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Eco-friendly extraction, optimization and characterization of natural Curcuminoids.

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Abstract: The introduction of new species in Algerian biodiversity is a crucial task in our environmental and economical politic, thus some spices of great interest as curcuma, saffron...are introduced by young start-ups as Algerian soil and climate are compatible with its culture; and in the framework of enhancement of such spices, the safe recovery of Curcumin in a keto-enol tautomeric form, a sensitive and versatile pro-oxidant and antioxidant propriety rarely reported, which improve its solubility and promote the effectiveness of Curcumin as natural anticancer agent, is reported.

To attend our target, non-thermal and conventional solid-liquid extraction by cold maceration with several solvents' systems and time depending is used, furthermore an optimization using Response Surface Method (RSM) is conducted, then obtained crud is separated using LC chromatography using ethyl acetate/hexane gradient, pure curcuminoids were identified by TLC, MP, UV, IR, and ^{1}H NMR spectroscopy.

This eco-friendly, economic and easy process improved Curcuminoids and Curcumin recovery, preservation and efficiency for further industrial applicationswhich make great profits of introduction of this spicy in Algerian soil and Biodiversity.

Keywords: *Curcuma longa* L. specie; Curcumin; Extraction kinetics; E
Structure analysis.

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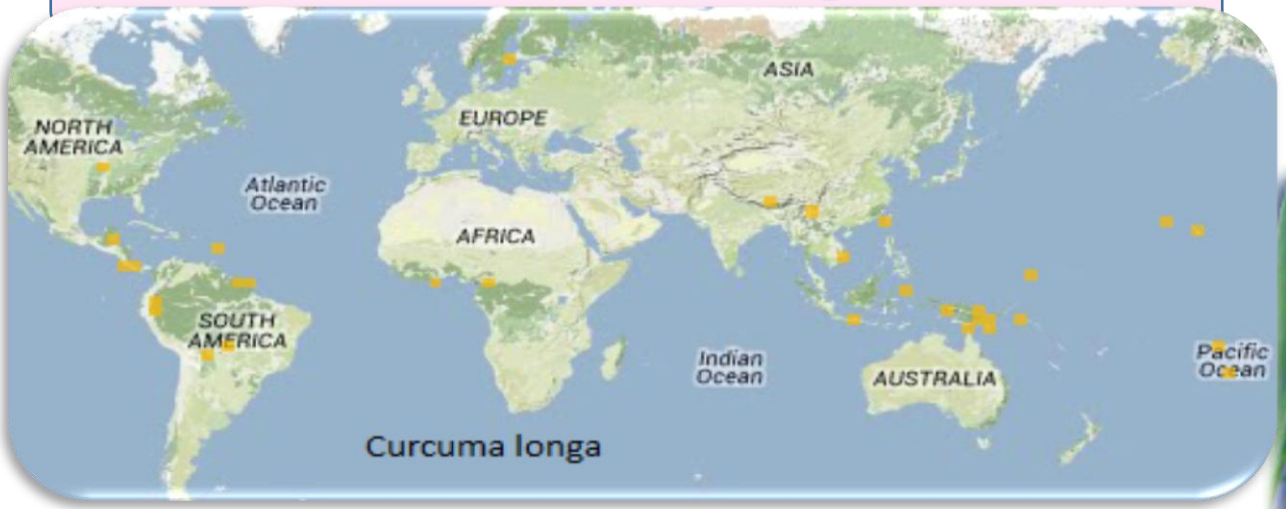
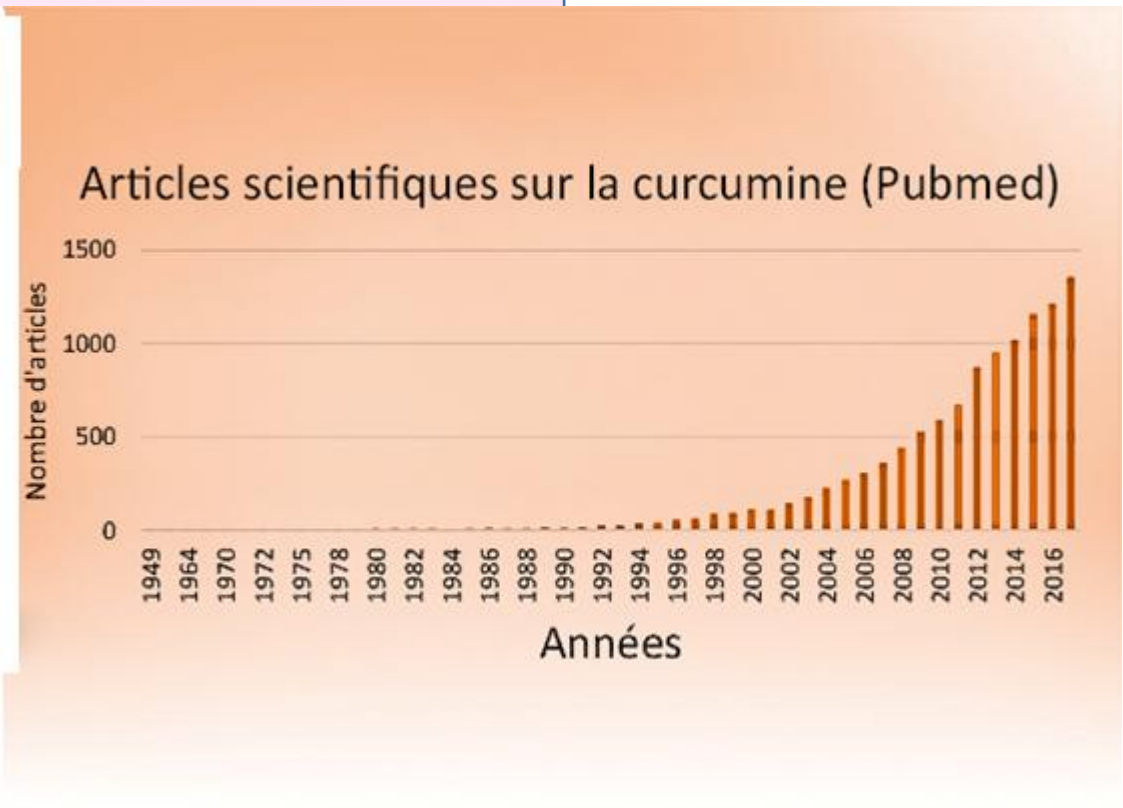
Curcuma longa.L



Genre :
Curcuma
Famille :
Zingibéracée
Ordre :
Zingibérale

Originaire du Sud de l'Asie

Usage traditionnel :



Activités

Anti-inf
Anti-
Anti
Anti-
Anti-p

Enquête Ethnobotanique :

- Riche potentiel
- Intérêt économique
- 3 types de climats en Algérie

Conditions	Parametres	Ecologie de la plante	Region étudiée	Compatibilité
Climat	Température	Démarrage : 30°-35° Tallage : 25° - 30° Initiation des rhizomes : 20° -25° Développement : 18° - 20°	/ Jun-aout :25°-30° Aout-sep :20°-25° Sep- oct : 18°-20°	- + + + +
	Précipitation	1000-2000 ml	> 900 ml	+
	Humidité	Elevée	Un domaine humide	+
	Luminosité	Endroits ombrés a mi-ombrés	Végétation foréstière étendue	+
Sol	Type	Fertile /argileux	Sols podzolique (silice ,argile)	+
	pH	5 – 7.5	8--9	-
	Drainage	Bien drainé	Oueds	+
Localisation	Longitude	Tropicale/subtropicale	Subtropicale	+

Results and Discussion using conventional extraction under optimized process control, exhibit nearly the same result for predicted and experimental yields namely acetone/shaking for 7,6%/6h of crud which is more than most reported results in literature. It also lead to maximize pure Curcumin recovery (2,52%), isolated Curcumin was identified through TLC, melting point, IR, UV and NMR 1H spectroscopy which reveled the target keto-enol tautomery, a very fragile and rare form with versatile propriety.

Préparation de l'échantillon :

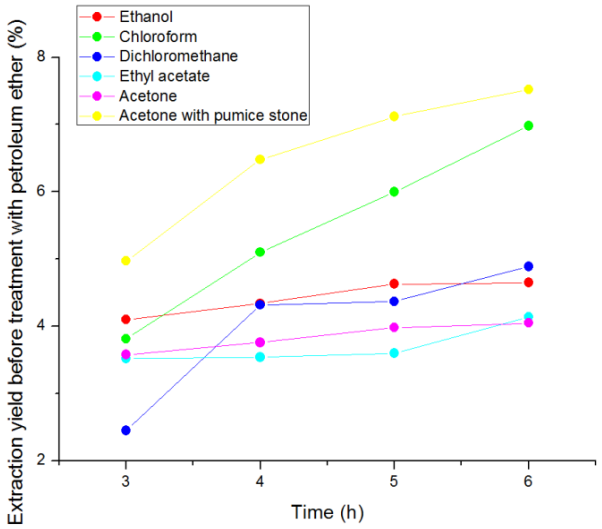
Séchage + broyage

Evaporation au Rotavapor

Studied Factors and levels.

Factors	Variable	Level
Extraction time (hours)	Quantitative multilevel	3
		4
		5
		6
Solvents' systems	Qualitative	S1 : Ethanol
		S2 : Chloroforme
		S3 : Dichloromethan
		S4 : Ethyle acétate
		S5 : Acetone
		S6 : Acetone with

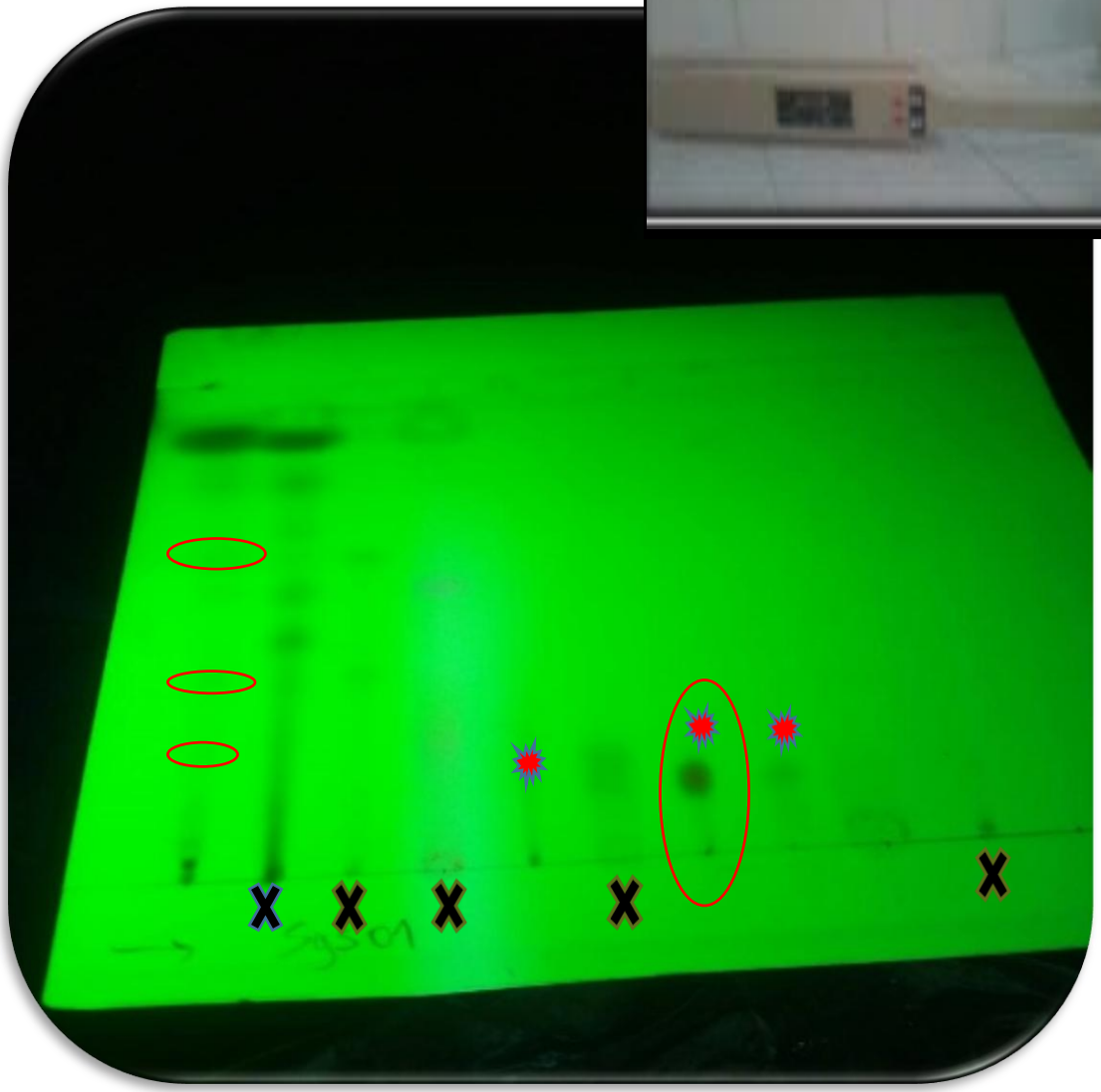
Extraction yields of turmeric with screened solvents and time depending.

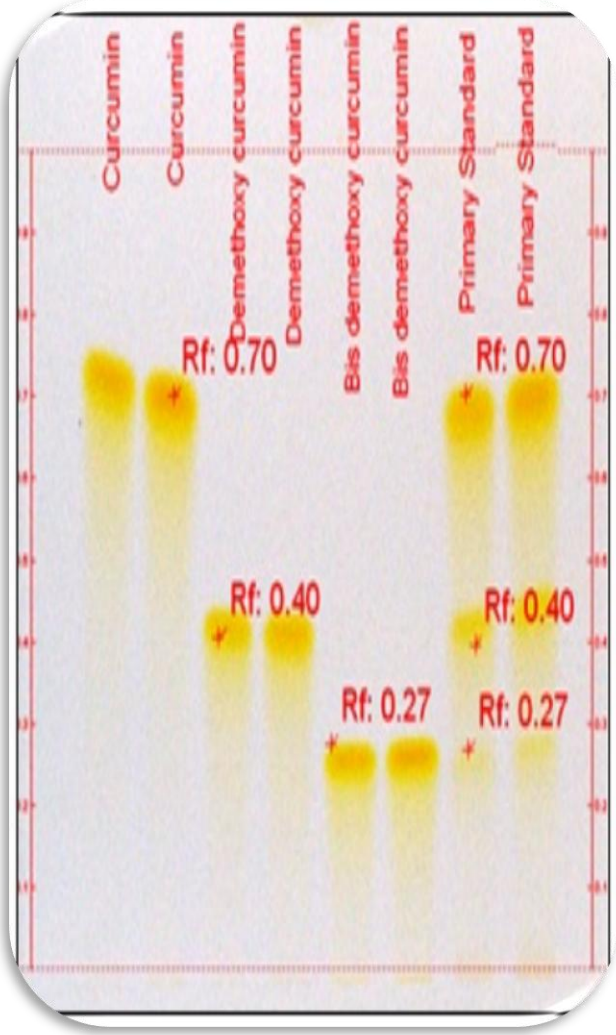


Séparation des Curcuminoides :

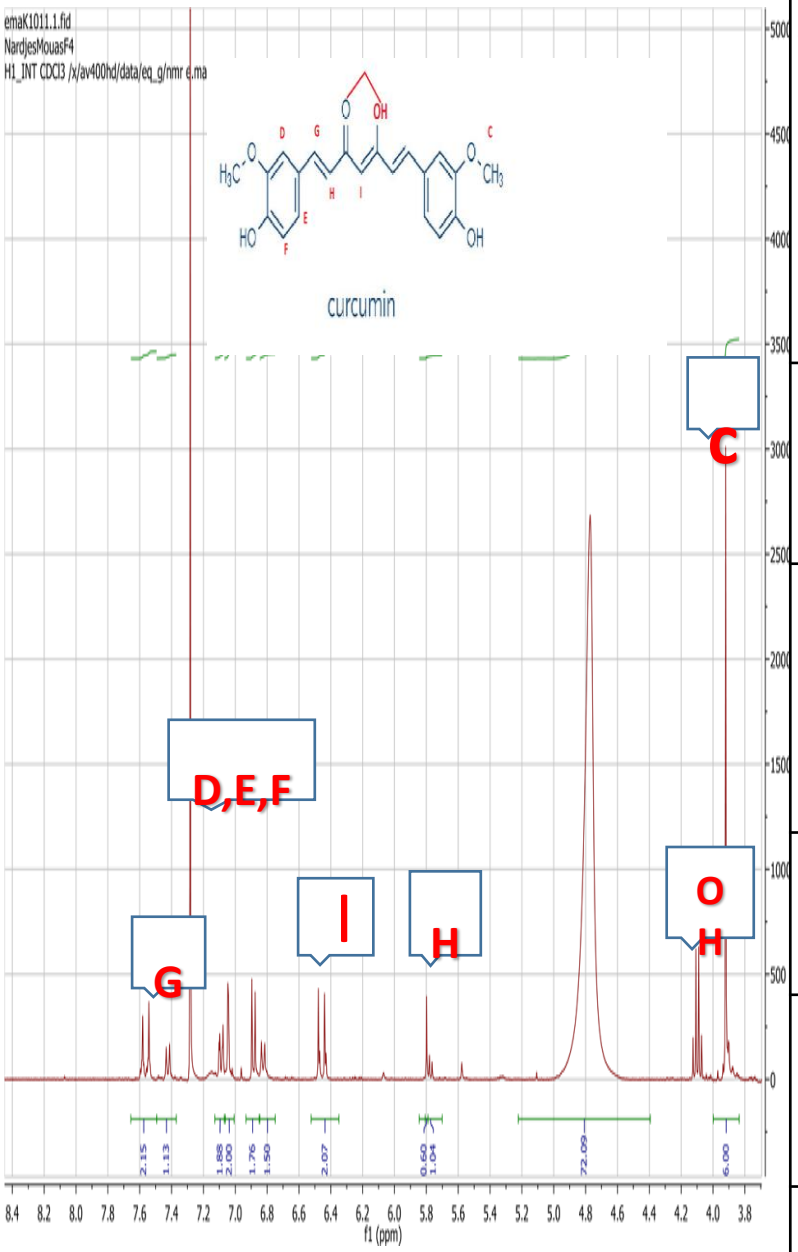
Récupération de différentes fractions

Analyse qualitative :





Revathy.Set *al* , *année?*



Attribution	Déplacement chimique δppm CDCl3	Réf Déplacement chimique δppm CDCl3
C	3.90	3.9 (Nagahama et *al* ,2015)
		3.8 (SarikaRachel, JamesNirmala 2016)
H	5.79-5.8	5.7-5.8 (Nagahama et *al* ,2015)
		6.1(SarikaRachel, JamesNirmala 2016)
I Forme céto-énol	6.4-6.5	6.5 (Nagahama et *al* ,2015)
		6.8(SarikaRachel , JamesNirmala 2016)
D,E,F	6.8-7.3	6.8-7.3 (Nagahama et *al* ,2015)
		6.8-7.2(SarikaRachel ,JamesNirmala 2016)
G	7.55	7.6 (Nagahama et al ,2015)
		7.7(SarikaRachel,

Conclusions The present study highlighted the role of solvent medium in the selectivity and structural stability of curcuminoids and reveled Curcumin as pro-oxidant and antioxidant at the same time; this effect is probably responsible of it effectiveness for scavenging carcinogenic free radicals and promoting it for further applications.

Acknowledgments

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