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Use of turmeric as a health ingredient in the treatment Université de Lille

of chronic inflammatory diseases





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Turmeric is used as a spice and additive worldwide but its use in pharmaceuticals and nutraceuticals is growing. Thus, its interest in the scientific

community is illustrated by the fact that turmeric is now cultivated and used as a health ingredient in herbal medicine on several continents according to

ESCOP and EMA. In addition, clinical trials have shown that turmeric has a long-term therapeutic potential for chronic inflammatory diseases (CID), in

addition to its beneficial adjuvant effect. The curcuminoids naturally present in large quantities in turmeric rhizome have several health effects in human and



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livestock, as illustrated in this work.

Traditionnal use and composition

Used in Ayurvedic medicine in India for 6000 years according to the FAO, turmeric is a plant whose traditional use is widespread in Asia [1]. Turmeric is part of the Zingiberaceae family, there are currently about 94 different species in the world [2]. Depending on the variety, the macronutrient composition of turmeric rhizome is characterized in Turmeric is particularly rich in polyphenols. Chromatographic analysis of turmeric powder (Figure B) highlights the major curcuminoids: prevalence the three curcumin, bisdemethoxycurcumin (BMC) and demethoxycurcumin (DMC).

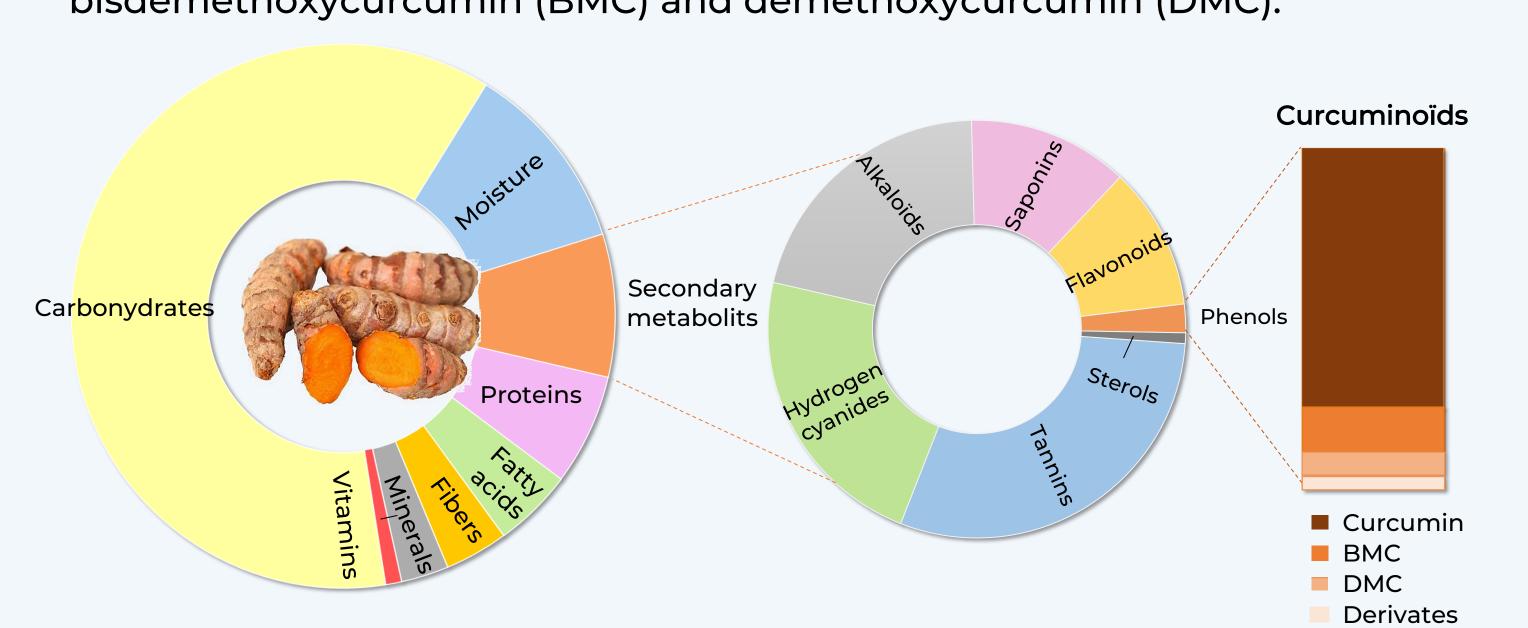


Figure A: Turmeric's macro- and micro-nutriments

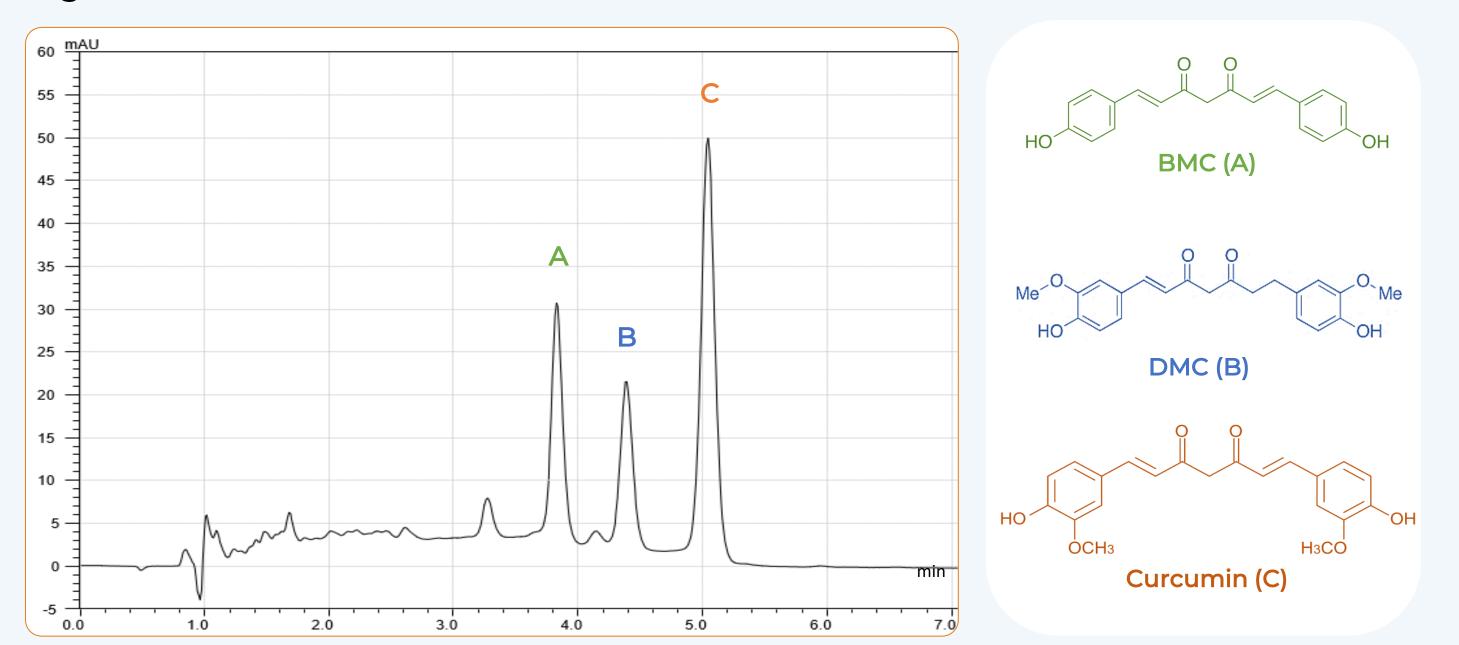
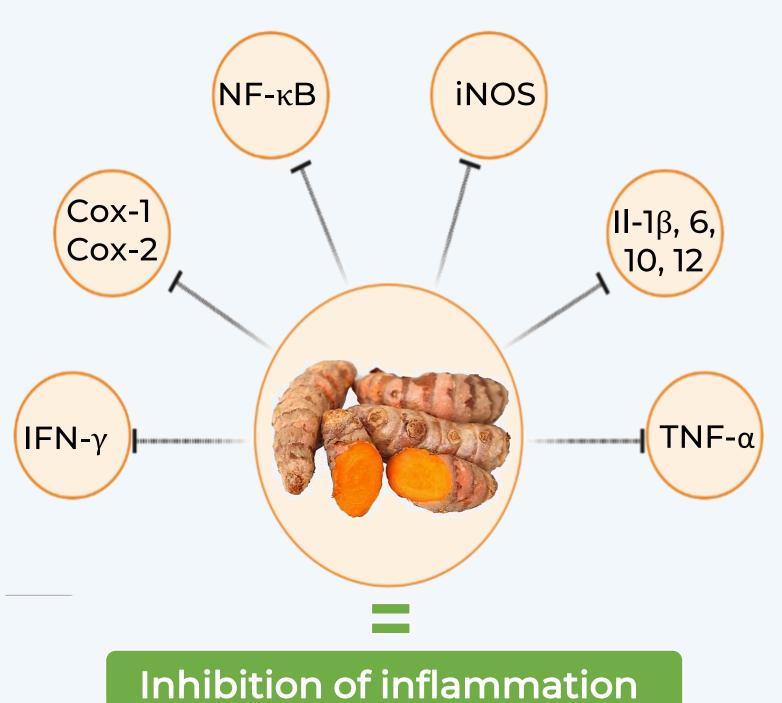


Figure B: Three majors curcuminoids from turmeric powder analysed by HPLC

The 3 major curcuminoids in turmeric powder (1 g/l, MeOH) are identified by HPLC (PFP column, UV detector, 420 nm): BMC (A), DMC (B) and curcumin (C), retention time respectively = 3.7 min, 4.3 min and 5 min.

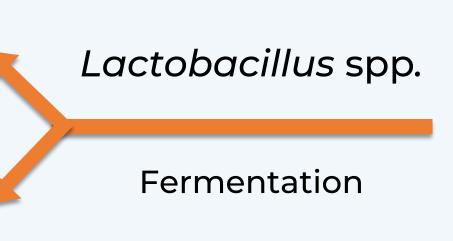
Anti-inflammatory effect of turmeric and curcumin

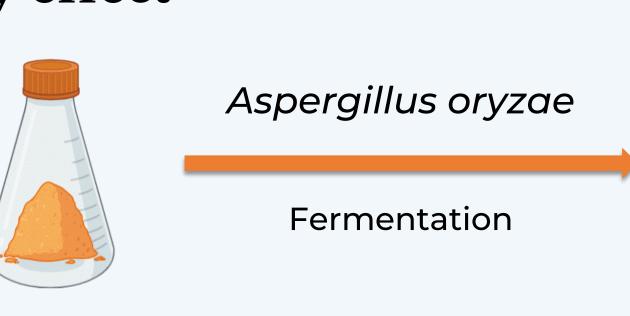


It is complicated to understand mechanisms involved in CID of the multifactorality. because Curcumin inhibits the action or secretion of some molecules as proinflammatory cytokines. It also binds to the MD2 receptor inhibiting the formation of TLR2-MD2, inducing the TLR4 membrane decrease thus synthesis and receptor inhibiting the NFkB pathway [5, 6, 7, 8].

Fermented turmeric (FT) anti-inflammatory effect







[24, 25] +Antioxydant [26]

+Hepatoprotective

Despite these encouraging data in humans and

Turmeric in Inflammatory Bowel Diseases

Crohn's disease Chronic episode of No conventional treatments acute inflammation before supplementation 360 mg curcuminoids/d (n=20)Or placebo (n=10) Irreversible lesions

YTNF-α, NF-KB, COX-1 & 2, LOX, IFN-γ, iNOS

Partial remission Endoscopic & clinical improvement [9, 10]

Ulcerative colite

Treated with mesalamine 3 g curcumin/d (n=26)

Or placebo (n=24)

Complete remission Clinical improvements[11]

This highlights the therapeutic effects of turmeric, not only on the symptoms, but also on the remission of IBD patients.

Turmeric in rheumatism arthrisis

Chronic episode of acute inflammation Breakdown of cartilage, joint lining, ligaments, underlying bone Irreversible progression

Surgical interventions

treatment's side effects

Conventional

Partial remission

Pain & stifness Long-term analgesics' side effects

Knee Osteoarthrisis

475 mg/d curcuminoids (n=73) Or paracetamol (n=71)

→ WOMAC score ע TNF-α, CRP [12]

Rheumatoid **Arthritis**

500 mg/d curcumin (n=14)Diclofenac sodium (n=12) Or both (n=12)

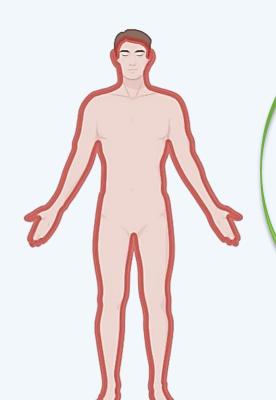
Improvement of Disease scores & Erythrocyte sedimentation rate [13]

Turmeric in psoriasis

Keratinocyte cycling Chronic psoriatic plaques



Dermal atrophy



Active psoriasis

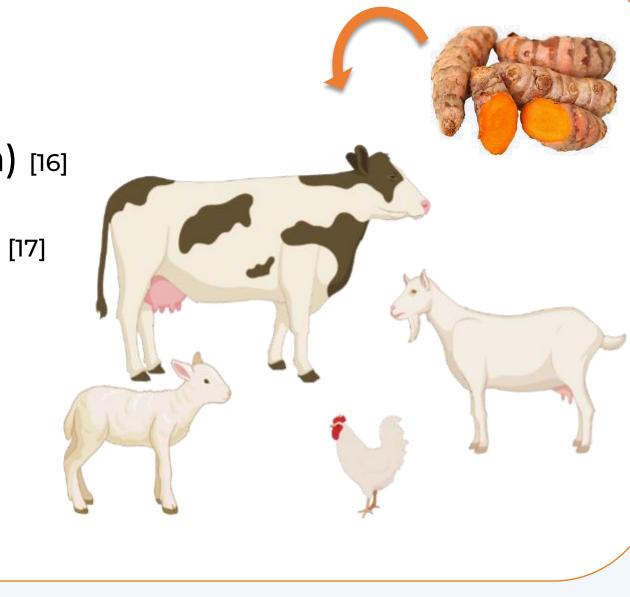
Alcoholic gel (1% curcumin) (n=10) Subjects with untreated psoriasis (n=10)

- א Phosphorylase kinase activity
- Keratinocyte transferrin receptor expression
- Parakeratosis' severity
- Epidermal CD8+ T cells' density [14]

Turmeric in livestock



- > Infertility (uterus of cows' inflammation) [16]
- > Infections (goat's contagious ecthyma) [17]
- > Feed conversion ratio value (broiler
- chickens) [18]
- **Y** Mortality [17, 19]



[22, 23]

+Antimicrobial [27]

+Anti-obesity_[28, 29]

Conclusion and perspectives:

Turmeric or curcuminoids supplementation

Remission and improvement of clinical signs

Potential natural treatment to limit surgical interventions and the side effects of conventional treatments of CID

livestock, the heterogeneity of duration, dosage and number of subjects require further trials to confirm turmeric and FT as therapeutic agents in CID.