الجمهورية الجزائرية الديمقراطية الشعبية
وزارة التعليم العالي و البحث العلمي

Université Ferhat Abbas Sétif 1
Faculté des Sciences de la
Nature et de la Vie



جامعة فرحات عباس، سطيف 1
كلية علوم الطبيعة و الحياة

DEPARTMENT OF: BIOCHEMISTRY N^0…. /SNV/2024

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For obtention of a:

MASTER'S DEGREE

Field: BIOLOGICAL SCIENCES
Specialty: APPLIED BIOCHEMISTRY

TOPIC

ANTI-OXIDANT AND ANTI-INFLAMMATORY EFFECTS OF PLANT METABOLITES

Presented publicly on: 30 /06 /2024

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Promotion: 2023/2024
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Acknowledgements

First and foremost, we would like to thank the God Almighty for giving us the strength, health, patience and will to be able to carry out this research. We thank our wonderful supervisor Professor Meziti Hicham for his exceptional support and for the opportunities he has given us throughout our thesis. His encouragement and guidance has given us confidence in our research ability and a true understanding of the nature of determination, particularly with regard to organizing the practical work. We would like to express our sincere gratitude to our friends Meriem, Chaima, Silia Yasmine, Dina and Soumaia and the rest of our 2024 promotion for their help in our studies and in this thesis. We also take this opportunity tore sincerely thank the professors of the applied biochemistry Research laboratory prof. Karnouf, prof. Boucheffa and prof. Kada for guiding us through the course of our research. We would also like to thank all the members of the jury for their interest our work:

Dr. MEZITI HICHAM
Dr. MAMACHE WALID
Dr. BOUDOUKHA CHAHRA

Finally, we would like to thank all those who have contributed to this work.

Dedications

I dedicate this work to:

The memory of my father **THOMAS MWAMVULA** who until his death was a source of encouragement and inspiration to my studies, and for the sacrifices he made to ensure that I got the best education.
My lovely mother **SALOME CHIZI** for her love, support, and prayers.
My cousin **Dr. GADIEL MWANJELE** for his immense support, mentorship, and encouragement throughout all my studies.
The love of my life **JOSEPH MAMBA** for his love, support, prayers, and encouragement throughout my studies here in Algeria.
My special friends and study partners **TRACEY CHIDA** and **SCOVIA NUWENYINE** for having being the best support system in my studies for 5 years and encouraging me to give my best in my education.
To my siblings **CLEMENCE WAKIO, ESTHER MGHOI, PAUL MWAMBERE,** and **PENINAH NYAMVULA**.
And lastly to all my relatives, friends, Setif cell group mates, and the **SAGALLA** community.

AGNES

Dedication

And thus concludes a lengthy journey, the time has come to turn the page and close this chapter of my story, marked with sacrifices and change.

First and foremost, I thank **GOD** for having given me courage, strength, protection (gift of life), good health, patience, and wisdom during this research study.

I dedicate this research study to;

To my Father (**Mr Bihagaro Samuel)** whose unwavering love and support have been the driving force behind my academic pursuits.

To My lovely mother **(Flavia Bihagaro)** her encouragement, prayers, and belief in me have been a constant source of inspiration and I am forever grateful for her guidance and wisdom.

To the people who have been my Source of inspiration, and guidance and given me strength, and who continually provided their moral, spiritual, emotional, and financial support. (Hon**. Molly Kamukama**,) I am grateful.

To my dear elder sisters(**Naome and Peninah, Monic)** thank you for your prayers, calls, texts, and encouragements, and in a special way thank you my dear **Peninah** for taking urgent care of my finances and endeavouring that I never lacked while am abroad **(My emergency call).**

To all my friends who have always encouraged me **Joshua, Collins, cell group, Winnie (Teammate), Armelle.**

To my colleagues who were with me in the research laboratory, **Tracey, Agnes, Chaima, and Dr. Chams,** thank you for the company, care, and love, learned a lot from you, dear scientists, it was an honor to share this moment with you, you are incredibly smart people.

To my teacher Dr. Meziti Hicham (director of my thesis), who has constantly guided me which made this study even better.

To **myself, Department of Biochemistry** (University of Ferhat Abbas setif 1), College of Nature Sciences **(Makerere University-Uganda), Rwenyena community,** and to all readers

Nuwenyine Scovia

I *dedicate this thesis firstly to my dear mother* ***Lucy Joseph****, for her genuine love, financial and moral support. For me to be where I am right now it's because of her unending sacrifices and I am happy the sacrifices have finally come with rewards. Her prayers and words of wisdom have made me reach this far and I appreciate her so much. I also dedicate this thesis to my grandparents who took care of me when I was a child. It was not easy but they never gave up on me. I am grateful to God for keeping them alive so that I can also celebrate this success with them. To my beloved step father* ***Clifford Jumo*** *who is now late, I say "this is also for you". His confidence in me made me believe that I am capable of becoming the person I want to be. I also dedicate this work to my father, my brothers, sisters, aunts and uncles who have never stopped advising, encouraging and supporting me throughout my studies. Lastly I dedicate this work to Melody, Ruvimbo, Scovia, Agnes, Chaima, Shams and my classmates for their endless support during the preparation period.*

Tracey

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Abstract

The aim of this study was to determine the anti-inflammatory and antioxidant activity of flavonoids (genistein, gossypin, myricetin, silymarin, diosmin, naringin, Quercetin,), phenolic acids (caffeic acid, gallic acid) and other plant metabolites (astaxanthin and vitamin C) on AAPH- induced hemolysis, myeloperoxidase and elastase activities. The in vitro antioxidant activity of flavonoids and other plant metabolites was evaluated and exerted a significant protective effect against AAPH-induced erythrocyte hemolysis, with a good correlation between concentration and half-hemolysis time (HT50). The plant metabolite that exhibited the highest anti-hemolytic effect was caffeic acid with half- hemolysis times of 3.44 and 2.62 hours at 5and 1 µg /ml respectively silymarin and astaxanthin had the lowest effect in comparison with the other plant metabolite. The study of plant metabolites showed also significant inhibitory effects on elastase and MPO activities. The anti-inflammatory activity was confirmed by evaluating the effects of plant metabolites on inhibition of elastase activity and neutrophil myeloperoxidase activity. The plant metabolites with the highest inhibition effect on MPO activity was caffeic acid with inhibition percentage of 93.65% and 59.6% at 5 and 1 µg /ml) while astaxanthin had the lowest effect with 4.72% and -14.15% at concentrations 5 and 1 $\mu g/ml$. The plant metabolites also inhibited neutrophil elastase activity with vitamin C exhibiting the highest inhibition effect of 24.75% and 23% at 10 and 5 $\mu g/ml$ while silymarin had the lowest inhibition effect of 0% at 10 μg /ml and 6.25% at 5 μg /ml. The obtained results showed that plant metabolites have considerable antihemolytic, antioxidant, and anti-inflammatory effects.

Key words: *anti-inflammatory, antioxidant, plant metabolites.*

List of Abbreviations

AAPH: 2,2'-Azobis(2-amidinopropane) dihydrochloride

ELISA: Enzyme linked immune-sorbent assay

fMLP: N-Formylmethionine-leucyl-phenylalanine

H2O2: hydrogen peroxide

HBSS: Hanks balanced salt solution

HEPES: 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid

HOCl: Hypochlorous acid

HTAB: Hexadecyl trimethyl ammonium Bromide

MPO: Myeloperoxidase

NADPH: Nicotinamide adenine dinucleotide phosphate

NE: Neutrophil elastase

NET: Neutrophil extracellular traps

NOX: NADPH oxidase

PAMP: Pathogen associated molecular patterns

PMN: Polymorphonuclear neutrophils

PRR: Pattern recognition receptor

RNS: Reactive nitrogen species

ROS: Reactive oxygen species

TLR: Toll like receptor

XO: Xanthine oxidase

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