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Brassica rapa

Hep-2		.Hela		AMN-3	
AMN-3	/	1250	.		
24	%(100)	%(42 63)	Hep-2		
%64					
48	/	10000	Hela		
AMN-3	/	10000			
72		.%25			

. Hormetic effect

Hormesis

CYTOTOXICITY EFFECT OF AQUEOUS EXTRACT OF *BRASSICA RAPA* ROOTS ON CANCER CELL LINES IN *VITRO*

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Abstract

Effect of aqueous extract of *Brassica rapa* roots on three types of cancer cell lines; Hep-2, AMN-3 and Hela was studied in *vitro*.

The results showed that, the cytotoxic effect of extract dependent on type of cells, amount of dose and exposure time.

The concentration 1250 µg/ml gave higher growth inhibition , were (63 and 42) % to ANM-3 and Hep-2 respectively compared with control 100% after 24 hours from exposure time , but inhibition growth of Hela cells was 64% by 10000 µg/ml crud roots extract for 24 hours.

Exposure time for 48 hours reduced the percentage of inhibited growth, only by 10000 µg/ml for extract; viability was 25 % for ANM-3 cells.

Crud aqueous extract of *Brassica rapa* roots was have hormetic effect (Hormesis), because also induced the proliferation of cancer cells by used low concentration of extract after 72 hours exposure time.

Brassica
Phytochemicals

Brassica rapa

Turnip

anti-carcinogene

Carotenoids [6 4]anti-mutagenes

[7]

(-)

[1 2]

(*in vitro*)

(Cruciferae Brassicaceae)

Flesh

Root

•

[3]

K

P

Ca

I

S

Mn

Na

Fe

Ar

Cu

Thiamine

Ascorbic acid

Niacin

Riboflavin

β - Carotene

4

[2 4] Erucic and Linoleic acid

50

37

Whatman No .1

Rotary

()

40

evaporator

[2]

4

[8]

(Stock Solution)

0.22 μm>

]

[5 4

() -2
Exposure النباتي
 (Seeding) -

(MEM RPMI-1640)
 (2048/1 ← 2/1)
 9.75 ← 10000)
 (/)
 (1)
 (0.2)
 (12 ← 2)
 / / (0.2)
 ()
 (37) -
 (72 48 24) (Exposure time)

Cytotoxicity assay -3
 (crystal violet stain)

()
 (PBS)
 (0.1)
 [10]
 PBS (20)
 (ELISA microplate
 (492) ,spectrophotometer)
 (Inhibitory -
 -: [11] Rate/I.R) (37)

$$IR\% = \frac{A - B}{A} \times 100$$

(Proliferation Rate/ كما حُسب معدل تحفيز النمو /
 PR) وفقاً لـ [12] وكالاتي :-

$$PR\% = \frac{B}{A} \times 100$$

: Hep - 2 -1
 Human Larynxepidermoid Carcinoma
 : AMN - 3 -2
 Mouse Mammary adenocarcinoma
 : Hela - 3
 Human Cervix uteri epithelial Carcinomam
 (222)
 (176)
 (%5) PRMI - 1640
 (FCS)
 (%5) MEM (275)
 (96-Microtiter Flat Bottom Plates)

Cell Seeding -1
 ()
 .(T.V) -
 (20) -
 ()
 (Haemocytometer)
 .[9] Freshney (%1)
 (0.1) -

/ (4 10×1)
 (Cell attachment)

% 110
 / 9 75 (P≤0.05)
 .% 100)
 48
 .(Hep - 2
 124) 24
 .(223)
 (%)
 (P≤0.05) Hep-2 (1)
 72 (P≤0.05)
 / 1250 % 42
 (Proliferation) 24
 / 9.75 % 129Rate
 % (21 , 30 , 32)
 / (2500 , 5000 , 10000)

. (Hep-2)

:1

(%100)			()
72	48	24	(/)
100 a	A 100 a	A 100 a	0
↑ 129 b	↑ 124 b	↑ 110 b	9.75
124 b	103 a	107 ab	19.5
122 b	107 a	102 ab	39
125 b	● 108 a	● 103 ab	78.125
123 bc	● A 3	● A 11	156.25
118 bc	A 7	A 11	312.5
115 c	A 7	B C 24	625
115 c	A 13	D 42	1250
116 c	A 11	B 21	2500
112 c	A 13	C 30	5000
● 111 c	↓ A 14	↓ C 32	10000

*الاحرف الانكليزية الصغيرة المتشابهة دلالة على عدم وجود فروق معنوية (P>0.05) للمقارنة في حالة تحفيز النمو لكل عمود.
 **الاحرف الانكليزية الكبيرة المتشابهة دلالة على عدم وجود فروق معنوية (P>0.05) للمقارنة في حالة تثبيط النمو لكل عمود.

AMN-3 48 Hep-2
 / 10000 % 75 (AMN -3)
 % 36 (P≤0.05) , (177) AMN-3
 24
 / (2500 5000)
 / 39 (2)
 % (127 141)
 / (75.9 5.19)
 % 63 / 1250
 (% 27 viability)
 , / 625 % 42
 (P≤0.05)

(AMN -3)

:2

() (%100)			(/)
72	48	24	
100a	A 100 a	A 100	0
↑ 128b	↑ 127 b	● A 3	9.75
118c	● C 141	A 11	19.5
113c	● A 9	A 13	39
112 cd	AB 10	A 14	78.125
111 cd	CB 16	BE 22	156.25
115 cd	C 17	C 26	312.5
101ad	D 24	D 42	625
101ad	DE 27	D 63	1250
104ad	E 31	BE 30	2500
111 d	F 41	E 42	5000
● 110 d	↓ G 75	↓ E 36	10000

*الأحرف الانكليزية الصغيرة المتشابهة دلالة على عدم وجود فروق معنوية (P>0.05) للمقارنة في حالة تحفيز النمو لكل عمود.
 **الأحرف الانكليزية الكبيرة المتشابهة دلالة على عدم وجود فروق معنوية (P>0.05) للمقارنة في حالة تثبيط النمو لكل عمود.

(Hela cells)

(38 42 64) %
 survival cells (62 58 36) %
 (. P≤0.05)
 Hela
 (3) . / (9,75 19,5) % 126

(276)
 . AMN-3 Hep-2
 24
 72

24 / (2500 5000 10000)

(Hela cell)

: 3

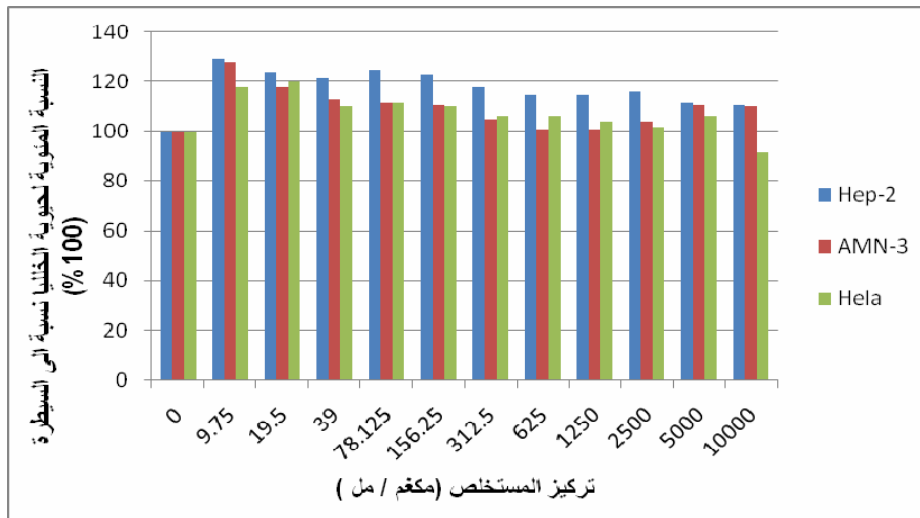
النسبة المئوية لنوع الاستجابة (تثبيط او تحفيز) نمو نسبة الى السيطرة (100 %)			فترة التعريض
ساعة 72	ساعة 48	ساعة 24	التركيز (مكغم/ مل)
A 100 a	A 100 a	A 100 a	0
118 b	110 b	126 b	9.75
120 b	110 b	126 b	19.5
110 b	108 b	116 c	39
112 b	106 b	111 c	78.125
110 b	101 a	A 20	156.25
106 a	A 2	B 22	312.5
106 a	A 6	B 30	625
104 a	A 17	B 31	1250
102 a	A 19	C 38	2500
106 a	B 26	C 42	5000
A 8	C 43	D 64	10000

*الأحرف الانكليزية الصغيرة المتشابهة دلالة على عدم وجود فروق معنوية ($P>0.05$) للمقارنة في حالة تحفيز النمو لكل عمود.
 **الأحرف الانكليزية الكبيرة المتشابهة دلالة على عدم وجود فروق معنوية ($P>0.05$) للمقارنة في حالة تثبيط النمو لكل عمود.

%36) , (%64
 (24
 / 1250
 ,Hela / (63 42)
 48 . (1) % 126
 , (2) % (37 , 58)
 %5
 / 10000) %25 AMN-3 Hep -2
 (3) (/ 10000)
 % (66 , 68)

Hela AMN -3 Hep-2 Hep-2
 72

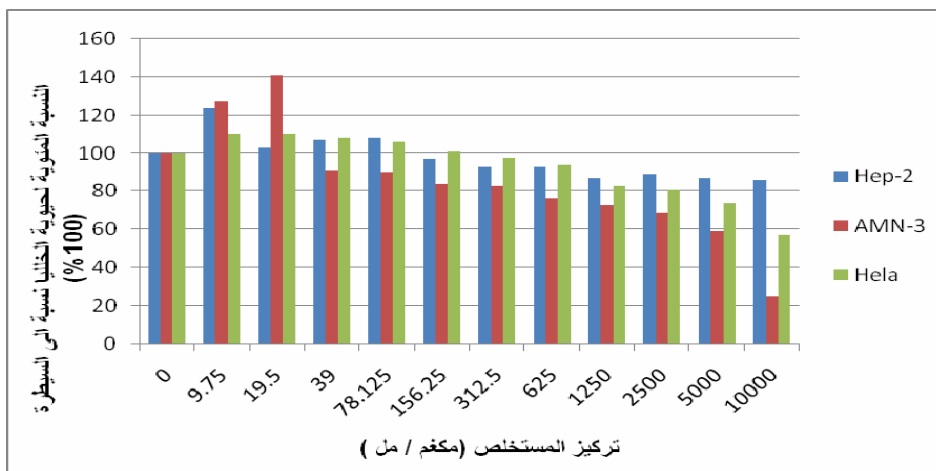
. Hela



(Hela , AMN-3 , Hep-2)

:1

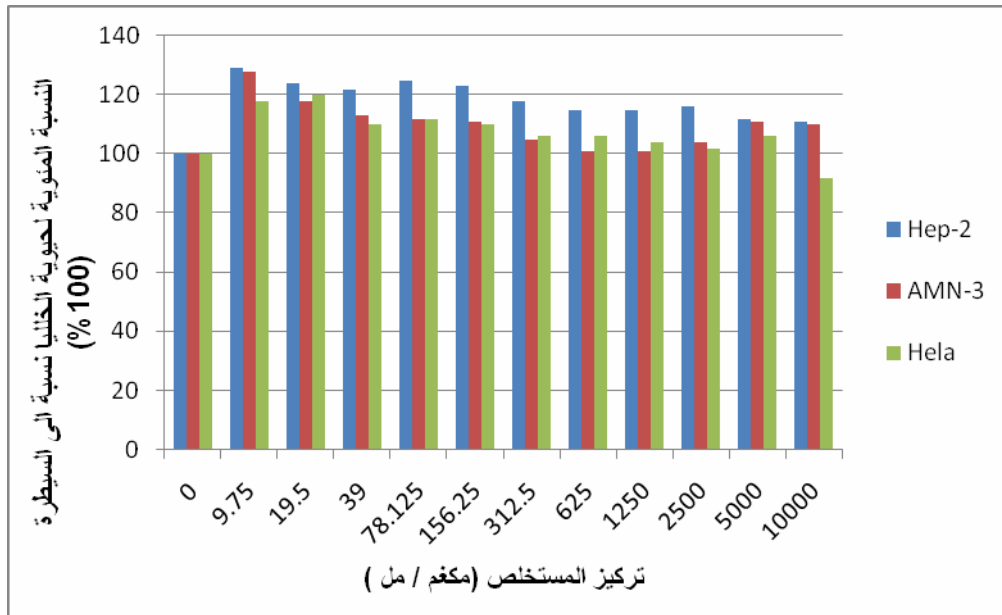
24



(Hela , AMN-3 , Hep-2)

:2

48



(Hela , AMN-3 , Hep-2)

:3

72

phenolics
anti-proliferative

antioxidant
Anthocyanine

[10]

] mutagens

carcinogens

3- Isothiocyanate

[16 15

, (Hep-2 , AMN -3 , Hela)

5- -2- thion(goitrin)

hydroxy-methyl-indole

, 48 , 24)

Anthocyanin

Rhadanides

vinyl-oxazolidine

, (72

Brasicasterol

Machrolysin

Rapine

(10000 – 9.75)

[17 ,10] Glucosinolates

Sinigrin

/

)

492

(

%(63,42)

/ 1250

AMN-3 Hep-2

)

(IR)

Hela

% 64

Proliferation)

, (% 100

24

/ 10000

(Rate

48 %75

AMN-3

Brassica

/ 10000

[14 13]

(GRH-ITC)
 BCI-2 Bax 24
 (Phase II detoxifying enzymes)
 .[14]
 Glucoraphasatin Glucoraphenin (LNCaP) Indole-3-carbinol (I3C)
 Glucosinolates (GLS) human lymph node carcinoma of prostate
 phase I G1
 Xenobiotic metabolizing phase II Androgen Receptor (AR)
 .[21] enzyme
 GLS (AR) expression mRNA
 Intracellular processes .[18] 12
 .[13] Tumorigenesis
Brassica I3C
 3,3' Diindolyl methane (DIM) G1/S
 Cyclin Cyclin D1, E
 multi-targeted P₂₁ P₁₅ dependent kinase 2,4,6
 anti-cancer drugs .P₂₇
 و Bcl-xL Apoptosis
 DIM Caspase-3 Survivin و Bcl-2
 nuclear receptor Caspase-9 و Bax
 Signaling Isothiocyanate .[19]
 .[22] Kinase (ITC)
 MCF-7 (DNA- DNA
 G1 Caspase-3 Fragmentation)
 ATPase .P21 HT-29
 48 / 7.08
 .[23] Reactive oxygen species (ROS) .[20]
 DIM Glucoraphasarin (GRH-ITC)
 INF- γ MCF-7 (Cell) Isothiocyanate مع proliferation
 DIM . [25 24] (Lovo TCT-116 HT-29)
 DNA dose-dependent
 Hep-G2)
 DNA DNATopoisomeras II alpha Hela AMN-3 Hep-2
 .[26] Topoisomerase I and II beta (

- ,1982 , .1
- ,1985, .2
- (%100)
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] (Biphasic effect)
Hormetic effect .[27
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Hormesis
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