentration. The percentage inhibition was calculated using the following formula:

$$\text{Inhibition}(\%) = \left[\left(\text{Blank Absorbance} - \text{Sample Absorbance}\right)/\left(\text{Blank Absorbance}\right)\right] * 100$$

2.3.3. FRAP (Ferric Reduction Antioxidant Potential) Method

The ferric reduction potential of recipes was determined in 96-well plates. The FRAP reagent was prepared by mixing 300 mM sodium acetate buffer adjusted to pH 3.6 with 10 mM 2,4,6-tripyridyl-j-triazine (TPTZ) solution and 20mM ferric chloride $FeCl_3$ in the ratio 10:01:01 (10 parts buffer to one part TPTZ and one part $FeCl_3$). The extracts were weighed and dissolved in distilled water at a concentration of 1 mg/mL. 10 µL of extract was added to each well and some wells were dedicated to the blank and contained 10 µL of buffer. Next, 300 µL of FRAP reagent was added to each well and the plate was read at 593 nm after 30 minutes incubation in the dark. Absorbances were read against a standard ascorbic acid curve. Rutin and quercetin were used as reference compounds. The potential of the extracts to reduce iron (III) to iron (II) was expressed in millimoles of ascorbic acid equivalent per gram of dry extract (mmol AAE/g) and calculated using the following formula:

$$C = \left(c * D\right)/\left(M * Ci\right)$$

where c = concentration read from the sample (calculated from the ascorbic acid curve); D = dilution factor; M = molar mass of ascorbic acid (176.1 g/mol); Ci = concentration of the stock solution.

2.4. Antiinflammatory Activity

2.4.1. 15-Lipoxygenase Inhibition

The aim here was to test the ability of recipes to inhibit 15-lipoxygenase (15-LOX) activity. For this purpose, the spectrophotometric method described by [14] was used with a few modifications. The assay was performed in 96-well microplates. Extracts and the reference compound (indomethacin) were prepared at a final concentration of 100 µg/mL. The experimental protocol is summarized in **Table 1**. The experiment was performed in triplicate and the corresponding inhibition percentages were calculated using the following formula:

$$\text{Inhibition}(\%) = \left[\left(\text{Enzyme Absorbance} - \text{Sample Absorbance}\right)/\left(\text{Enzyme Absorbance}\right)\right] * 100$$

where Enzyme Absorbance = Absorbance of enzyme activity − Absorbance of Enzyme Blank; Sample Absorbance = Absorbance of sample activity − Absorbance sample blank.

2.4.2. Cyclooxygenases (COX) Inhibition

COX activity inhibition tests were carried out according to the manufacturer's procedure (Cayman). Tests were performed on a 96-well plate. Extracts were prepared at a final concentration of 100 µg/mL in the wells. A reaction mixture

Table 1. Lipoxygenase inhibition protocol.

Substances (µL)	Enzyme blank	Enzyme activity	Sample blank	Sample activity
Borate buffer	153.75	-	150	-
Recipes	-	-	3.75	3.75
LOX Enzyme	146.25	146.25	146.25	146.25
Incubation	Two minutes			
Linoleic Acid	-	150	-	150
Reading	234 nm in spectrophotometer			

consisting of 10 µL extract, 10 µL enzyme, 10 µL hemin and 150 µL diluted buffer was dispensed into one well of a 96-well plate. The same mixture was made without the extract but with 10 µL of the extract dilution solvent and dispensed into another well. The blank consisted of 160 µL diluted buffer, 10 µL hemin and 10 µL extract dilution solvent. The plate was homogenized and incubated for 5 minutes. Then 20 µL of substrate (arachidonic acid) and 20 µL of colorimetric substrate were added to the wells. The plate was read at 590 nm after homogenization and incubation for two minutes. Reaction mixtures were run in triplicate. Percentage COX inhibition was calculated using the following formula:

$$\text{Inhibition}(\%) = \left[\left(\text{Enzyme Absorbance} - \text{Sample Absorbance}\right)/\left(\text{Enzyme Absorbance}\right)\right] * 100$$

where Enzyme Absorbance = Absorbance of enzyme activity − Absorbance of Enzyme Blank; Sample Absorbance = Absorbance of sample activity − Absorbance sample blank.

2.5. Cytotoxicity Activity

2.5.1. Cell Culture

Cervical cancer HeLa and liver cancer HepG2 cell lines were thawed, cultured and maintained under sterile conditions in a laminar flow hood. These cells were grown at 37˚C in an incubator with 5% CO_2 in cell culture flasks, in DMEM medium supplemented with 10% fetal calf serum, one per cent penicillin-streptomycin and one per cent L-Glutamine. Cells at confluence were used to test cell viability.

2.5.2. MTT (Methyl Thiazolyl Tetrazolium) Cell Viability Assay

Overall cell growth was assessed using the re-adapted Mosmann MTT colorimetric assay [15]. The cell proliferation assay is based on the ability of living cells to reduce MTT (yellow) to its metabolite, formazan blue (purple). In 96-well plates, 10,000 cells were seeded in 100 µL per well against a cell-free blank and an extract-free control. After 24 hours incubation, the medium was removed and replaced by the extracts at different concentrations (cascade dilutions) starting at 1 mg/mL. After 72 hours of incubation, 10 µL of tetrazolium salt (5 mg/mL in PBS 1X) was introduced into each well. The plates were then incubated for four hours and the supernatant was removed. Next, 100 µL of isopropanol was in-

troduced into the wells to dissolve the formazan crystals. Plates were shaken for 20 min, then read by spectrophotometer at 570 nm. Growth inhibition was calculated using the following formula:

$$\text{Inhibition}(\%) = \left[\left(\text{Control Absorbance} - \text{Blank Absorbance}\right)/\left(\text{Extract Absorbance} - \text{Blank Absorbance}\right)\right] * 100$$

2.6. Statistical Analysis

All data were presented as mean ± standard deviation. Data were analyzed by the one-factor ANOVA test followed by Tukey's multiple comparisons test using R software with $P < 0.05$ as the criterion for statistical significance. Graphs were constructed in Excel.

3. Results

The two recipes gave extraction yields and residual moisture content of 13.35% and 4.20 ± 0.08 respectively for *paanfo tiben 1* and 10.06% and 6.44 ± 0.27 for *paanfo tiben 2*.

Total phenolics were determined using the gallic acid calibration curve ($y = 0.0254x + 0.0717$, $R^2 = 0.9964$), while total flavonoids were determined using the quercetin calibration curve ($y = 16.573x + 0.1277$, $R^2 = 0.9957$). The results are shown in Table 2.

The antioxidant potential results obtained for the two recipes, determined using the DPPH, ABTS and FRAP methods, are presented in Table 3.

Table 2. Total phenolics and total flavonoids content for the two recipes.

	Total Phenolics (mg GAE/mg)	Total flavonoids (mg QE/mg)
Paanfo Tiben 1	21.321 ± 1.782[a]	0.0439 ± 0.001[a]
Paanfo Tiben 2	11.611 ± 1.336[b]	0.019 ± 0.001[b]

Values are represented as means ± standard deviation. Different letters in the columns indicate a significant difference ($P < 0.05$) between the two recipes.

Table 3. Antioxidant potential of the two recipes.

	DPPH (IC_{50} in µg/ml)	ABTS (IC_{50} in µg/ml)	FRAP (µM AAE/mg)
Paanfo Tiben 1	21. 02 ± 0.6[b]	22.94 ± 0.57[b]	165.15 ± 22.8[b]
Paanfo Tiben 2	200.01 ± 7.02[a]	37.97 ± 2.02[a]	7.74 ± 0.24[c]
Rutin	nd	nd	452.29 ± 10.2[a]
Quercetin	4.41 ± 0.20[c]	nd	157.79 ± 8.9[b]
Trolox	nd	2.51 ± 0.09[c]	nd

Values are represented as means ± standard deviation for three independent experiments. Different letters in the columns refer to a significant difference ($P < 0.05$) for the two recipes, the same letters mean that there is no significant difference. nd: not determined.

Anti-inflammatory activity. The percentages of inhibition of the pro-inflammatory enzymes 15-lipoxygenase and cyclooxygenases 1 and 2 by the two recipes at a concentration of 100 µg/mL are shown in Table 4.

Cytotoxic activity. Both recipes showed cytotoxicity on HeLa and HepG2 cell lines, with IC_{50} values presented in Table 5. Figure 1 and Figure 2 show the effect of the recipes on cell viability depending on the concentration used.

Table 4. Percentages of inhibition of 15-LOX, COX 1 and COX 2 enzymes by recipes.

	Inhibition percentages at 100 µg/mL (%)		
	15-LOX	**COX 1**	**COX 2**
Paanfo Tiben 1	18.742 ± 2.415^{c}	20.118 ± 2.2^{b}	34.725 ± 2.02^{a}
Paanfo Tiben 2	32.523 ± 10.197^{b}	24.717 ± 1.3^{a}	7.106 ± 2.32^{b}
Indomethacin	91.51 ± 0.34^{a}	nd	nd

Values are represented as means ± standard deviations for a triplicate experiment. Different letters in the columns refer to a significant difference ($P < 0.05$) for both recipes. nd: not determined.

Table 5. IC_{50} of recipes on HeLa and HepG2 cells.

	IC_{50} (µg/ml)	
	HeLa	**HepG2**
Paanfo Tiben 1	112.02 ± 0.025	80.67 ± 6.08
Paanfo Tiben 2	>1000 ($\%\ I_{1000\mu g/ml} = 37.475 \pm 0.213$)	>1000 ($\%\ I_{1000\mu g/ml} = 29.462 \pm 0.024$)

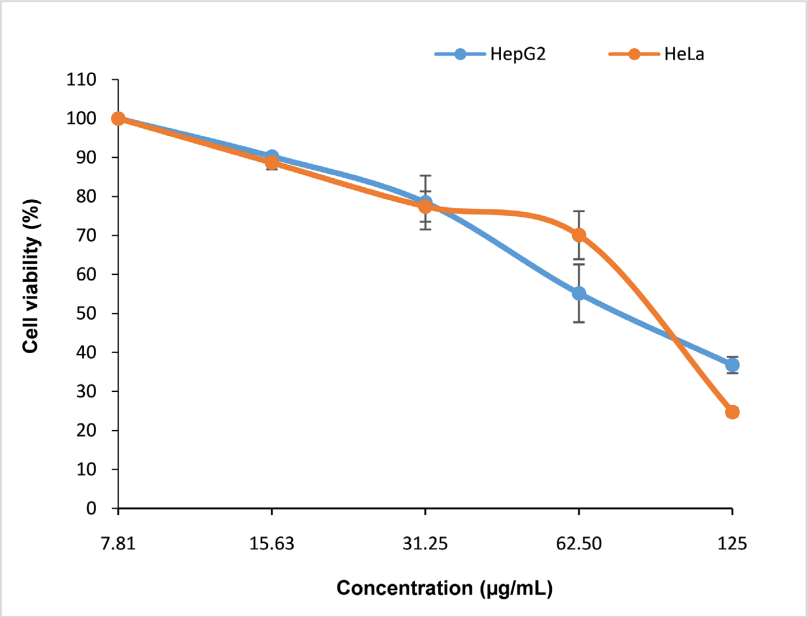

Figure 1. Cytotoxic activity of *paanfo tiben 1* on HeLa and HepG2 cells.

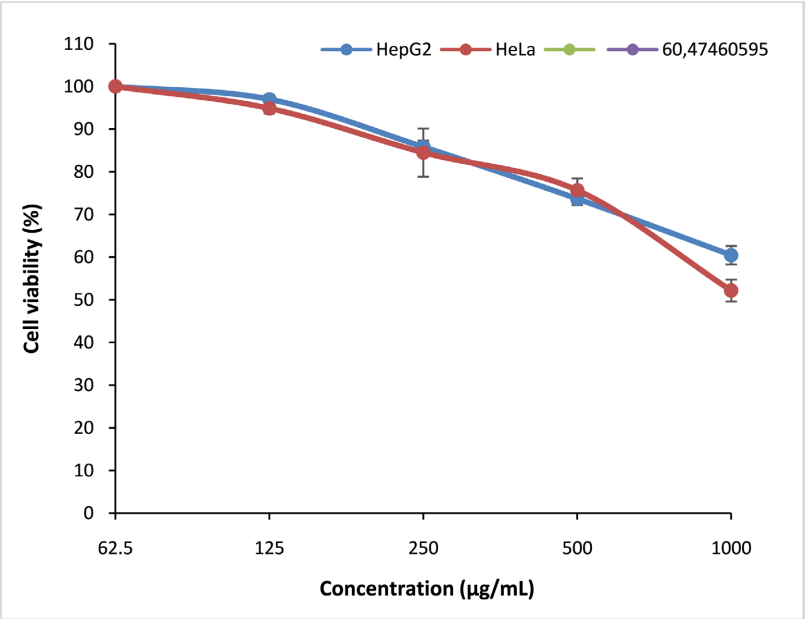

Figure 2. Cytotoxic activity of *paanfo tiben 2* on HeLa and HepG2 cells.

4. Discussion

A fairly large number of plants are beneficial to cancer patients, and this concerns individual plants as well as traditional recipes composed of several plants [16]. In Burkina Faso, several recipes are used by traditional health practitioners in the traditional treatment of cancer. This study assessed the cytotoxic activity of two traditional recipes used in Burkina by a health tradipratician in the traditional management of cervical cancer. Cytotoxic activity was determined on HeLa cervical cancer cells and HepG2 liver cancer cells, which, like cervical cancer, are mainly caused by viruses. The quality of each recipe was first assessed by calculating the residual moisture content. In fact, high water content can allow the growth of bacteria and other microorganisms in extracts, posing a danger to patient health; for this reason, it should be less than 10% [17]. The residual moisture content of the recipes was 4.20 ± 0.08 and 6.44 ± 0.27 for *paanfo tiben 1* and *paanfo tiben 2* respectively, i.e. below 10%, reflecting good drying and preservation practices for these recipes by the tradipratician, in accordance with European Pharmacopoeia recommendations. The total phenolic and flavonoid contents of the recipes were 21.321 ± 1.782 mg GAE / mg and 0.0439 ± 0.001 mg QE/mg respectively for paanfo *tiben 1*, and 11.611 ± 1.336 mg GAE/mg and 0.019 ± 0.001 mg QE/mg respectively for paanfo *tiben 2*. These results show that *paanfo tiben 1* is richer in total phenolics and flavonoids than *paanfo tiben 2*. This could be explained by the composition of plants involved in the formulation of each recipe, and therefore the content of these metabolites in each constituent plant. This work shows that the recipes in this study are richer in total phenolics than the *Acti-plus* recipe reported by authors, which were 61.95 ± 0.01 mg GAE/g and 43.01 ± 0.05 mg QE/g) for total phenolics and total flavonoids respectively [18].

Oxidative stress is an important factor in the onset of chronic diseases including chronic inflammation, cancer, cardiovascular disease and diabetes. The ability of recipe extracts to prevent oxidation was tested through DPPH radical scavenging, ABTS radical cation decolorization and ferric ion reduction—three complementary methods to better assess antioxidant properties. The results revealed that all the extracts tested showed anti-free radical activity by all three methods, and thus antioxidant activity, with the best activity being held by the *paanfo tiben 1* recipe. Paanfo *tiben 1* had a ferric-reducing power comparable to that of quercetin used as a reference compound, indicating its strong antioxidant potential by this method. Through these activities, these two recipes therefore show a beneficial effect against free radical damage and thus against oxidative stress induced by the latter. The antioxidant activity of these recipes could be explained by the presence of metabolites such as polyphenols in general, and flavonoids in particular, highlighted in each recipe extract. Indeed, according to several authors, these compounds are recognized for their antioxidant activity, and in particular their ability to trap free radicals, chelate metal ions or inhibit the enzymes responsible for radical formation [19].

Both recipes inhibit the 15-LOX, COX 1 and COX 2 enzymes involved in the inflammation process. Indeed, at 100 µg/mL, *paanfo tiben 1* and *paanfo tiben 2* extracts had 15-LOX inhibition percentages of 18.742% ± 2.415 and 32.523 ± 10.197 respectively. These values were lower than those of indomethacin used as a reference compound at the same concentration. With regard to COX 1 and 2, *paanfo tiben 1* had a lower inhibition percentage than *paanfo tiben 2* for COX 1, but a higher one for COX 2. According to authors, recipes or substances that inhibit several types of pro-inflammatory enzymes, notably COX and LOX, have greater anti-inflammatory activity than recipes or substances that inhibit only COX [20]. Thus, the two recipes in our study, which inhibit both COX 1&2 and LOX, would have good anti-inflammatory activity. The anti-inflammatory effect of the recipes could be explained by the presence of flavonoids and phenolic compounds. Indeed, flavonoids and polyphenols are known for their ability to inhibit pro-inflammatory enzymes [21]. Evaluation of the recipes' activity on the overall growth of the HeLa cervical and HepG2 liver cancer cell lines assessed using the colorimetric assay enabled IC_{50}s (concentration that inhibits cell growth by 50%) to be determined for each recipe tested. Both recipes showed a concentration-dependent effect on cell viability in both HeLa and HepG2 cell lines. IC_{50} results (**Table 5**) showed that the *paanfo tiben1* recipe had the best cytotoxic activity on all cancer cell lines. This could be explained by the higher flavonoid content of the *paanfo tiben 1* recipe, as several studies have demonstrated that flavonoids have antitumoral properties [22] [23] [24] [25]. According to Diallo *et al.* [26], the methanol and ethanol extracts of *Cochlospermum tinctorium* rhizomes exhibited antihepatotoxic effects based on carbon tetrachloride and galactosamine-induced cytotoxicity in primary cultured rat hepatocytes. *Vitellaria paradoxa* has been shown to be hepatoprotective against sodium arsenite-induced toxicity by using selected liver function markers (aspartate

aminotransferase, alanine aminotransferase, alkaline phosphates) [27]. The hepatoprotective properties of these two plants in the *paanfo tiben 1* recipe may explain why HepG2 liver cancer cells are more sensitive to *paanfo tiben 1* (IC_{50} = 80.67 ± 6.08 µg/mL) than HeLa cervical cancer cells (IC_{50} = 112.02 ± 6.08 µg/mL). Furthermore, the *Acti-plus* recipe showed an IC_{50} of 0.362 ± 0.027 mg/mL on HeLa cervical cancer cell lines [18], a value which is higher than the IC50 of *paanfo tiben 1* and lower than the IC_{50} of *paanfo tiben 2* obtained in our study. In addition to Burkina Faso, various researchers in other countries around the world are exploring traditional recipes in the search for cancer treatments. For example, in Nigeria, researchers evaluated the anticancer capacity of two recipes, A and B, on MCF-7 and MDA-MB-231 breast cancer cells; they found IC_{50} values well below 30 µg/mL, which is the limit set by American National Cancer Institute (NCI) guidelines for crude extracts on cancer cells [28]. Literature data show that traditional recipes are a source of anti-cancer substances. In China, authors had conducted a study on a traditional Chinese recipe called HS, consisting of *Hedyotis diffusa* Willd. (H) and *Scutellaria barbata* D. Don (S), and found that HS had the ability to hinder transition into the G2-M phases of the cell cycle in the LNCaP and PC-3 lines of prostate cancer, and therefore could be used in the prevention of prostate cancer progression [29]. Another traditional Chinese recipe, Yanggan Jiedu Sanjie, consisting of eight herbs showed inhibition of cell adhesion, migration and invasion in Bel-7402 hepatocellular carcinoma cells [30].

The results we found in this study suggest some correlation between traditional use in cancer treatment and cytotoxic activity on cancer cells. Further study of these recipes, in particular *paanfo tiben 1*, could shed further light on their anticancer properties.

5. Conclusion

Today, knowledge of traditional medicine is widely used to discover new anti-cancer drugs. Indeed, there is a strong increase in scientific research into cancer therapy based on plants and traditional medicine. *Paanfo tiben 1* and *paanfo tiben 2* are two traditional herbal recipes used in Burkina Faso to treat cervical cancer by a traditional health practitioner. Although these recipes are traditionally used for therapeutic purposes, there is no scientific evidence to support this use. That's why this study was carried out. In addition to containing phytochemicals of interest, both recipes presented interesting antioxidant properties and the ability to inhibit cyclooxygenases 1 and 2 and 15-lipoxygenase, enzymes involved in the inflammatory process. Also, the ability of recipes to inhibit cancer cell growth in a concentration-dependent manner has been demonstrated on HeLa cervical cancer cells and HepG2 liver cancer cells. These properties could therefore explain their use in traditional medicine for the treatment of cancer. The search in these recipes for potential pure compounds involved in different anti-cancer activities is necessary to assess the antagonistic or synergistic effects of molecules with a view to proposing a mechanism of action for the most active ones.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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