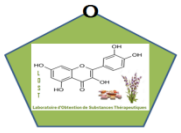
BDEE 2021
The 1st International Electronic Conference on Biological Diversity, Ecology and Evolution
15–31 MARCH 2021 | ONLINE
Chaired by PROF. DR. MICHAEL WINK
diversity
MDPI

Phytochemical study and *in vitro* biological assays on *Zingiber officinal*: a widely used spice

Toma Nardjes Mouas [1,*], Zahia Kabouche [1], Amine Boucherka [2], and Abdenour Messaoud [2]

[1] Université frères Mentouri-Constantine1, Laboratoire d'Obtention de Substances Thérapeutiques LOST, Campus Chasbet Ersas, 25000 Constantine, Algeria;
[2] Constantine 25000, Algeria.
•Corresponding author: mouas.toma.nardjes@umc.edu.dz



Laboratoire d'Obtention
de Substances Thérapeutiques

Abstract: *Zingiber officinal* is a widely used plant in cooking as well as traditional remedy in prevention of digestive conditions and disorders, cancer, inflammatory disease, antiseptic. In recent years several studies are conducted on botanical, chemical and toxicological parts of this plant in order to prove a concordance between traditional and medicinal knowledge. There is an urgent need to explore and investigate the innovations, current shortcomings, future challenges explore and convey the key concepts for understanding the assessment of plant based metabolites in therapeutically caring. Furthermore, Drug discovery from plants goes through different strategies: empirical approach like ethno botanical and pharmalogical studies, and chimiotaxonomical one like choosing certain secondary metabolites family phenols, flavones, terpens...
In this case, the present work is a contribution in the evaluation of *Zingiber officinal's* rhizome percolate potential in polyphenols, flavonoïdes, *in vitro* antioxidant test Ferric reducing *antioxidant* power FRAP, antibacterial activity against several gram + (*S.aureus)* and gram-(*E.coli* , *P.aeruginonose, K.pneumoniae)* referential strains and antifungal activity (*Candida albicans, Aspergillus niger,)* were tested using disk diffusion method, which reveled a very interesting dose-depending activity (
to 26mm) against *S.aureus, P.aeruginonose and K.pneumoniae,* similar
standard Gentamicin GN, whereas fungi exhibit less sensitivity wi
of inhibition and *E.coli* was resistant to crud ginger extract.
Keywords: *Zingeber officinal*, phenols, antioxidant activity, antimicrobia

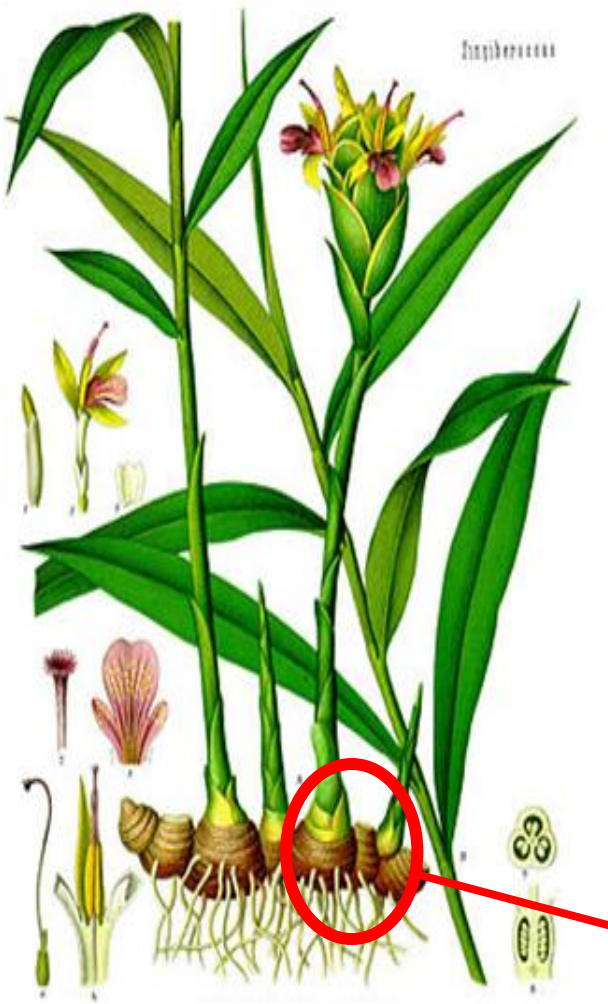
BDEE 2021

Zingebre *Officinale*

Classification	
Famille	Zingibéracées
Genre	Zingiber Mill.
Espèce	Zingiber officinale

Origin

- Asie du Sud-est (Indonésie et Philippines)
- Chine
- Inde
- Afrique tropicale (Nigéria)

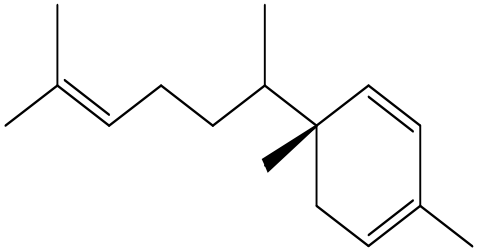


Uses

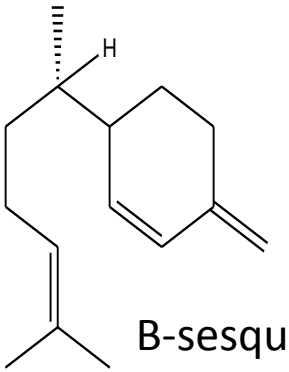
- Epice.
- Remède contre les douleurs musculaires, les troubles gastro-intestinal, les inflammations des voies respirat

Composition biochimique du Zingebre *Officinale*

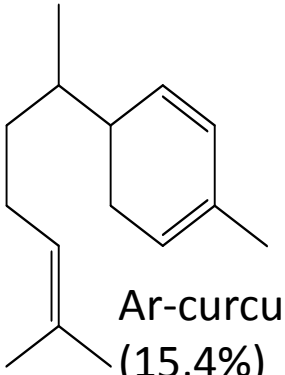
- Métabolites primaires
  - 60% glucides
  - 10% lipides
  - Protéine, fibres, minéraux, vitamines… etc
- Métabolites secondaires
  - Polyphénols
  - Flavonoïdes
  - Terpènes… etc.



Zingebrene
(31%)



B-sesquiphellandrene
(14,02%)



Ar-curcumene
(15,4%)

Results and Discussion

Yield= 19,06 %

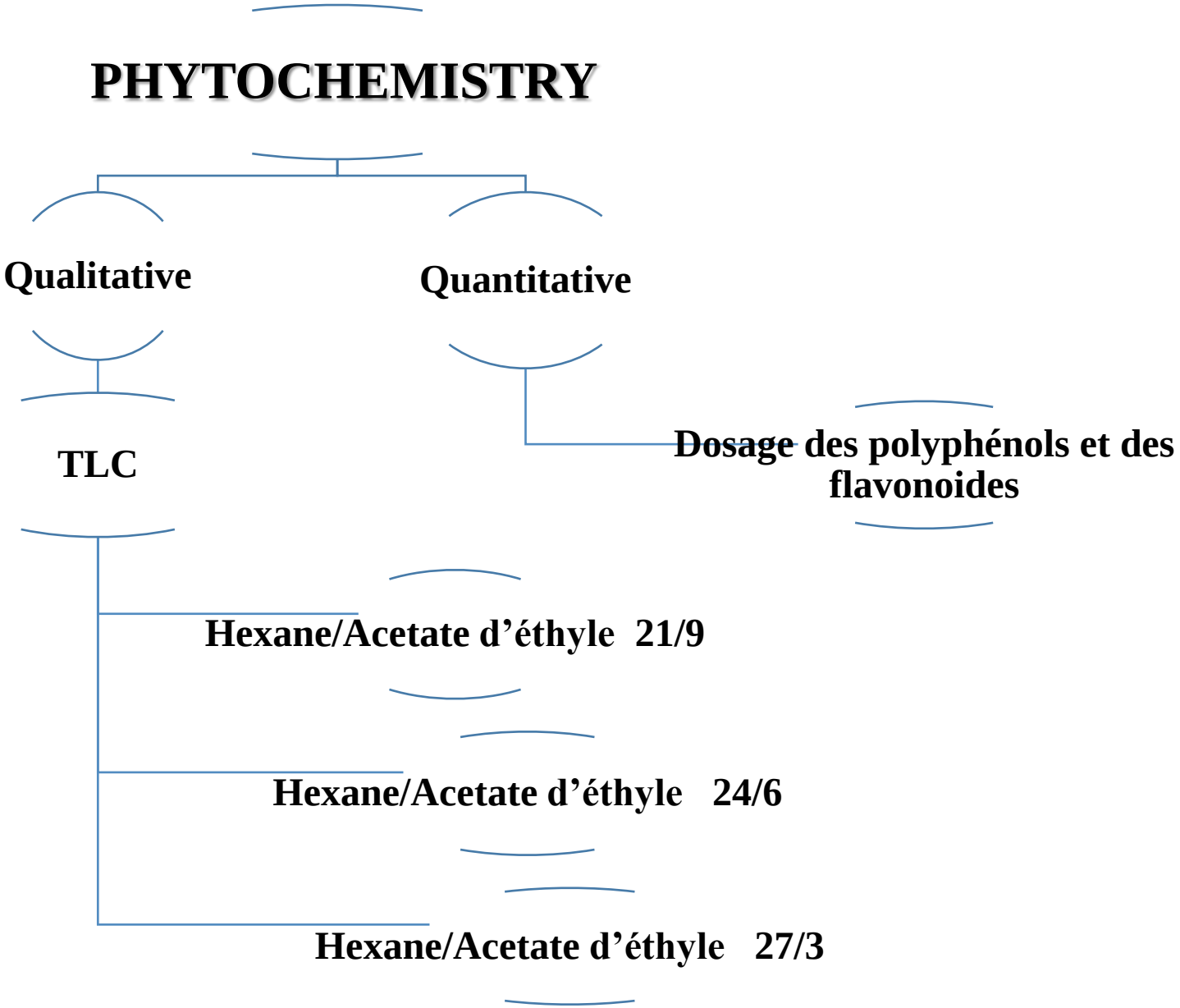
Broyage

Extraction par Soxhlet

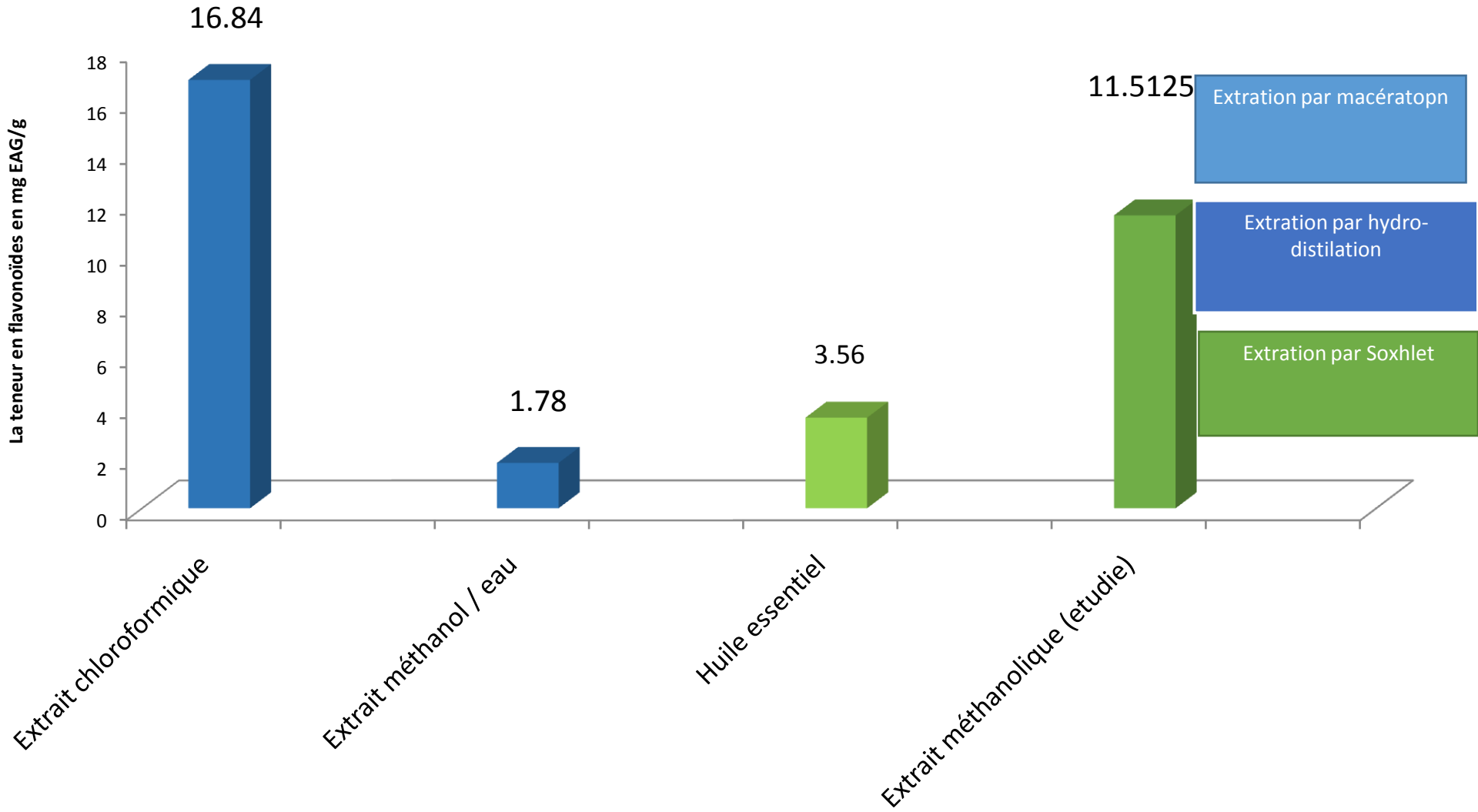
Evaporisation par Rotavapor

Crud extract

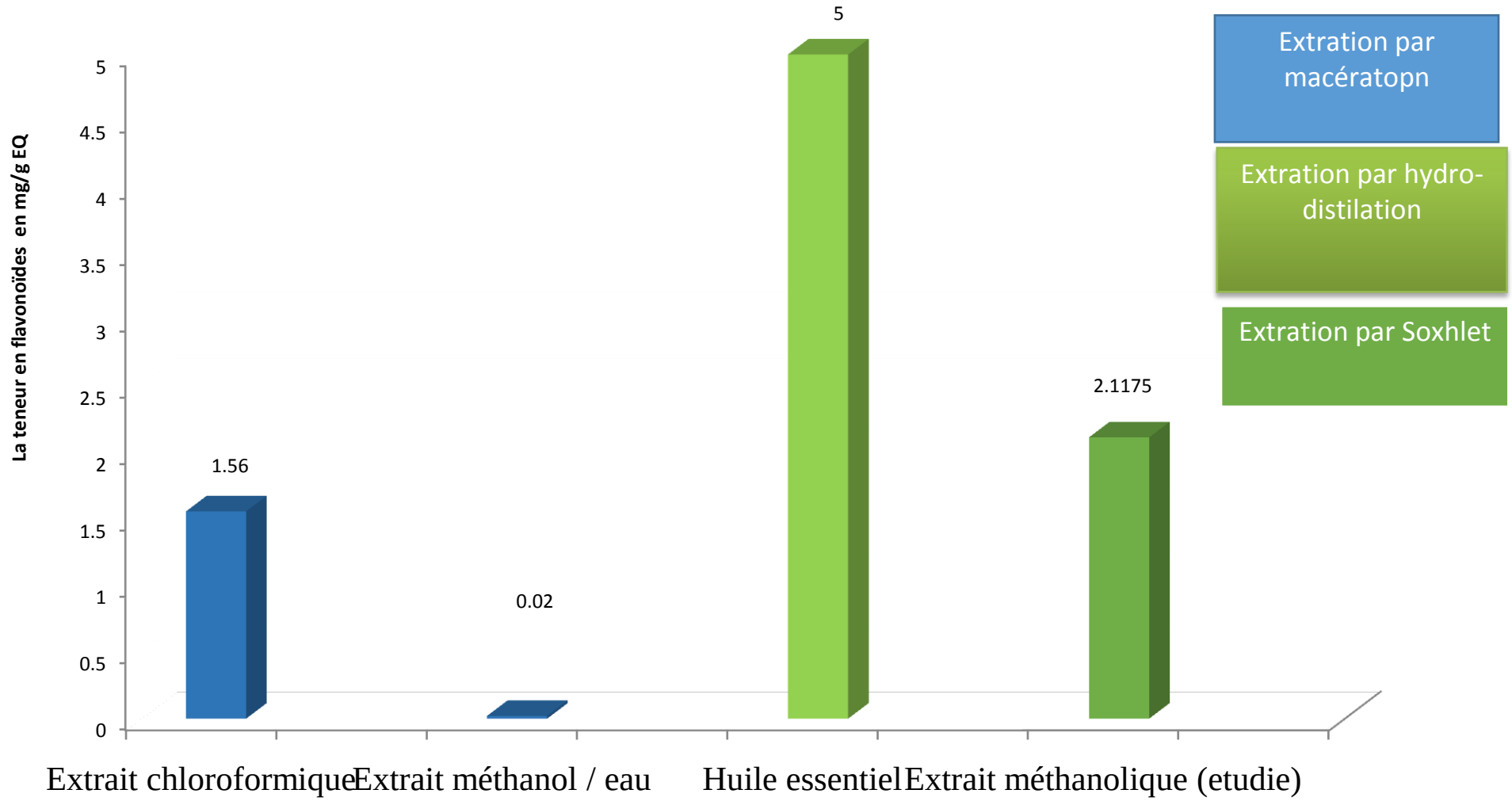
PHYTOCHEMISTRY

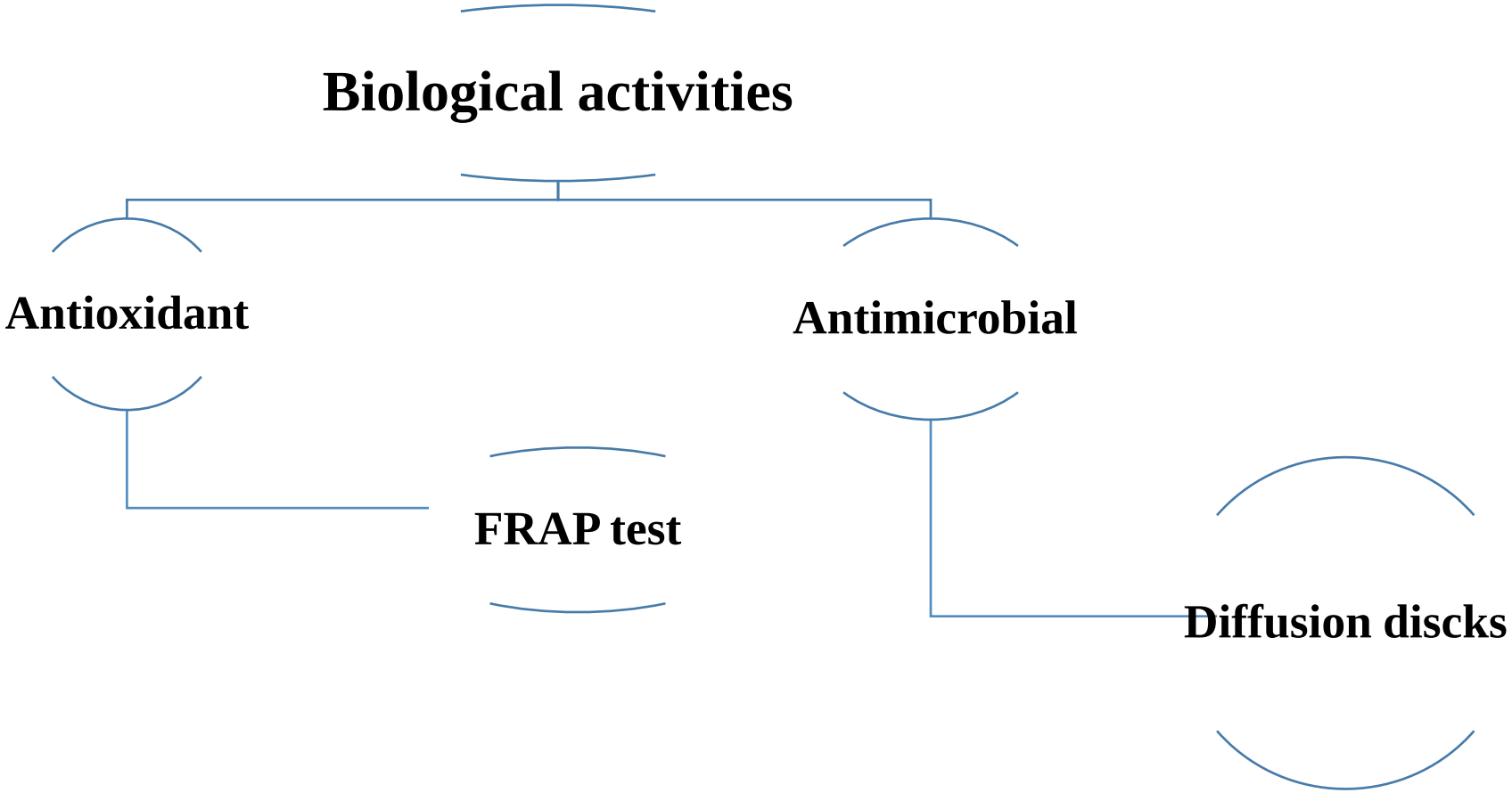


Phenols

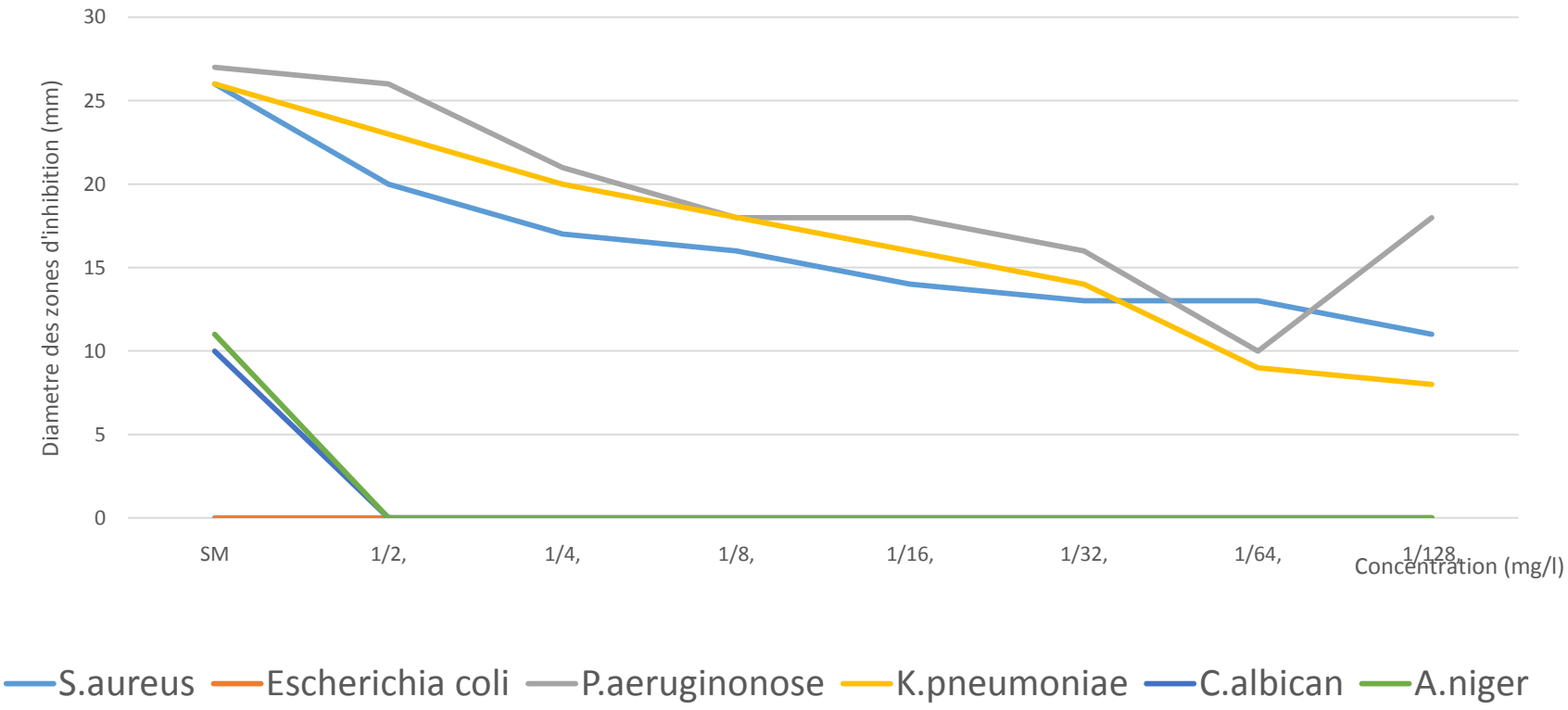

16.84
1.78
3.56
11.5125
La teneur en flavonoïdes en mg EAG/g
0
2
4
6
8
10
12
14
16
18
Extrait chloroformique
Extrait méthanol / eau
Huile essentiel
Extrait méthanolique (etudie)
Extration par macératopn
Extration par hydro-distilation
Extration par Soxhlet

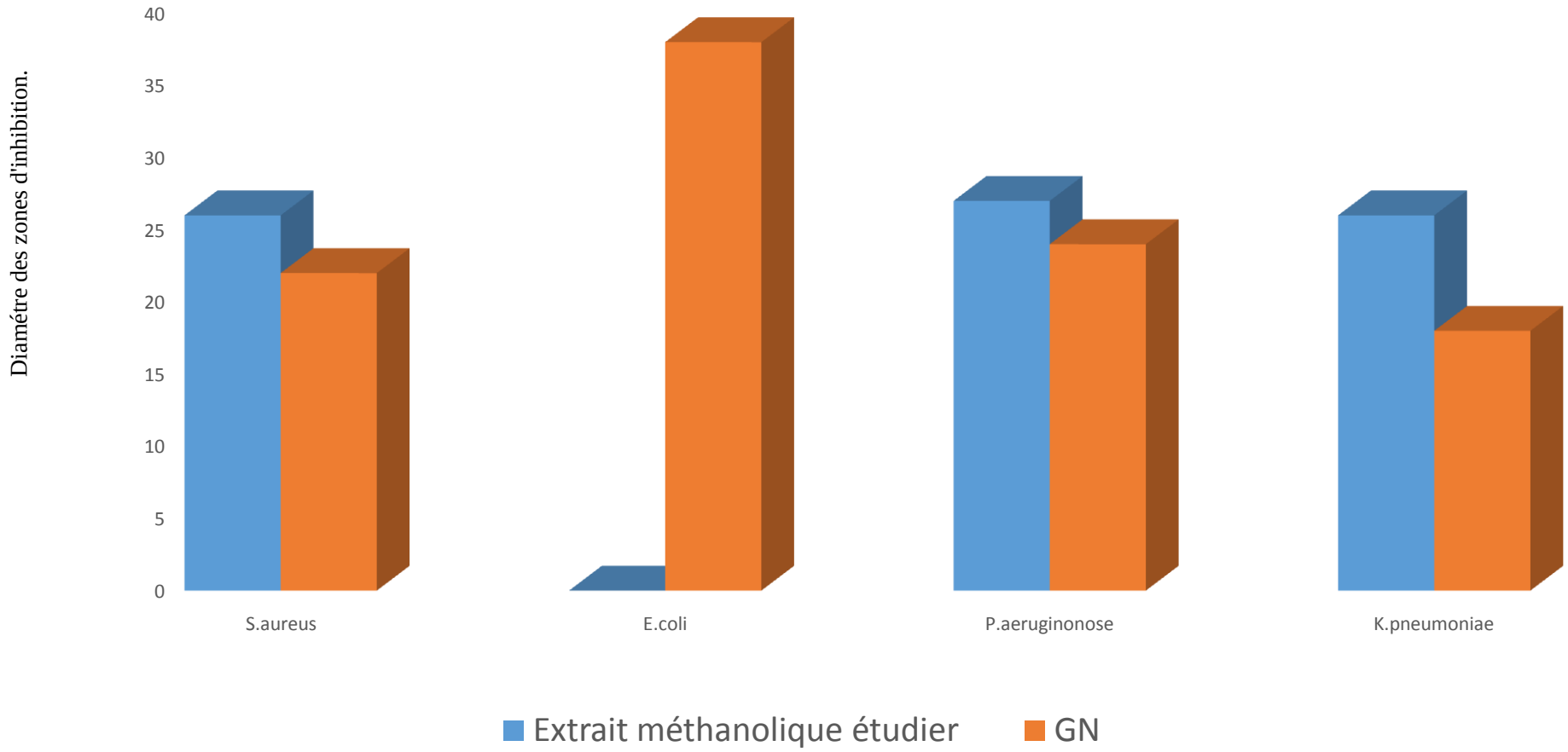
Flavonoids


La teneur en flavonoïdes en mg/g EQ
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1.56
0.02
5
2.1175
Extration par macératopn
Extration par hydro-distilation
Extration par Soxhlet
Extrait chloroformique
Extrait méthanol / eau
Huile essentiel
Extrait méthanolique (etudie)


Biological activities
Antioxidant
Antimicrobial
FRAP test
Diffusion discks

Dose-dependending antimicrobial activity




Diamétre des zones d'inhibition.
40
35
30
25
20
15
10
5
0
S.aureus
E.coli
P.aeruginonose
K.pneumoniae
Extrait méthanolique étudier
GN

Conclusions In the present work a widely used spice in culinary field as well as traditional remedy *Zingeber officinal* rhizomes'' methanol percolate was investigated through its *in vitro* antioxidant and antimicrobial activities assessment. Phenols potent was evaluated. The antioxidant effect of studied plant was evaluated by the FRAP test which gave high effect at low concentration similar to vitamin C, the antimicrobial activity was evaluated by disk diffusion method for three Gram (-) bacteria (*E.coli, P.aeruginonose, K.pneumoniae*), one bacteria Gram (+) (*Staphylococcus aureus*) and two funguses: *Candida albicans, Aspergillus niger*. and exhibit an interesting antibacterial effect for *P.aeruginonose, K.pneumoniaeand Staphylococcus aureus,* similar to used standard Gentamicin GN. Therefore, it may be considered, as an efficient nutraceutical and functional food for treating gastrointestinal disorder.

Acknowledgments

Authors would like to thank Algerian Ministry of Higher Education and Scientific Research DGEFS, and the Algerian Directorate General for Scientific Research and Technological Development DGRSDT for financial fund.

BDEE
2021