

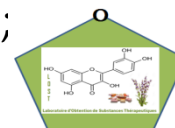
Efficient extraction and structural analysis of Biosourced Piperine as natural adjuvant.

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Abstract: In the framework of valorization of introduced and cultivated spices on Algerian soil, Piperine main constituent of black pepper is chemically and biologically studied, as it improves bioavailability of several synthetic and natural drugs such as Resveratrol and Curcumin thanks to its diffusion mechanism and a high permeability coefficient. In fact it was reported that Curcumin- Piperine nanoparticles were used to increase Curcumin bioavailability in cancers treatment.

In the present work an efficient Soxhlet extraction of Piperine with several solvents screening namely: ethanol, chloroform, dichloromethane, acetate ethyl, acetone; and time depending is reported in order to optimize extraction conditions and maximize extraction yields, besides a purification and structural characterization of obtained biocompounds was conducted using several analytical and spectroscopic methods as: MP, TLC, UV, FT-IR.

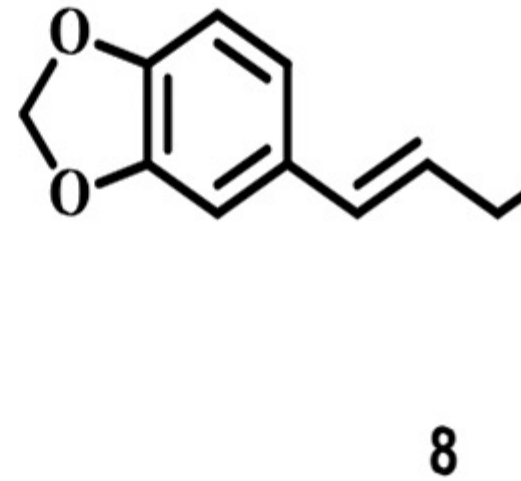
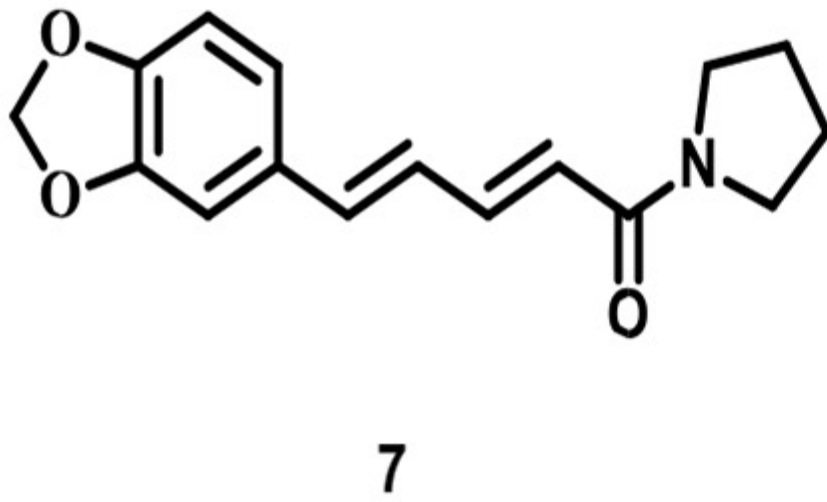
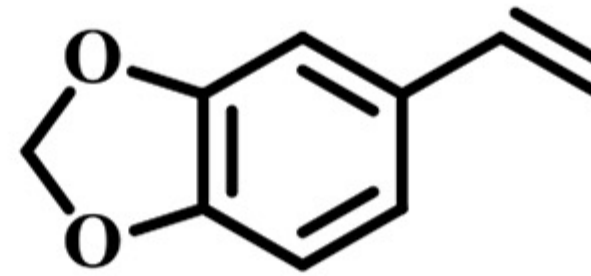
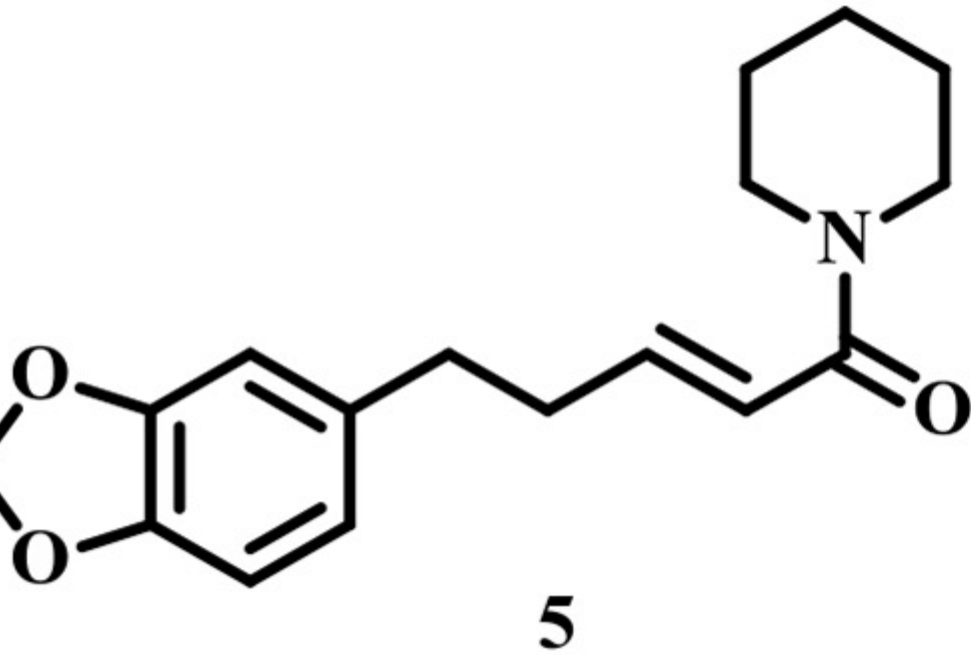
Optimized Soxhlet extraction exhibits ethanol in 2h as the best solvent and time extraction conditions. On the other hand, LC chromatography isolation in addition to spectroscopic analysis leads to identify target pure Piperine.

The scope of this study is to use the obtained biobased Piperine in further applications like hemi synthesis or formulation by simply encapsulated and used as nutraceutical adjuvant to optimize efficiency of other biomoleculs.

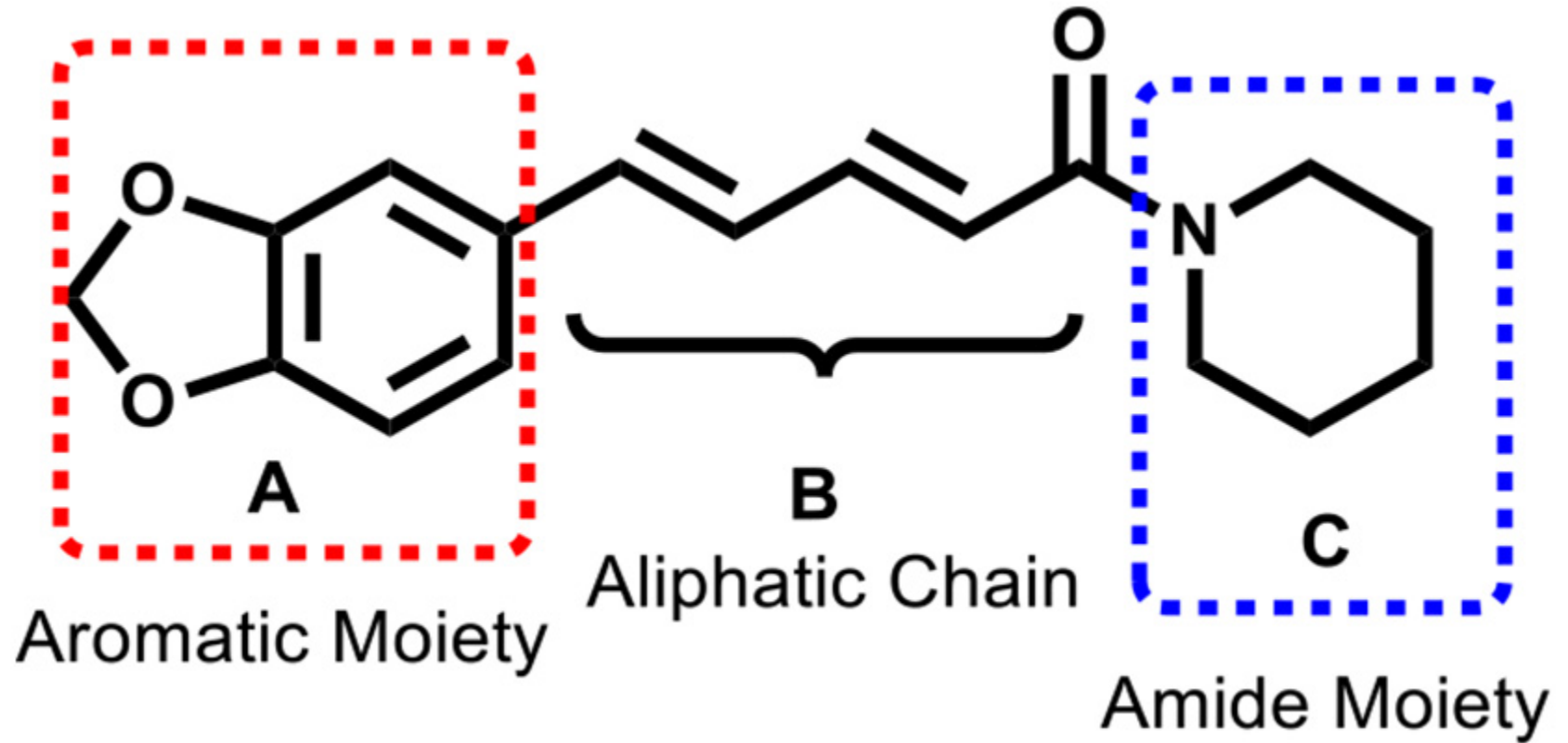
KEYWORDS: Bioenhancer; Piperine; Solvent screening; Soxhlet extraction; Purification; Structure analysis.

Results and Discussion Extraction was carried out using conventional extraction under optimized process obtained after solvent screening, exhibit the best yield for ethanol 12,34%/2h of crud. It also lead to maximize pure Piperine recovery, isolated Piperine was identified through TLC, melting point, IR, and UV spectroscopy which reveled the target chemical structure.

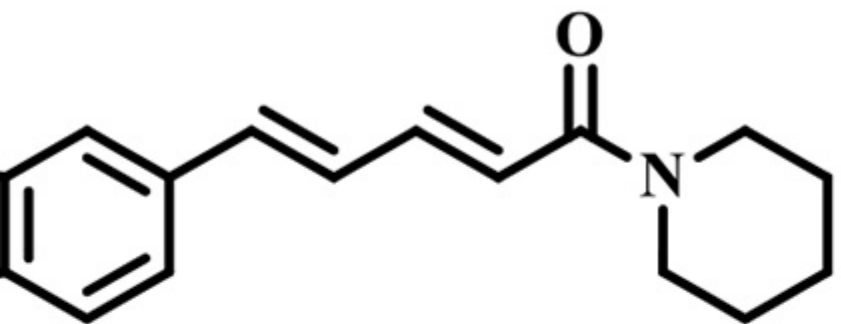
Alkaloids present in Black pepper



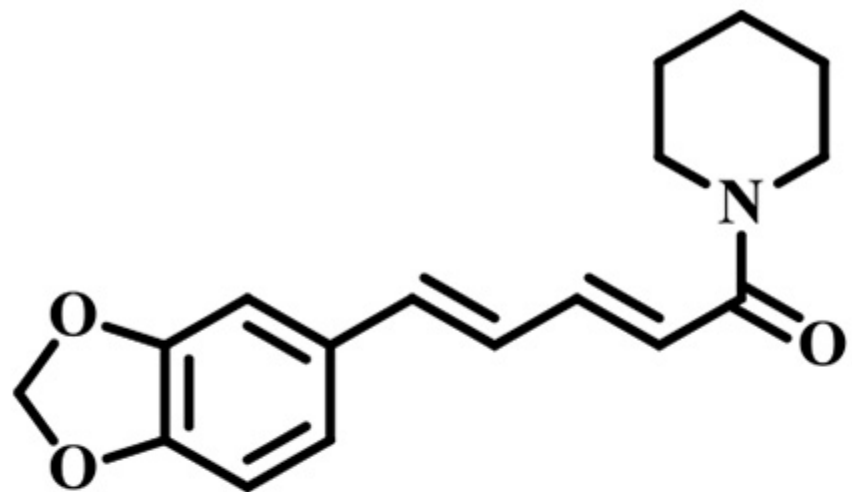
Piperine chemical structure



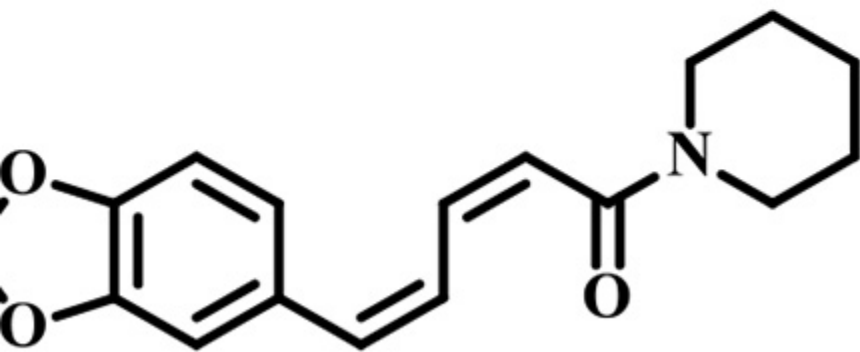
Piperine isomers



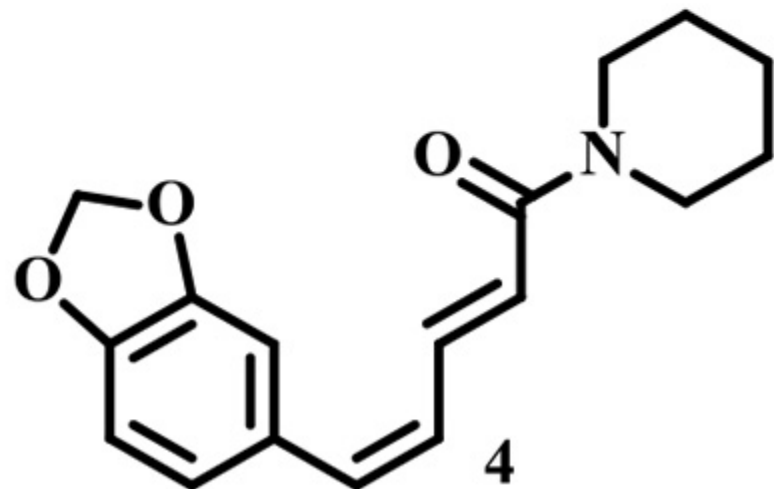
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Piperine structural analysis

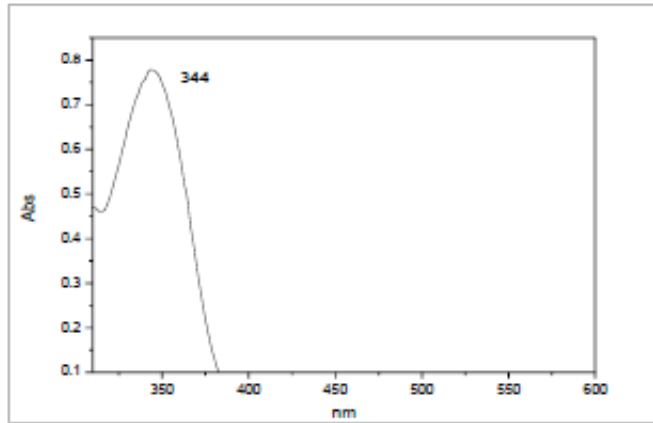


Fig4. Piperine UV spectra

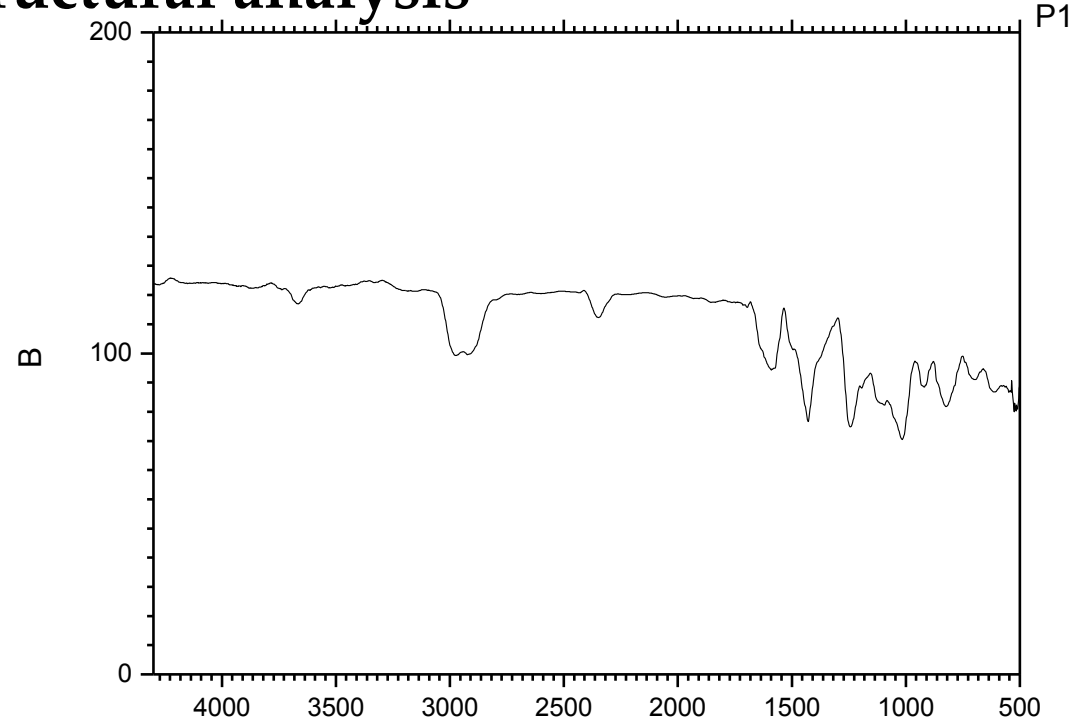


Fig5. Piperine IR spectra

Groupement	Longueur d'onde (cm ⁻¹) Expérimentales	Longueur d'onde (cm ⁻¹) de la littérature
C=C _{aroma}	1582, 1584, 1490	1608, 1580, 1495
C-O	927	930
C-O-C	1254, 1184	1250, 1190
-CO-N	1700	1700
C=C _{diène}	1634, 1583	1635, 1608
C-H _{ali asy,sy}	2942, 2844	2925, 2840

Conclusions In the present work, an efficient Soxhlet extraction, isolation and identification of Piperine the main bioactive compound of black pepper through conventional routine methods were reported, in order to validate the ease access to this prized bioactive compound even at industrial scale, for pharmaceutical and food purposes using specific formulation to maximize its therapeutic effect as bioenhancer.

Acknowledgments

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