THE NATURAL PRODUCT CURMERIC®: FROM RESEARCH TO THE CUBAN BASIC LIST OF MEDICINES AND NATURAL PRODUCTS.

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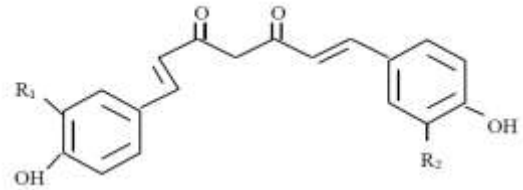
Curcuma longa

*Curcuma longa (*Turmeric*)* is one of the most used plants as spice and medicine from ancient times, in India and other Asian countries. It has shown antimicrobial, anti oxidant and anti inflammatory properties.

Curcuminoids (curcumin), are major poliphenols, which are related to the beneficial effects of *Curcuma longa*. It also contains volatile oils such as turmerone, atlantone and zingibereno.



	R_1	R_2
Curcumina	$-OCH_3$	$-OCH_3$
Demetoxi-curcumina	$-OCH_3$	-H
Bis-demetoxi-curcumina	-H	-H

Turmeric has been used for the treatment of artritis, atherosclerosis, respiratory disorders, gastrointestinal (hepatic) and skin diseases.

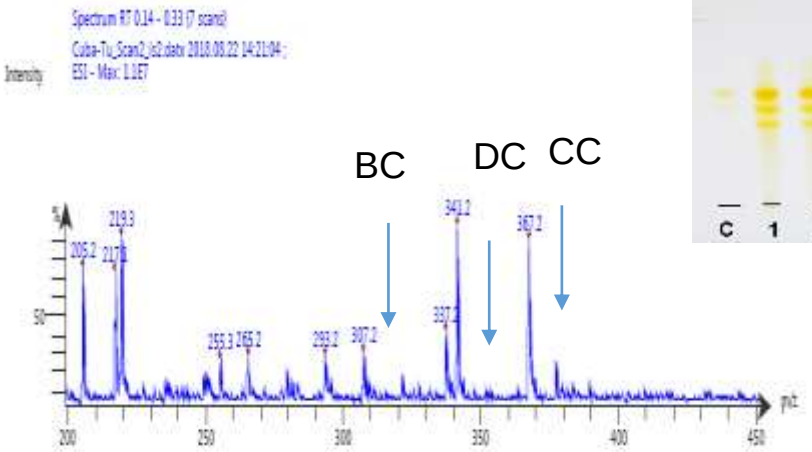
Currently, several research groups are studying the impact in cancer and neurodegerative diseases.

Classified as GRAS (Generally Regarded as Safe) by the FDA.

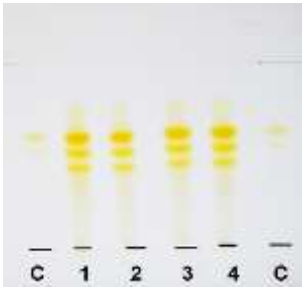
Characterization of *Curcuma longa* cultivated in Artemisa province

Coop Vicente Pérez Noa, Artemisa (from 2011)

Mass spectrometry

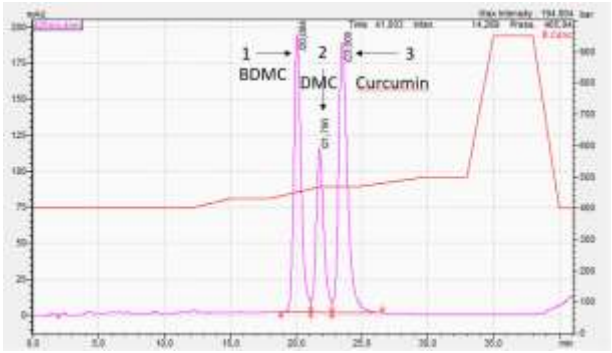


TLC



Curcumin (CC)
Demetoxicurcumin (DC)
Bisdemetoxicurcumin (BC)

UHPLC



Atomic Absorption

Element	Concentration (ug/g)	Element	Concentration (ug/g)
Na	131,79±3,51	Ni	0.76±2,26
K	26663±573,95	Fe	431±4,88
Cd	<2,5	Cu	5,09±0.35
Pb	<12,5	Mg	2693±44,32
Zn	22,72±2	Mn	21,96±0,94

Spectrophotometry

Metabolites	%
b-carotene	0,027 [b]
Total anthocyanins	0,002 [a]
Total chlorophyll	0,06 [b]
Flavonoids	10,86 ± 1,8 [a]
Phenols	14,34 ± 1,9 [b]
Soluble Proteins	8,30 ± 3,9 [a]
Soluble carbohydrates	29,93 ± 11,2 [b]

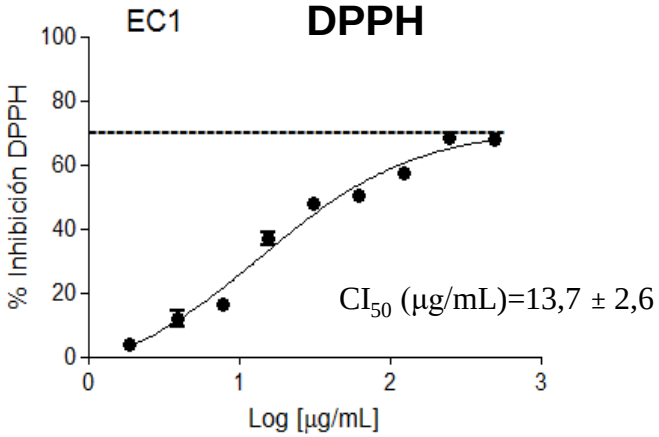
Curcuminoids content (%)
6.7±0.3

Valdés- González T y cols. Archivos del Hospital Calixto Garcia 2019:1

Antioxidant and anti inflammatory activities

(Institute for Marine Sciences, ICIMAR)

Anti-oxidant activity



FRAP

Concentración [mg/mL]	(mM equivalentes de ácido ascórbico*)
500	3599,0 ± 20,8
250	1585,7 ± 26,5
125	350,1 ± 22,2
62,5	NE

Cytotoxic activity- lung cancer cell line

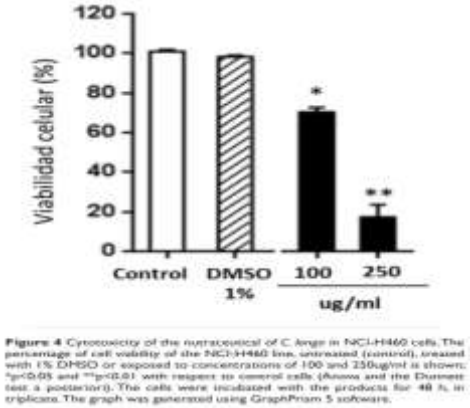


Figure 4 Cytotoxicity of the nutraceutical of C. longa in NCI-H460 cells. The percentage of cell viability of the NCI-H460 line, untreated (control), treated with 1% DMSO or exposed to concentrations of 100 and 250µg/ml is shown; *p<0.05 and **p<0.01 with respect to control cells (Anova and the Dunnett test a posteriori). The cells were incubated with the products for 48 h, in triplicate. The graph was generated using GraphPrism 5 software.

Anti-inflammatory activity (granuloma method)

* p<0,05, ** p<0,01 y *** p<0,001 (ANOVA and Dunnett a posteriori)

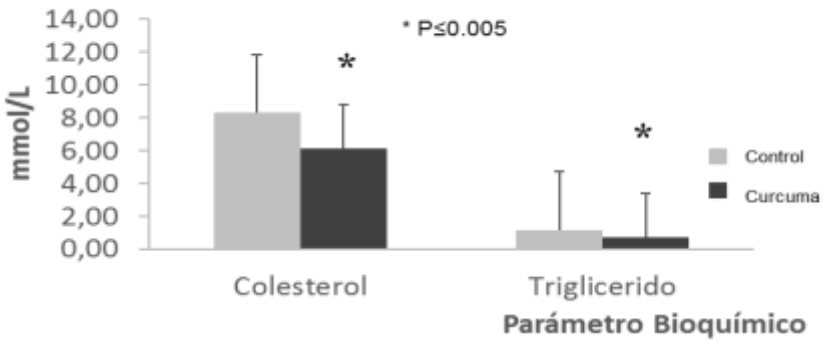
Treatment	Dosis (mg/kg)	Transudative weigth (mg)	Tissue associated to granuloma (mg)	Activity antiinflamatory (%)
Control	CMC (0,5%)	88,85	18,38	---
Curcuma longa nutraceutical	0,1	89,57	18,97	4,40
	1	85,51	16,63	4,23
	10	66,10 **	17,21**	28,85
	50	64,57 **	14,51**	30,79
	100	60,34 **	11,55***	**36,15**
	200	60,33 ***	12,40***	**36,17**

Valdes- Gonzalez el al. Pharmacy and Pharmacology International Journal 2019;7(6):319–328

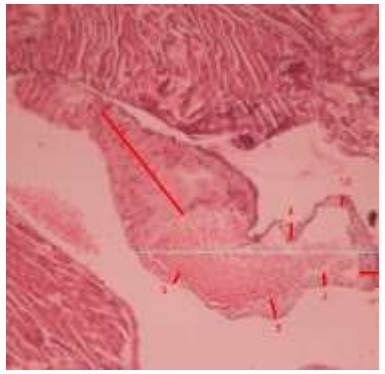
Lipid lowering and anti inflammatory properties of *Curcuma longa* nutraceutical in knock out ApoE mice

Finlay Institute for Vaccines (IFV)- Centre for Production of Laboratory Animals, CENPALAB

Effect of *Curcuma longa* nutraceutical on total cholesterol and triglycerides

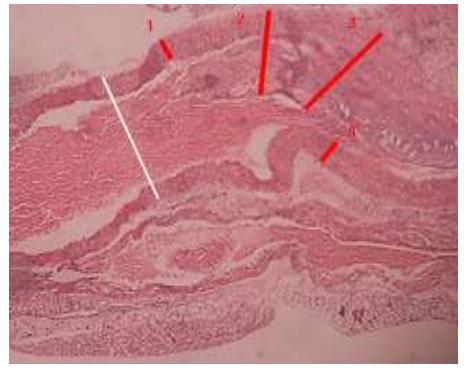


Treated ApoE mice



H.E.x120

Control ApoE mice



H.E.x120

Relative size vessel wall-atheroma

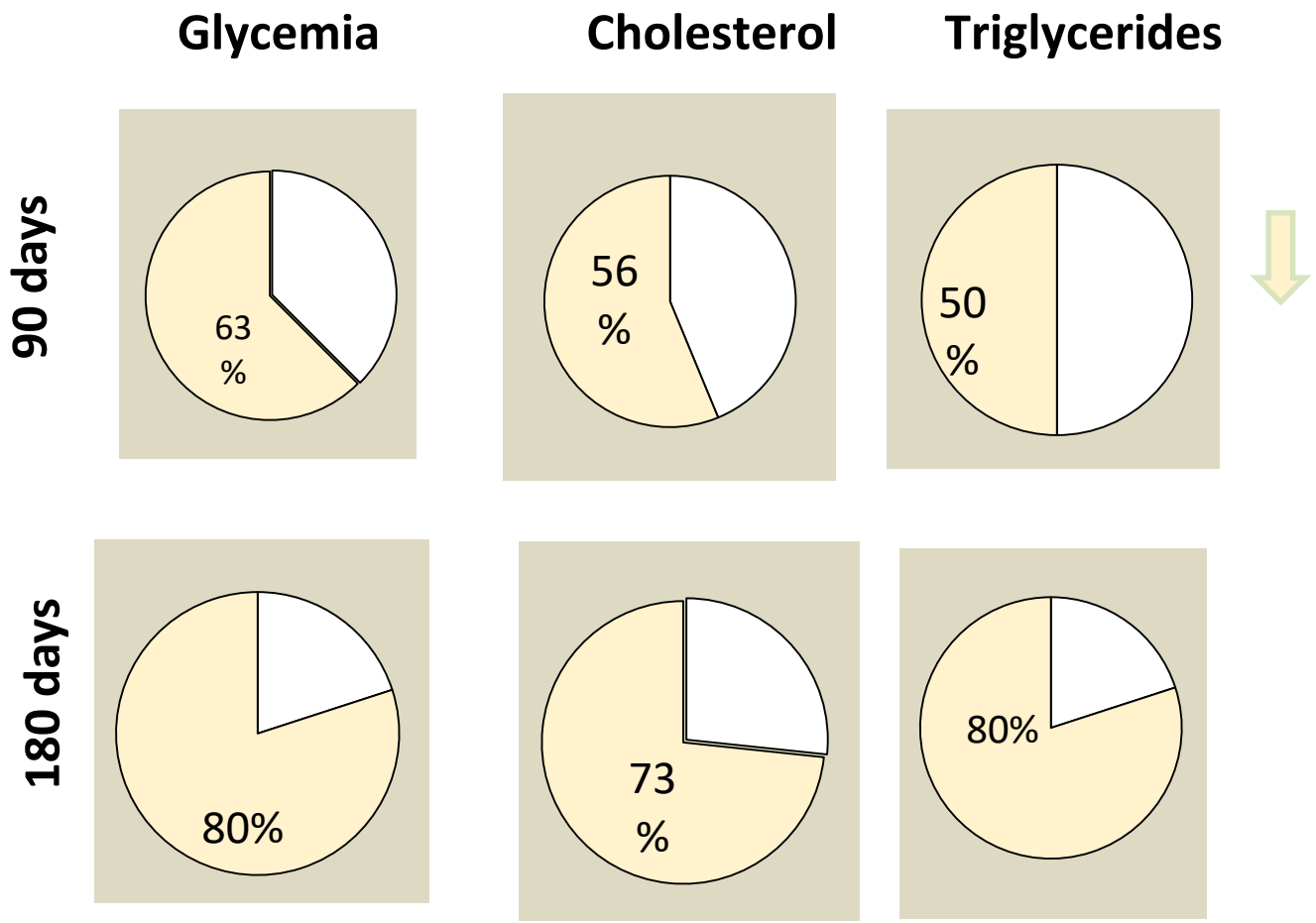
Group	**Vessel Wall**	**Atheroma**	**Vessel walll+Atheroma**
Treated	0.059	0.066	0.124
No treated	0.193	0.475	0.700

Valdes- Gonzalez el al. Pharmacy and Pharmacology International Journal 2019;7(6):319–328

Use of Curcuma longa nutraceuticals in chronic diseases patients of the University Hospital General Calixto García

(University Hospital General Calixto Garcia, HUGCG)

***Curcuma longa* supplements**



Arguelles- Barreto D, Valdés- González T (2024) Revista Cubana Nutrición

Natural Product Curmeric®

Concept: Natural antiviral/ antibacterial molecular complex
Chemical barrier + sistemic effect
Safe

- ✓ Curmeric: Combined natural emulsion (with *Cúrcuma longa* extracts), which contains vitamin E, omega fatty acids, minerales and other oligoelements.

- ✓ Patent request: 020-25 (OCPI)
  CEADEN

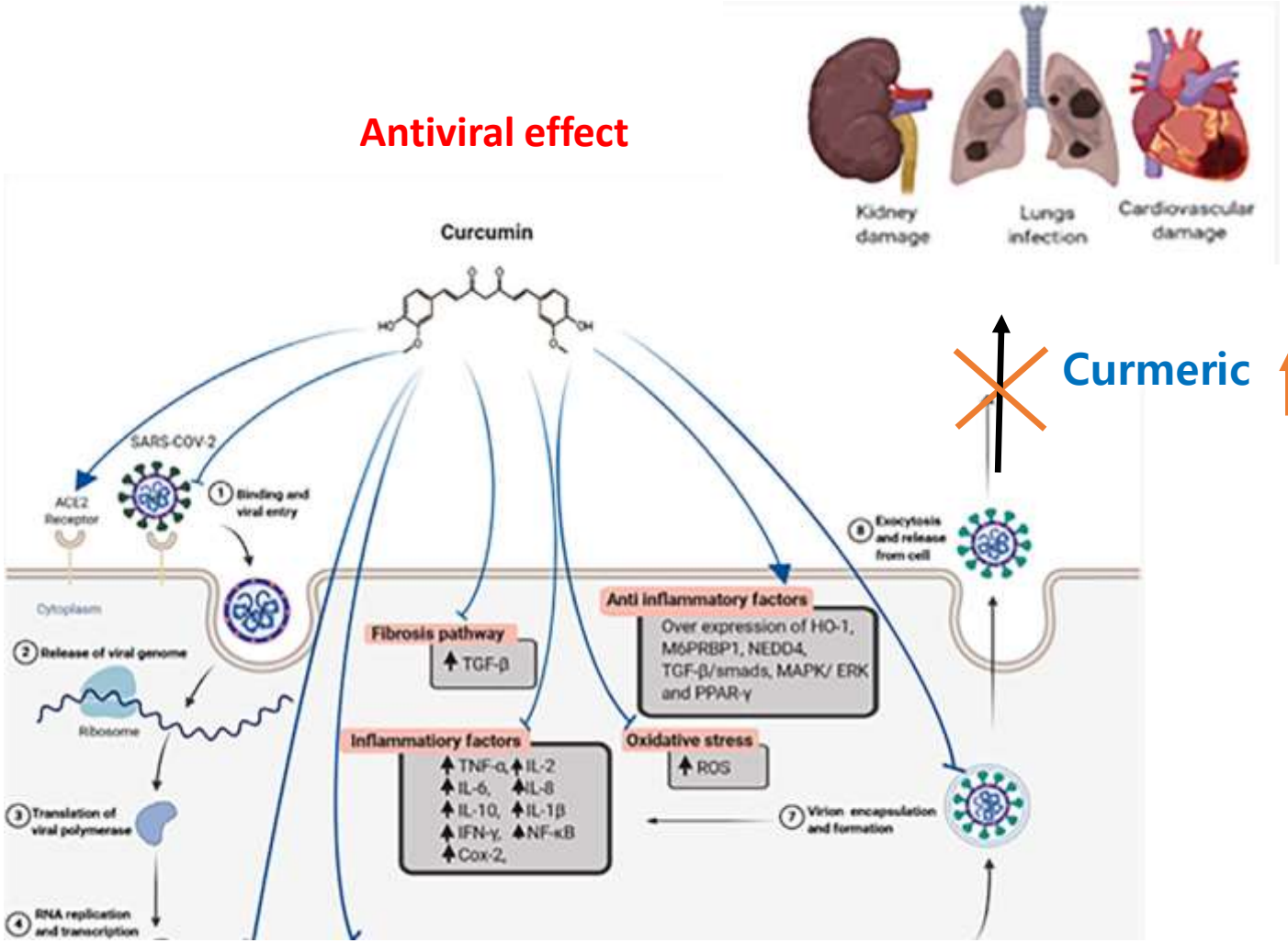
- ✓ Current products : Nasal drops
  Mouth wash/ Gargle
  Oral formulation

- ✓ Registered: National Institute for Hygiene, Epidemiology and Microbiology (INHEM).

- ✓ Produced by Medilip, Biocubafarma in collaboration with CEADEN and FARMABANA

Curmeric- combined effects in COVID-19

Antiviral effect



Curmeric

Endothelial protection

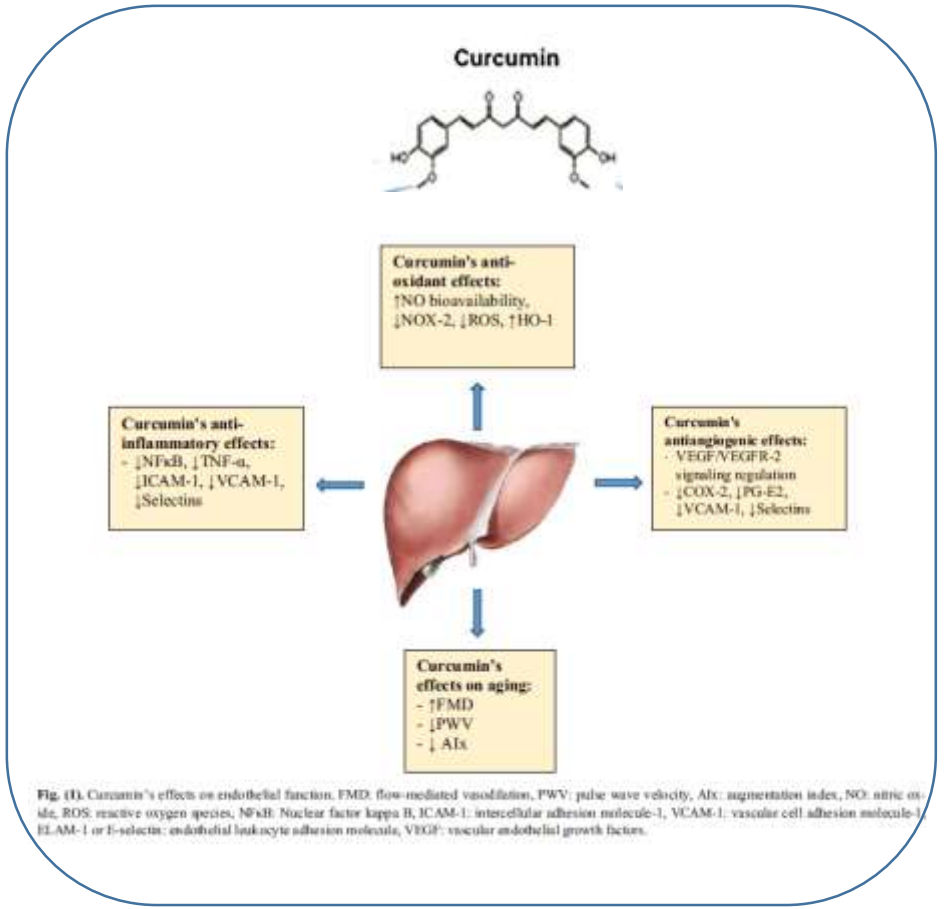


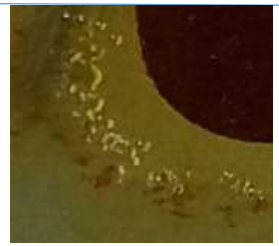
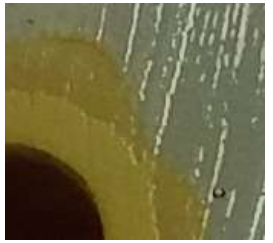
Fig. (1). Curcumin's effects on endothelial function. FMD: flow-mediated vasodilation, PWV: pulse wave velocity, AIx: augmentation index, NO: nitric oxide, ROS: reactive oxygen species, NFκB: Nuclear factor kappa B, ICAM-1: intercellular adhesion molecule-1, VCAM-1: vascular cell adhesion molecule-1, ELAM-1 or E-selectin: endothelial leukocyte adhesion molecule, VEGF: vascular endothelial growth factors.

Fatemeh Zahedipour et al. Potential effects of curcumin in the treatment of COVID-19 infection Phytotherapy Research. 2020;1–10.

Karimiam M et al Curcumin and Endothelial Function Evidence and Protective effects. Current Pharmaceutical Design, 2017, 23, 2462-2473

Antibacterial effect in strains isolated from samples of patients with severe respiratory infection diseases

Microbiology Laboratory, HUGCG

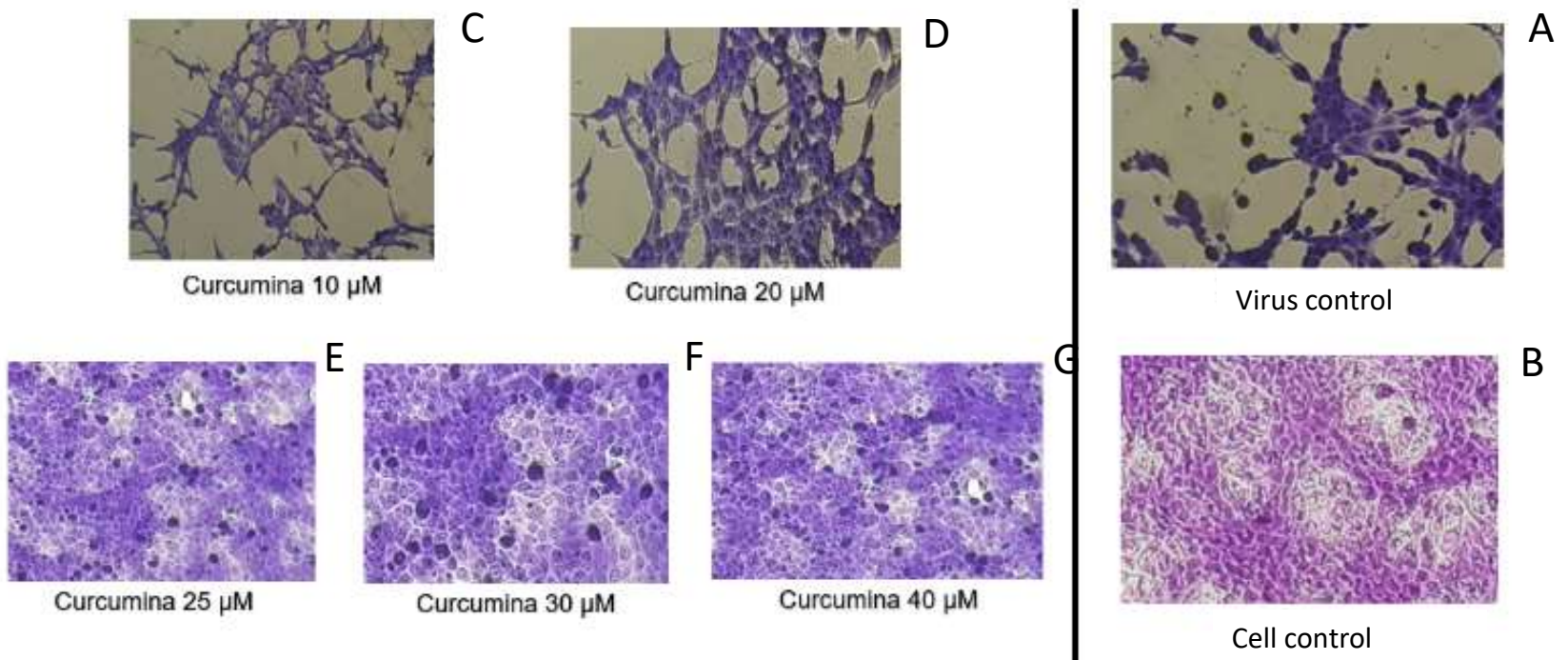
Strain	Sample	*Curcuma longa* extract	Curmeric nasal drop	Curmeric Oral solution
Proteus spp	Sample 6-18 Traqueobronchial sample Patient UCIM	 (+)	 (++)	 (+++)
Escherichia coli spp	Sample 1-21 Traqueobronchial sample Patient post Neurosurgery	 (+)	 (++)	 (+++)
Staphylococcus aureus spp	Sample 8-27 Secreción traqueobronquial Patient UTI	 (+)	 (++)	 (+++)

Curmeric anticoronavirus activity *in vitro*

(National Centre for Animal Health, CENSA)

At curcumin concentration of 10µM (D) and 20µM (D), detached and rounded cells typical of the effect of this virus, were observed (A).

The antiviral activity was observed from curcumin at 25µM (E, F, G). The cell monolayer was confluente, similar to the cells without inoculation (B).



Antiviral activity of Curmeric against bovine coronavirus Mebus. Staining with crystal violet 5 days post virus inoculation in fetal bovine serum.

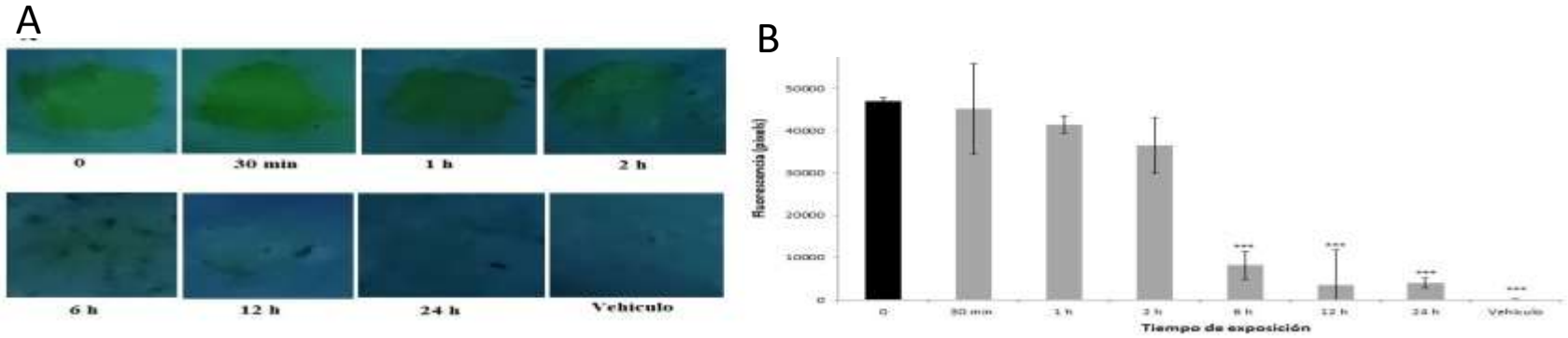
Controls: Cytopatic effect of bovine coronavirus Mebus in celular line MBDK (A, virus control). Cells MBDK without virus inoculation (B, cell control).

Samples: Cells MBDK treated with curcumin at concentrations of 10uM-40uM and inoculated with bovine coronavirus (D-G).

Evaluation of skin absorption of Curmeric in Balb/c mice

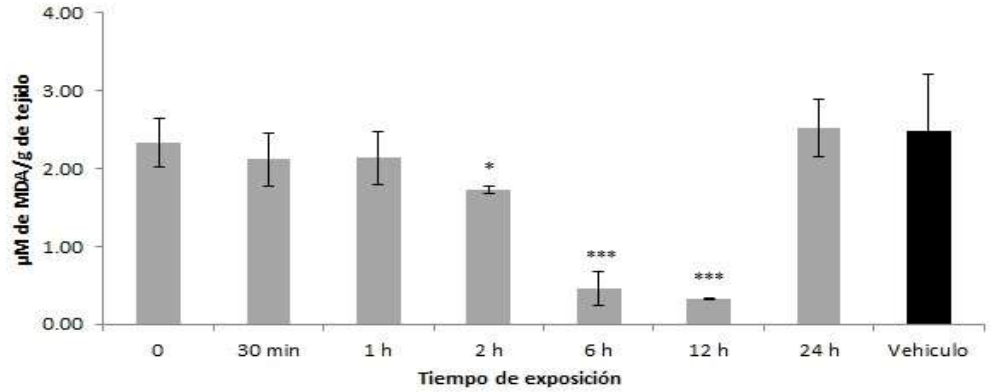
(Institute for Marine Sciences, ICIMAR)

Absorption of Curmeric –nasal drops on the cutaneous tissue of Balb/c mice for 24h



*** p< 0.001 (Prueba de *Dunnett*).

Levels of malondialdehyde (MDA) in homogenates of skin exposed to Curmeric –nasal drops



* p< 0.05, *** p< 0.001 (Prueba de *Dunnett*)..

Curmeric for protection of health care workers,
University Hospital General Calixto Garcia (HUGCG), march 2020

Participants in the clinical study

Group Study		Group Control	
Services or Departaments	**n**	**Services o Departaments**	**n**
Respiratory Sympt. Service	25	Intermediate Care Unit	43
Allergy Service	43	Intensive Care Unit	65
Clínical Laboratory	80		
Microbiology Laboratory	8		
Total	**91**	**Total**	**108**

COVID-19 cases confirmed by PCR

Group Study		Group Control	
Servicios o Departamentos	**n**	**Servicios o Departamentos**	**n**
Respiratory Symp. Service	0	Intermediate Care Unit	9
Allergy Service	0	Intensive Care Unit	3
Clinical Laboratory	0		
Microbiology LAbortory	0		
Total	**0**	**Total**	**12 ***

11%

Study period: from march 19th to April 18th 2020, before the application of PrevengHo- Vir at the hospital.

No report of related adverse event.

COVID-19 cases in the control group (*Fisher exact test p=0,0054 for p<0,05).

Based in these results, it was indicated the use of Curmeric in 16 services and departaments of the del hospital.

Valdes-Gonzalez T Journal of Integrative Medicine Japan 2024

Curmeric in Primary Health Care for prevention of COVID-19 transmission
Safety studies (sept-dec 2020)

Clinical study	Curmeric Formulation	Date	Municipality	Total participants	Study/ Control Patients	COVID-19	EA	Intensity EA			Causality EA				
								Slight	Moderate	Severe	No related	Conditional	Possible	Probable	Related
Safety study in Primary Health Care	Mouth wash/ Gargle	Sep-Oct 2020	Plaza de la Revolución	186	186/0	0	9	9	0	0	0	9	0	0	0
Preventive effect in Primary Health Care	Mouth wash/ Gargle	Oct-Nov 2020	Plaza de la Revolucion	112	66/66	0	1	1	0	0	1	0	0	0	0
			Regla	234	117/117	0	9	9	0	0	8	1	0	0	0
Preventive effect in Primary Health Care	Nasal drops	Nov-Dec 2020	Regla	83	42/41	0	2	2	0	0	1	1	0	0	0
Total				**615**	**227/228**	**0**	**21**	**21**	**0**	**0**	**10**	**11**	**0**	**0**	**0**

Panamerican Health Organization Bulletin 2021. No.3 page 43-47

EA-Adverse Event

Curmeric for protection of health care workers of stomatological services in Plaza de la Revolucion municipality, Havana (jan-march 2021)

Participants in the clinical study

Services or Departmets	CLINIC H Y 21	CLINIC MININT	CLINIC PUENTES GRANDES
Management	9	2	6
Administration	20	7	8
Medical assistance	137	26	41
Total	**201**		**55**
COVID-19 cases	**0**		**7*** (12%)

(* Fisher exact test p=0,0054 for p<0,05).

1.

2.

3.

Revista Cubana de Estomatología 2024 (in preparation)

Curmeric as complemmentary treatment for COVID-19 patients with mild symptoms and 5th day positive PCR

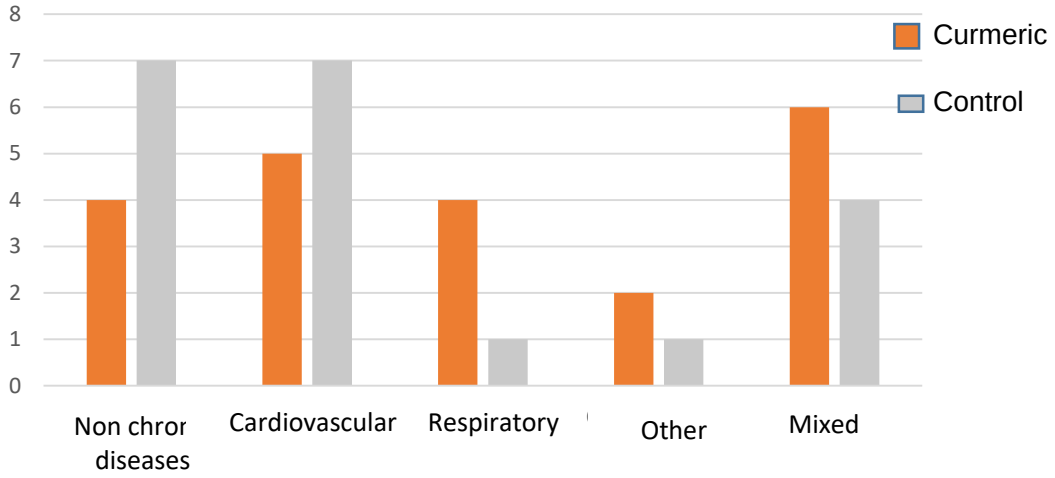
¨Dr. Luis Díaz Soto¨ Hospital (apr-jul 2021)

Participants	Group Treatment	Group Control
38	18	20

Demographic data

Variables		Group Treatment	Group Control
Demografics	Age	46,1±1.7	54,2±1.9
	Female	9	12
	Male	9	8
Tóxic habits	Tobbaco	5	0
	Coffee	9	12
	Alcohol	3	1

Chronic diseases



Classification of COVID-19 pacients in the study [a]

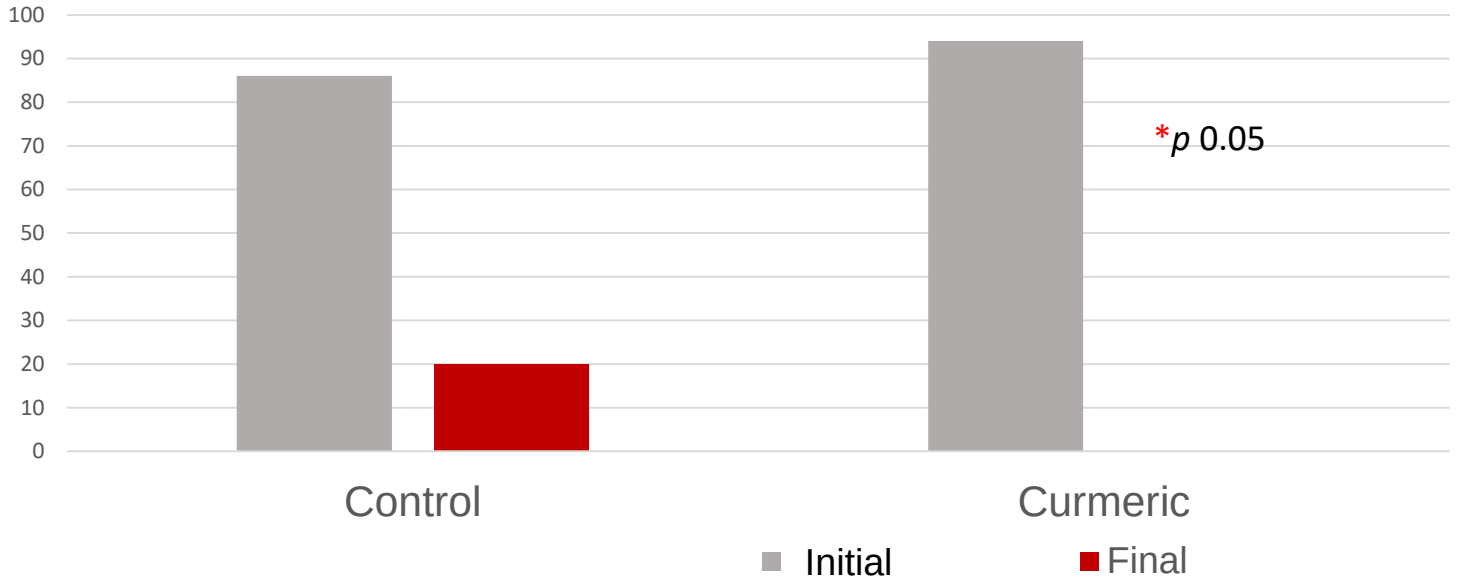
Clasification	Grupo Treatment	Group Control
High risk	76%	66%
Low risk	24%	34%

[a] Protocol for COVID-19 MINSAP. Version 1.6, jan 2021

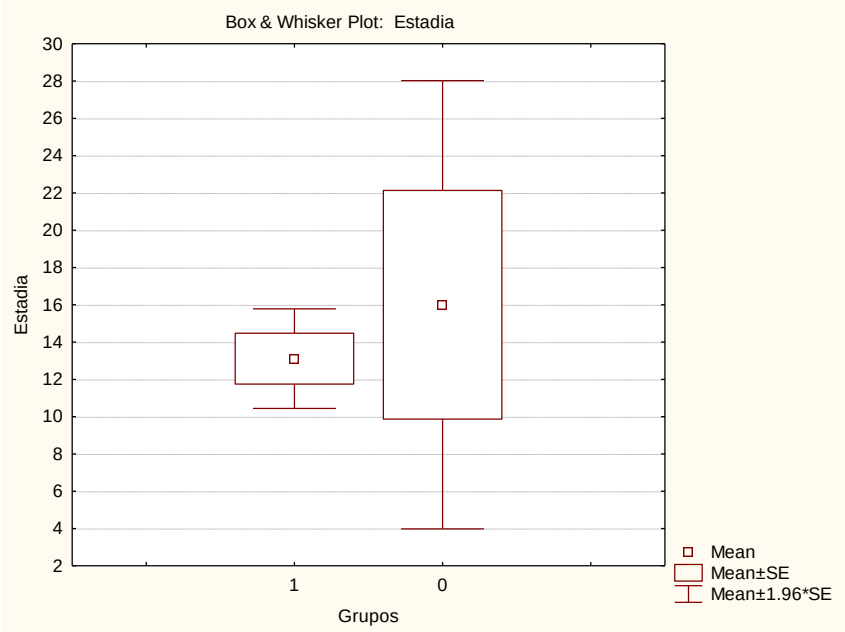
Efects of Curmeric on the improvement of disease condition

¨Dr. Luis Díaz Soto¨ Hospital (apr-jul 2021)

Effect of Curmeric in symptom relief in COVID-19 patients



Hospitalization period



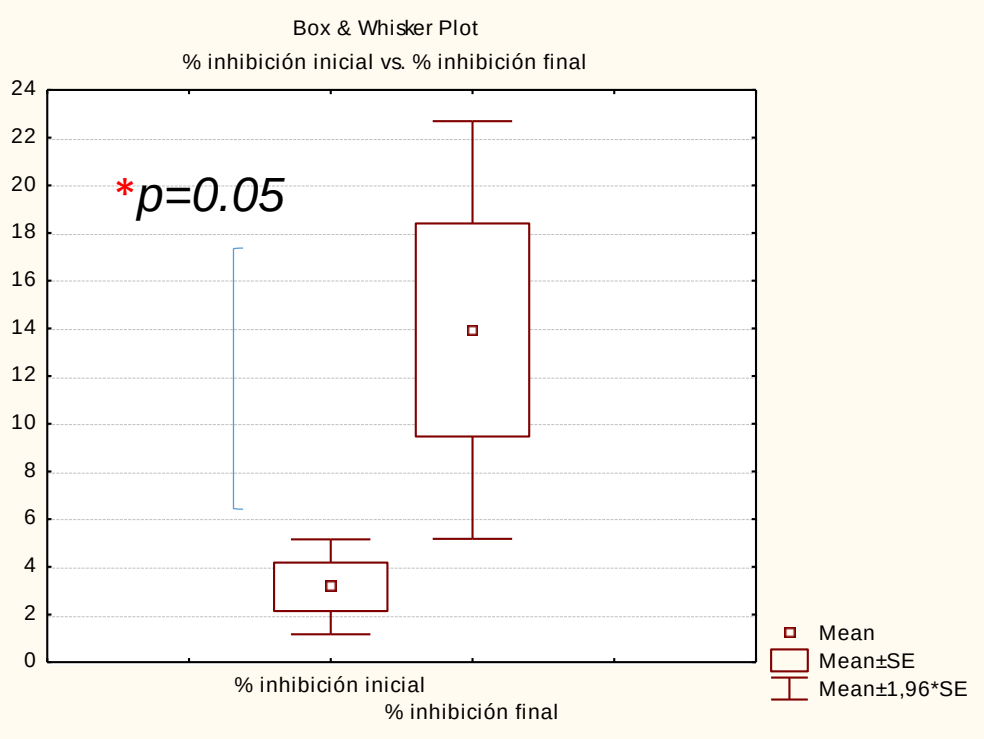
Group Curmeric : 13.1 days
Group Control: 16 days

* No severe adverse events related with Curmeric

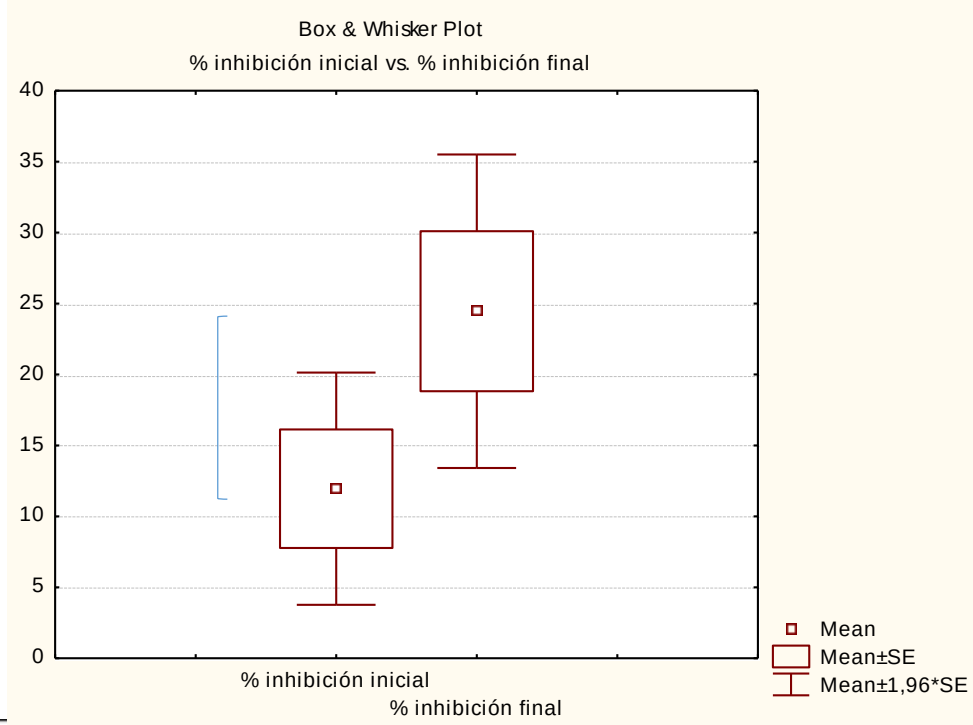
SARS-CoV2 inhibition effect

¨Dr. Luis Díaz Soto¨ Hospital – CIGB (apr-jul 2021)

SARS-CoV-2 Inhibition % (Curmeric)



SARS-CoV-2 Inhibition % (Control)



T-test for Independent Samples (Tratados) Note: Variables were treated as independent samples

	Mean	Mean	t-value	df	p	Valid N	Valid N	Std.Dev.	Std.Dev.	F-ratio	p
% inhibición inicial vs. % inhibición final	3,161111	13,93333	-2,35075	34	0,024675	18	18	4,311836	18,95760	19,33046	0,000000

T-test for Independent Samples (No tratados) Note: Variables were treated as independent samples

	Mean	Mean	t-value	df	p	Valid N	Valid N	Std.Dev.	Std.Dev.	F-ratio	p
% inhibición inicial vs. % inhibición final	11,95000	24,46316	-1,79627	37	0,080621	20	19	18,67691	24,57106	1,730764	0,244658

Clinical laboratory database

T-tests; Grouping: Grupos (BD en uso.sta) Group 1: 1 Group 2: 0											
	Mean	Mean	t-value	df	p	Valid N	Valid N	Std.Dev.	Std.Dev.	F-ratio	p
1Glicemia Inicial	4.9800	5.4830	-2.08686	36	0.044044	18	20	0.6795	0.7935	1.364	0.524630
1Glicemia final	5.5589	5.0584	1.14243	35	0.261031	18	19	1.5711	1.0573	2.208	0.104677
2 Colesterol inicial	3.7944	3.7745	0.08869	36	0.929823	18	20	0.6853	0.6983	1.038	0.944336
2 Colesterol final	9.9296	4.1895	1.06556	35	0.293918	18	19	23.4882	0.7196	1065.520	0.000000
3 Triglicéridos inicial	1.2642	1.4270	-0.61658	35	0.541502	17	20	0.8030	0.7979	1.013	0.968343
3 Triglicéridos final	1.6194	6.8037	-0.92343	34	0.362288	17	19	1.6625	23.0587	192.371	0.000000
4 Ácido úrico inicial	304.9412	291.7000	0.47201	35	0.639846	17	20	81.8180	87.6567	1.148	0.788138
4 Ácido úrico final	343.0000	324.0526	0.54808	34	0.587221	17	19	86.1996	116.8325	1.837	0.227249
5 Creatinina inicial	93.2222	98.3158	-0.55015	35	0.585708	18	19	22.6367	32.5065	2.062	0.142464
5 Creatinina final	90.3889	85.5556	0.68276	34	0.499383	18	18	19.4517	22.8839	1.384	0.510023
6 TGO inicial	33.3889	40.5000	-0.78810	36	0.435797	18	20	22.4293	31.8012	2.010	0.153699
6 TGO final	22.2778	27.7368	-0.76736	35	0.448016	18	19	4.2538	29.8754	49.326	0.000000
7 TGP inicial	37.1667	39.1000	-0.24954	36	0.804364	18	20	28.7714	18.3530	2.458	0.061206
7 TGP final	28.8889	31.7222	-0.34413	34	0.732870	18	18	12.4659	32.6313	6.852	0.000250
8 GGT inicial	42.5000	70.5000	-1.32928	36	0.192120	18	20	35.2675	82.7739	5.509	0.000879
8 GGT final	33.2222	54.8947	-1.69102	35	0.099720	18	19	22.3332	49.8106	4.974	0.001759
9 Proteinas totales inicial	68.2778	76.8250	-3.36957	36	0.001807	18	20	4.7992	9.7411	4.120	0.005014
9 Proteinas totales final	74.2611	70.4000	0.95581	35	0.345725	18	19	12.3574	12.2096	1.024	0.956771
10 Albúmina inicial	43.3056	47.9700	-1.47490	36	0.148933	18	20	3.3550	13.0178	15.055	0.000001
10 Albúmina final	43.7722	42.9167	0.39581	34	0.694720	18	18	3.9795	8.2623	4.311	0.004348
12 Fosfatsa alcalina inicial	170.7778	203.5500	-1.32745	36	0.192717	18	20	45.5897	95.2943	4.369	0.003576
12 Fosfatsa alcalina final	183.9444	193.5789	-0.50669	35	0.615549	18	19	47.6982	65.9506	1.912	0.188211
13 LDH inicial	378.3889	455.6500	-1.49099	36	0.144675	18	20	114.0491	191.2101	2.811	0.036927
13 LDH final	357.4444	408.7895	-1.89125	35	0.066891	18	19	69.5297	93.1734	1.796	0.233862

Clinical studies with Curmeric in COVID-19 epidemy in Havana

Public Cuban Register of Clinical Trials (CENCEC)

Scale-up production of Curmeric for health interventions

FARMABANA-CEADEN-Medilip (agosto 2021-jul 2022)

August 4th 2021 Indication from the Minister of Health for health intervention in provinces with high COVID-19 transmission.

August 13th 2021: 1st 300L batch of Curmeric-nasal drops produced in Medilip, Biocubafarma

Health intervention with Curmeric

DPS Ciego de Ávila (Sept– Dic 2022)

Ciego de Ávila

Total population: 143 449 inhab

Number of municipalities: 11

Natural product: Curmeric-nasal drops

HEALTH WORKERS

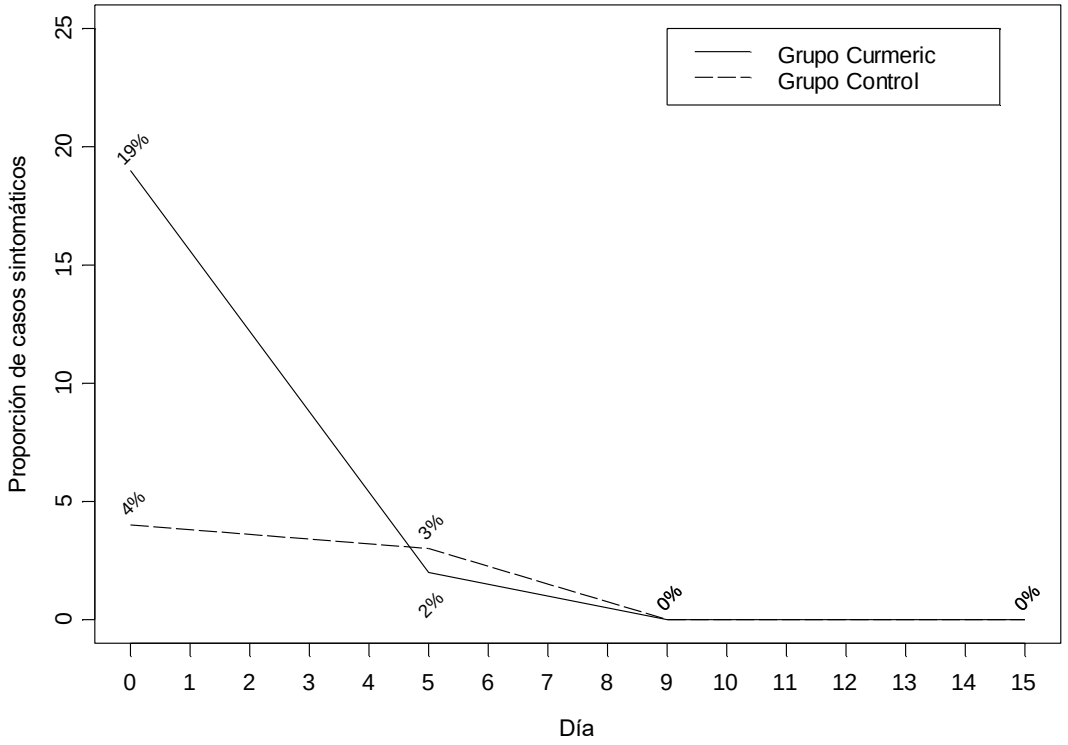
CLOSE CONTACTS OF PATIENTS

WITH RESPIRATORY SYMPTOMS

TOURISM WORKERS

Effect of Curmeric in COVID-19 transmission in suspicious patients and their contacts, Ciego de Ávila Sep 2021 (CENCEC)

Evaluation of respiratory symptoms during 15 days treatment with Curmeric



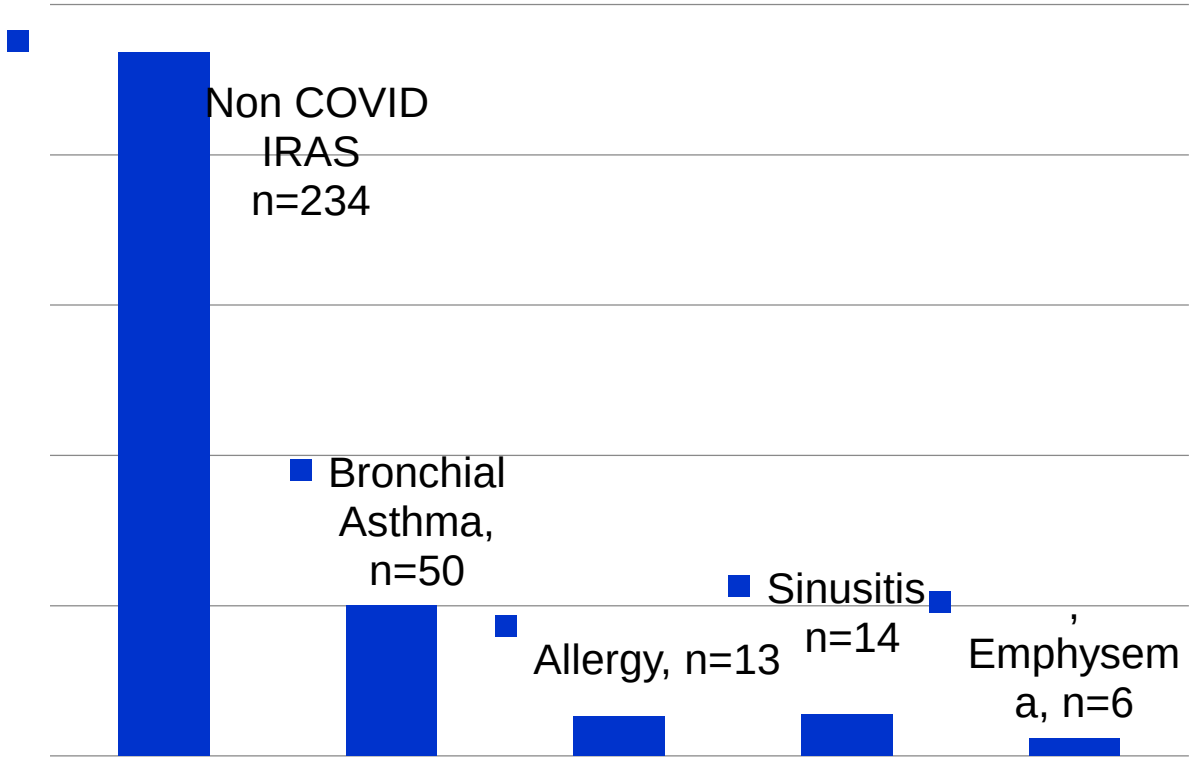
Municipality Ciego de Ávila
Control n= 100 (Policlínic Belkys Sotomayor)
Curmeric n=100 (Policlínic Norte)

Reported Adverse Events= 9, all mild

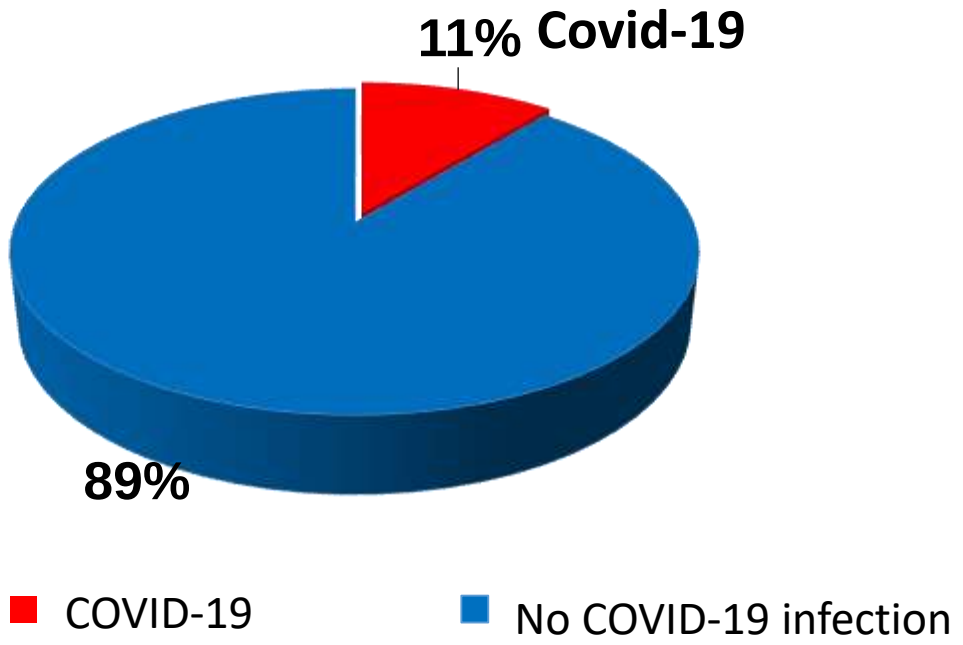
Protection of health care workers with Curmeric nasal drops

Antonio Luaces Provincial Hospital

Effect of Curmeric nasal drops in COVID-19 respiratory diseases



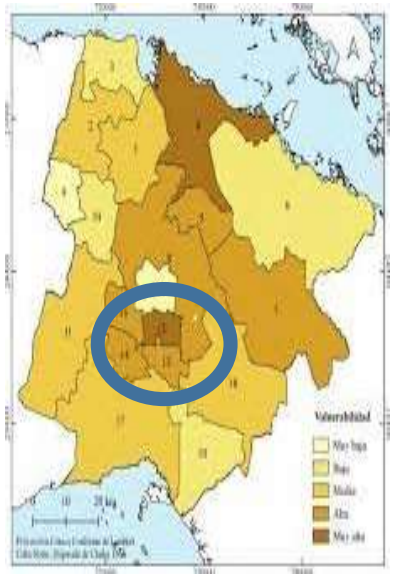
Curmeric in health workers



Patients with respiratory symptoms treated with con Curmeric

Policlinic Belkis Sotomayor Health area (sept 2021-April 2022)

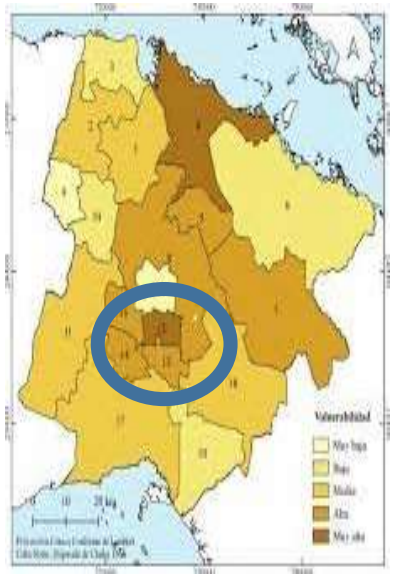
Mnth	Number of patients	Patientes with comorbidities	Confirmed COVID-19		
			#	%	Develppment of severe symptoms
September	192	38	17	8.8	0
October	178	46	15	8.4	0
November	30	10	2	6.6	0
December	54	9	0	0	0
January	250	75	41	16.4	0
February	206	81	21	10.1	0
March	59	12	9	15.2	0
April	32	8	3	9.3	0
TOTAL	**1001**	**279**	**108**	**10.7**	**0**



Effect of Curmeric nasal drops in cohabitants of COVID-19 patients

Policlinic Belkis Sotomayor Health área (sept 2021-April 2022)

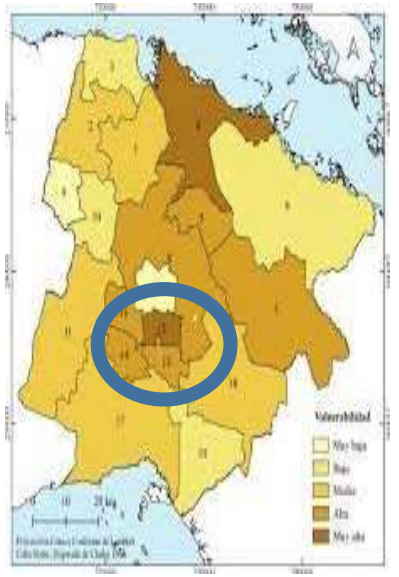
Month	Number of persons			Comorbidities	Developed symptoms	
		M	F		#	%
Sept	721	509	212	102	21	2.9
Oct	286	145	141	57	8	2.8
Nov	94	46	44	40	5	5.3
Dec	29	12	17	10	2	6.8
Jan	735	608	129	158	39	5.3
Feb	480	291	189	116	20	4.1
Mar	449	220	229	99	12	2.7
Apr	103	67	36	50	7	6.7
TOTAL	2877	1898	979	632	114	3.9



Adverse Events

Policlinic Belkis Sotomayor Health área (sept 2021-April 2022)

Total Treated Patients	No Adverse Events Patients	Adverse Events	No. de personas	%	Intensity
3356	3327	Burning Nose	24	82.8	Mild
		Cefalea	3	10.4	Mild
		Runny Nose	1	3.4	Mild
		Nausea	1	3.4	Mild
			29 (0.9 %)		**All mild**



Prevention of the COVID-19 transmission in the tourism workers

Cayo Largo, Ciego de Avila province (15 Nov. –31Dec 2021)

n=5000

99 tourists diagnosed with COVID-19 in the evaluated period

No tourism worker diagnosed with COVID-19 in the evaluated period.

Health intervention in Granma province

nov 2021 - dec 2022

Granma

Total population **:** 833600 inhab

Number of municipalities: 13

Natural product: Curmeric-nasal drops
Curmeric mouth wash/gargle
Curmeric oral formulation

HEALTH WORKERS

CLOSE CONTACTS OF PATIENTS

WITH RESPIRATORY SYMPTOMS

COVID-19 PATIENTS

Post COVID-19 PATIENTS

Symptom relief with Curmeric-nasal drops in patients with respiratory symptoms

Bayamo municipality

Symptoms	Total of symptoms T=0 days	Total of symptoms T=5 days	% (5 days)	Total of symptoms T=15 days	% (15 days)	Total of symptoms T=15 days	% Symptom relief
Headache	344	275	79.94	69	20.06	344	100
Runny nose	143	89	62.23	54	37.76	143	100
Dry cough	306	176	57.51	128	41.83	304	99.35
Joint pains	197	90	45.68	100	50.76	190	96.44
Loss of taste and smell	40	20	50	12	30 .00	32	80.00
Nasal obstruction	87	74	85.07	10	11.49	84	96.55
Sore throat	326	274	84.05	52	15.95	326	100
Muscle pain	388	239	61.59	119	30.67	358	92.26
Fatigue	184	110	59.78	74	40.22	184	100
Fever	141	141	100	0.0	0.0	141	100
Total	**2156**	**1488**	**69.01**	**618**	**28.66**	**2106**	**97.68**

Effect of Curmeric-oral formulation on the symptom relief in post COVID-19 patients

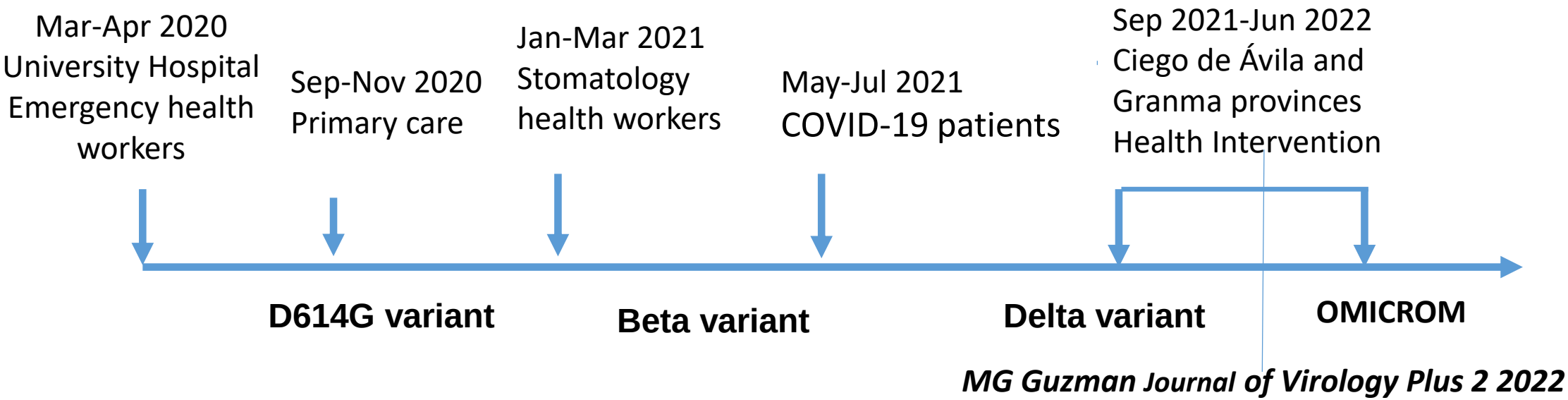
Cauto Cristo municipality

Symptoms	Number of patients with symptoms T=0 days	Symptoms relief in 7 days	%	Symptoms relief in 15 days	%	Total %
Dry cough	17	14	82,3	3	17,6	99.9
Joint pains	5	3	60	2	40	100
Fatigue	13	9	69,2	4	30,7	99.7
Total	**31**	**22**	**70,9**	**9**	**29,0**	**99.9**

General aspects of clinical studies with Curmeric in COVID-19

1. Total number of participants n= 100 028

2. The studies were performed transversal to all COVID-19 variants from the very beginning of epidemic.



MG Guzman Journal of Virology Plus 2 2022

3. Transmission prevention studies were performed in non vaccinated population

4. Treatment studies with COVID-19 and post COVID-19 patients were performed in vaccinated population

5. The post- COVID studies were extended to December 2022 (less dengue cases in the municipalities where Curmeric was applied)

Conclusions

- ✓ Curmeric is a safe natural emulsion obtained with high technology, which contains polyphenols (curcuminoids), vitamin E, omega-3, minerals and other trace elements.

- ✓ Curmeric showed antivirus activity (anti-coronavirus), as well as anti-bacterial effects *in vitro.* Moreover it has shown antioxidant, anti inflammatory, hypolipemiant properties.

- ✓ Clinical studies and health intervention performed in 100 028 subjects during the COVID19 pandemic in Cuba, indícated that Curmeric products are safe and that the nasal drops, and gargles could help to decrease the disease transmission. Moreover, together with the oral formulation could improve symptoms in COVID-19 and post-COVID-19 patients, and other non COVID-19 respiratory diseases.

- ✓ The nasal drops have been included in the Cuban Basic List of Drugs and Natural Products in 2023 and are currently commercialized by the national system of pharmacies.

- ✓ A clinical study to evaluate the effect of Curmeric oral formulation in dengue infection started from June 2024.

Collaborators

FARMABANA

MEDILIP

CEADEN

University Hospital General Calixto García

ICIMAR

CENCEC

UH (IFAL, FLEX, INSTEC, FacMat)

CENSA

Hospital Dr. Luis Díaz Soto (Naval)

CIM

IPK

CIGB

DPS La Habana

DPS Ciego de Avila

DPS Granma

Section of Drugs and Technologies, MINSAP

Department of Natural and Tradicional Medicine, MINSAP

Committee of Science and Innovation, MINSAP

Local Development Project (FARMABANA-CEADEN) Co-working with BIOCUBAFARMA

Cúrcuma longa as **raw material is obtained with agroecological techniques applying Circular Economy.**

- Renewable Energy sources (solar dehydration).
- Environment Protection
- Inclusion of women and people with special physical needs.

Curcuma natural products for the National Basic List of Drugs and Natural Products.

- Good Manufaturing Practices
- Quality System
- Clinical and Non-Clinical Research

ALL INVITED TO THE
PANEL CURMERIC IN DENGUE AND OROPOUCHE
AT 2PM

MUCHAS GRACIAS!