

Lipid lowering and antioxidant properties of total extract and fraction of *Anogeissus leiocarpus* (Combretaceae)

Aku Enam MOTTO¹(*), Povi LAWSON-EVI¹, Batomayena BAKOMA², Kwashie EKLUGADEGBEKEU¹, Kodjo AKLIKOKOU¹,

¹Laboratory of Physiology/Pharmacology, Unit of Pathophysiology, Bioactive Substances and Safety, Faculty of Sciences, University of Lome, Togo, BP 1515

² Department of Pharmacognosy, Faculty of Health Sciences, University of Lome BP 1515 Togo

Context

Diabetes combined with chronic hyperlipidemia could accelerate the progress of atherosclerosis and increase the incidence of cardiovascular disease due to an oxidative stress [1]. *Anogeissus leiocarpus* is a medicinal plant used in Togo to treat diabetes mellitus and others diseases. The present study was undertaken to evaluate the antihyperlipidemic and antioxidant activities of total extract and fractions of roots of *Anogeissus leiocarpus*.

Materials and methods

The lipid lowering effect of the total extract and the supernatant was performed *in vivo* by the fructose overload test in ICR mice. Antioxidant potential was determined *in vitro* by methods based on scavenging of DPPH*, total antioxidant capacity and reducing power. After the screening, phenolic compounds and flavonoids were evaluated by the well-known colorimetric assay using respectively Folin-Ciocalteu reagent and aluminium chloride.

Results and Discussion

- The method of fractionation of the hydroalcoholic extract of the roots of *Anogeissus leiocarpus* has allowed two fractions to be obtained : the supernatant fraction and the pellet fraction. The results obtained showed that the total extract and the supernatant significantly reduced the serum and liver levels of triglycerides and hence the level of VLDL-Cholesterol compared to hyperlipidemic mice. The decrease was more pronounced in the liver than in the serum. A significant ($p < 0.05$) increase in HDL-cholesterol in treated groups prove that *A. leiocarpus* can be used to prevent arterosclerosis and reduce oxidative stress.
- In vitro*, the total extract and fractions had the ability to scavenge free radicals, to reduce metal and possessed strong total antioxidant activity.
- phytochemical study revealed the presence of alkaloids, saponins and polyphenolic compounds in the fractions as well as in the total extract. However, the supernatant contained more phenolic compounds. The antihyperlipidemic and antioxidant activities of the total extract and supernatant may be due to the polyphenols and related compounds present in them. Hence, the supernatant fraction was the most biologically active [2].

Table 1: Effect of total extract and supernatant on lipid profil

	NC	HC	TE 500	Sup 100	Met 100
Serum					
TG (g.L ⁻¹)	0.36±0.04	1.08±0.05 ^{####}	0.73±0.04 [*]	0.41±0.07 ^{****}	0.83±0.11
Chol-T (g.L ⁻¹)	1.29±0.06	1.59±0.13	1.55±0.18	1.17±0.07	1.18±0.09
HDL-C (g.L ⁻¹)	1.01±0.05	0.92±0.06	1.26±0.10 [*]	1.10±0.09	0.93±0.03
LDL-C (g.L ⁻¹)	0.28±0.04	0.69±0.11 [#]	0.36±0.14	0.14±0.04 ^{**}	0.23±0.08 [*]
VLDL-C (mg.dL ⁻¹)	7.2±0.9	21.6±1.1 ^{####}	14.8±1.0 [*]	8.2±1.6 ^{****}	16.6±2.2
Liver					
TG (g.L ⁻¹)	0.43±0.04	1.15±0.11 ^{####}	0.49±0.03 ^{****}	0.30±0.03 ^{****}	0.67±0.05 ^{***}
VLDL-C (mg.dL ⁻¹)	9.26±0.88	23.02±2.37 ^{####}	11.13±1.28 ^{****}	5.26±0.55 ^{****}	13.36±1.05 ^{***}

The NC and HC groups received distilled water and the groups (TE 500, Sup 100 and Met 100) were treated respectively with total extract (500 mg.Kg⁻¹), supernatant (100 mg.Kg⁻¹) and metformin (100 mg.Kg⁻¹) for 4 days. The results are treated with Anova one way and represent the mean ± ESM. *p < 0.05 **p < 0.01; ***p < 0.001; ****p < 0.0001; Compared to hyperlipidemic control (HC); ####p < 0.0001; # p < 0.05; Compared to normal control (NC).

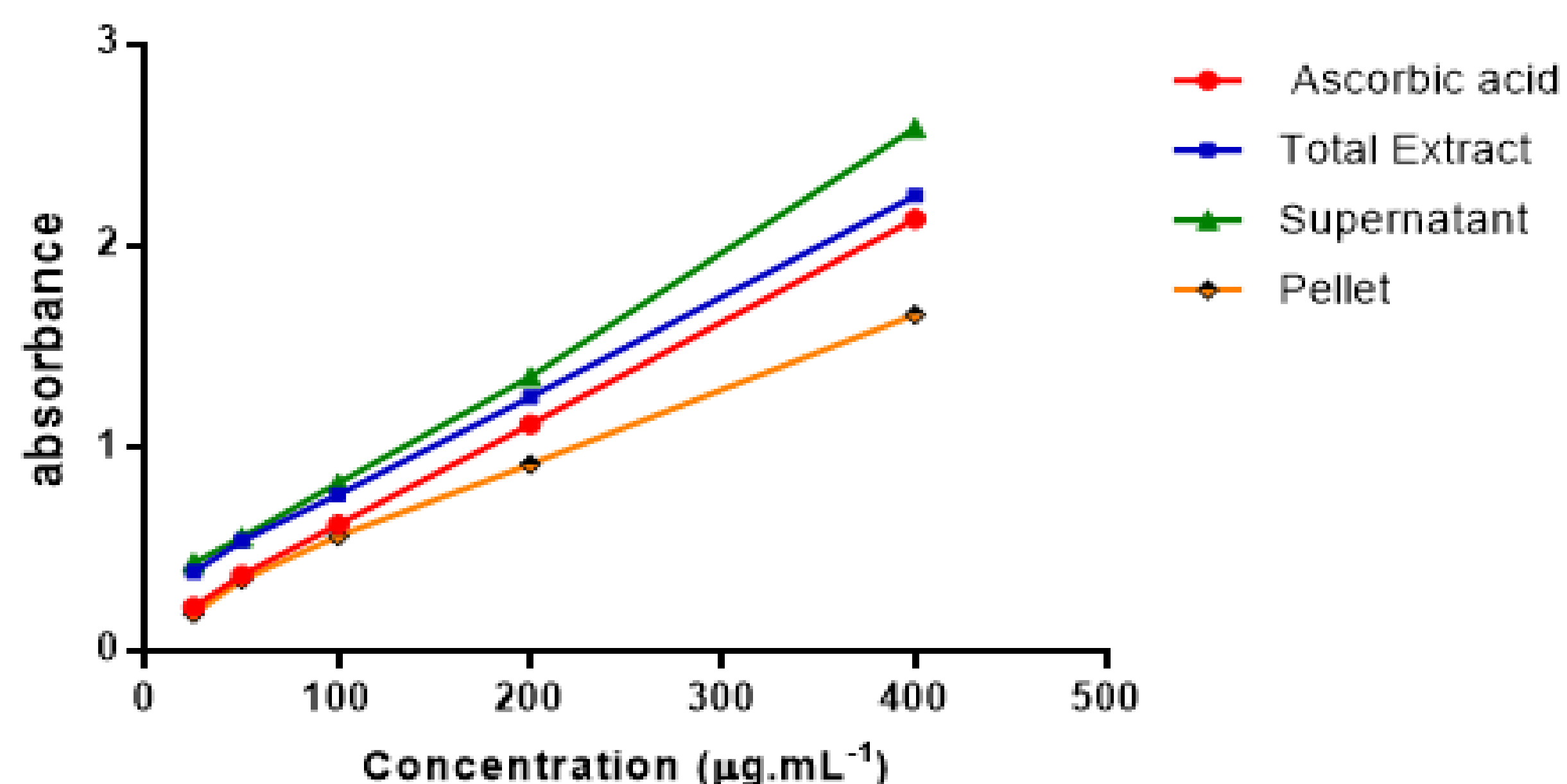


Figure 1: Reducing power

The results represent the means ± SEM. N = 3

Table 2: DPPH* radical scavenging activity

	Ascorbic acid	Total extract	Supernatant	Pellet
IC 50 (µg.mL ⁻¹)	46.9 ± 0.15	48.7 ± 0.15	23.3 ± 0.35	72.7 ± 0.70

The results represent the means ± SEM. N = 3

Table 3: Total antioxidant capacity

	Total extract	Supernatant	Pellet
Total antioxidant (mg AA.g ⁻¹)	233 ± 1.5	237 ± 1.5	141 ± 2.5

The total antioxidant were expressed in mg/g of Ascorbic Acid. The results represent the means ± SEM. N = 3

Table 4: Total phenols, tannins, flavonoids and polysaccharids amount

Compounds	Total extract	Supernatant	Pellet
Total Phenols (mg AG.g ⁻¹)	74.5 ± 0.003	75.5 ± 0.008	73 ± 0.011
Tannins (mg AG.g ⁻¹)	63.5 ± 0.003	70.5 ± 0.007	62.5 ± 0.007
Flavonoids (mg R.g ⁻¹)	42.5 ± 0.005	57 ± 0.005	48.5 ± 0.003
Polysaccharids (mg GLU.g ⁻¹)	297 ± 0.008	331 ± 0.002	281 ± 0.007

Phenols and tannins expressed in mg Gallic Acid Equivalent/g extract. Flavonoids, Polysaccharides are respectively expressed in mg Rutin Equivalent/g mg Glucose Equivalent/g extract. Results represent mean ± SEM. N = 3

Conclusion

The present study reports the antihyperlipidemic and antioxidant properties of total extract and fractions of roots of *Anogeissus leiocarpus*. It may be helpful in preventing macrovascular complications associated with diabetes mellitus

Bibliography

- Ighodaro, O. M. (2018). Molecular pathways associated with oxidative stress in diabetes mellitus. *Biomedicine & Pharmacotherapy*, 108, 656-662.
- Motto, A. E., Lawson-Evi, P., Bakoma, B., Eklugadegbeku, K., Aklikokou, K. (2021). Antihyperlipidemic and antioxidant properties of hydro-alcoholic extracts from *Anogeissus leiocarpus* (Combretaceae). *Heliyon*, 7(4), e06648, 2021



The 7th International Electronic Conference on Medicinal Chemistry
01-30 NOVEMBER 2021 | ONLINE