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PP-323 [Apitherapy]

Moroccan Propolis' potential as a multitarget therapeutic product

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ABSTRACT

Morocco, as a north-African and Mediterranean country, is characterized by its floral biodiversity. In fact, our research revealed the variability of Moroccan propolis and its richness in flavonoids as well as its important antioxidant power.

The present in vitro study investigated the potential use of propolis as a multitarget therapeutic product and the physicochemical properties, chemical composition, and immunomodulatory, antioxidant, antibacterial, and anticancer properties of a propolis extract from the northern Morocco region (PNM). Within the Moroccan propolis, there are valuable molecules whose mechanisms of action and clinical interest need to be further investigated, to enable the transfer of experimental results from the laboratory to the patient's bedside.

INTRODUCTION

Many studies have been conducted on the propolis of Morocco and have shown the importance of some of its biological activity.

However, there are no detailed studies on the action mechanisms of these activities, especially anticancer and anti-inflammation activities.

Therefore, we investigated here the anti-inflammatory, antioxidant, antibacterial, and cytostatic effects on cancer cell lines of a propolis extract from the northern Morocco region.

→ In order to analyze its **multi-target therapeutic potential**

MATERIALS & METHODS

70% ethanolic extract of Moroccan propolis was prepared and evaluated for their:

→ **Physicochemical characteristics:** resin, wax, balsam, ash, pH, humidity

→ **Total antioxidant capacity, phenol and flavone/flavonol** content

→ **Antioxidant activity:** DPPH, ABTS, FRAP **and Phenolic compounds**/ RP- HPLC analysis

→ *In vitro* **antimicrobial activity** *(MIC/MBC):*

- ***GNB:*** *E. coli BLSE (ATB : 87) BGN, E. coli (ATB : 57) B6N, E. coli (ATB : 97) BGM, Pseudomonas aeruginosa*
- ***GPB:*** *Streptococcus faecalis, Staphylococcus aureus*

→ *In vitro* **cytotoxic and cytostatic activity:** ***THP-1:*** human monocytic cell line, ***HCT-116:*** human colorectal carcinoma cell line, **MCF-7**: breast cancer cell line

→ *In vitro* **anti-inflammatory activity:** assessed by investigating propolis ability to alter cytokines production (TNF-α, IL-6, IL-10) in human peripheral blood mononuclear cells (PBMNCs) stimulated with lipopolysaccharide (5µgLPS/mL).

RESULTS

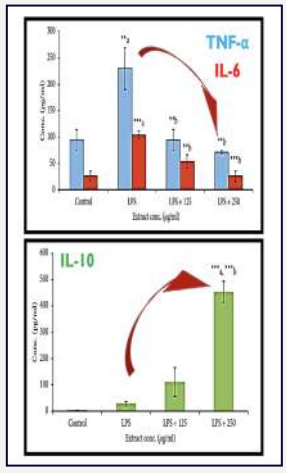
PHYSICO-CHEMICAL PROPERTIES

Resin : 59.01 ± 0.12%
Wax : 20.31 ± 1.03%
Balsam : 1.11 ± 0.01%.
Moisture : 1.01 ± 0.01%
pH : 5.1 ± 0.11
Ash : 4.87 ± 0.01%

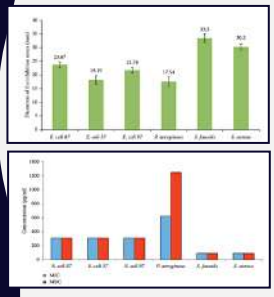
ANTIOXIDANT ACTIVITY

Sample	Phenols (mg GAE/g)	Flavone/ Flavonol (mg QE/g)	TAA (mg AAE/g)	DPPH IC_{50} (mg/ml)	ABTS IC_{50} (mg/ml)	FRAP IC_{50} (mg/ml)
Moroccan Propolis	141.46 ±	98.33 ±	94.76 ±	0.02 ±	0.04 ±	0.04 ±
	1.67	1.19	1.91	0.002	0.001	0.001

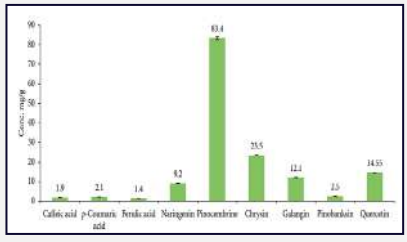
ANTI-INFLAMMATORY ACTIVITY



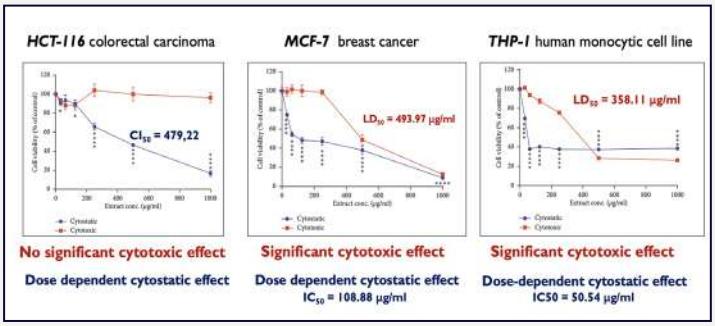
ANTIBACTERIAL ACTIVITY



PHENOLIC COMPOUNDS



CYTOTOXIC AND CYTOSTATIC ACTIVITIES



Taken collectively, our results show that traditionally known anticancer effects of the PNM seem to be mediated in part through cytostatic effects and immunomodulatory effects. These include the inhibition of proinflammatory cytokines and stimulation of the anti-inflammatory cytokine in LPS-activated PBMNCs.

The results of this study show that propolis from Morocco has important therapeutic activities especially in suppressing the TNF-α and IL-6 production and increasing the production of the anti-inflammatory IL-10.

CONCLUSIONS

The multitarget actions including antibacterial, anti-oxidant, cytostatic, and immunomodulatory actions of the Moroccan propolis seem to be as a result of the presence of several active compounds which may act in a synergistic pathway.

Our findings suggest the potential application of PNM in the pharmaceutical industry as well as in health foods and nutritional supplements. Still, propolis is yet or hardly considered in health systems, the main obstacles being lack of standardization and data from well-conducted clinical trials related to safety (allergy, toxicity) and therapeutic efficacy.

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Forma E et al. Anticancer Activity of Propolis and Its Compounds. Nutrients 2021
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PP-323 [Apitherapy]
Moroccan Propolis' potential as a multitarget therapeutic product: from experimentation to clinical perspectives

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Modern apitherapy is a promising branch of medicine and owes much to the serious work and multiple scientific researches in progress. It is important to emphasize that modern apitherapy is conceived as being innovative, codified, based on proven and reproducible facts, not alternative but complementary to conventional therapies. In this era of viral pandemics, alarming resistance to antibiotics and oxidative stress at the center of all cellular aggressions, our work aims to bridge the two fields of biology and medicine. This presentation will be navigating both experimental findings and clinical perspectives of propolis, from a clinician point of view.

Beehive products, and specially propolis, are not yet or hardly considered in health systems. The main obstacles to their pharmaceutical exploitation are the lack of standardization and data from well-conducted clinical trials related to the safety (allergy, toxicity) and therapeutic efficacy related to their use. Morocco, as a north-African and Mediterranean country, is characterized by its floral biodiversity. In fact, our research revealed the variability of Moroccan propolis and its richness in flavonoids as well as its important antioxidant power. It would be interesting to study the effect of its individual components (CAPE, pinocembrine, galangin...) in propolis mixture plans (exp brazilian propolis) but also with other products of the hive such as arbutus honey characterized particularly by the presence of epicatechin.

Within the products of the Moroccan beehive, and in particularly propolis, there are valuable molecules whose mechanisms of action and clinical interest need to be further investigated, to enable the transfer of experimental results from the laboratory to the patient's bedside.