



## The curcumin effects on mitotic index rates , chromosomal changes and weights of lab mice

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### Abstract

The delivery of curcumin parentally or orally as a treatment found to decrease the bone marrow mitotic rates in sampled mice. The use of turmeric oral treatment showed weight gain on contrary to injection route which showed weight loss. Higher chromosomal rates were found in the results which was 33% for injection route and 24% for oral route than the control group which was 4%.

**Key words: curcumin, mitotic index, chromosome, weight**

### Introduction

The ancients knew a wide list of medicinal plants and used them successfully in the treatment of diseases. For example, they used the harmel plant to treat tapeworms (Moloudizargari *et al.*, 2013). Chamomile strengthens the immune system, gastrointestinal disorders, ulcer, menstrual disorders, hemorrhoids and rheumatic pain (Srivastava *et al.*, 2010). Cinnamon is used for lowering cholesterol levels, antitumor and antioxidant (Gruenwald *et al.*, 2010).

Plant extracts play an important role in medical treatments and laboratory materials. For example, in medicinal uses, Digoxin which is used to strengthen the heart muscle, prepared from Digitalis (Moore and Taylor, 1996), Buscopan is a product of Datura (Gryniewicz and Gadzikowska, 2008) which is used for the treatment of colic and abdominal pain caused by the contraction of abdominal organs and internal pelvis, such as irritable bowel and menstrual pain, Carination extracted from *Syzygium aromaticum* (Kumar *et al.*, 2012) used as dwelling and anesthetic for dental pain.

Curcumin is a powder of a yellow leafy plant with a distinctive aroma and flavor (Chattopadhyay *et al.*, 2004). Turmeric is known scientifically as *Curcuma longa* (Borra *et al.*, 2014). The part used from turmeric plants are small tubers that resemble roots grow near the surface of the earth and the length of between 5 - 8 centimeters.

The medical uses of turmeric are many and varied: anticancer (Aggarwal *et al.*, 2003), heart and blood vessels, respiratory system diseases (Aggarwal and Harikumar, 2009), joints (Mobasheri *et al.*, 2012), and gastrointestinal diseases (Dulbecco and Savarino, 2013). Turmeric is one of the most important herbs in India, China, Japan and all South Asia. Turmeric is one of the most safe and effective herbs in cleansing the body of various toxins. Curcumin is one of the most scientifically researched plants and has produced thousands of scientific articles that indicate the effectiveness of curcumin in the healing of many diseases (Gupta *et al.*, 2012). Mohammed, (2013) curcumin extract (*Curcuma Longa*) on Cancer Cell Lines in Vitro, who found the inhibition effect on transformed cell line of Rat Embryogenic Fibroblast.

### Materials and Methods

#### Turmeric aquatic extraction and Mice treatment

One hundred gram of turmeric powder was added to 250 ml of water and boiled, then it was filtered by filter papers. The extract was left to dry and 1.5 mg of the extract was dissolved in 0.2 ml of distilled water which was administered orally and injected to three mice for each treatment while three other mice were not treated with the extract which represented the control.

#### Mitotic index Rates

URL: <http://www.uokufa.edu.iq/journals/index.php/ajb/index>  
<http://iasj.net/iasj?func=issues&jid=129&uiLanguage=en>  
Email: [biomgzn.sci@uokufa.edu.iq](mailto:biomgzn.sci@uokufa.edu.iq)



Mitotic index was calculated by the equation = (The number of divided cells / the total number of the cells ) \* 100 (Patlolla *et al.*, 2005) .

### Chromosome Aberration test

Chromosome smears were prepared from bone marrow according to Preston *et al.*, (1987).

### The weight of mice

The mice were weighted at the start of the experiment and every week period of the experiment which was lasted for 3 weeks.

### Statistical analysis

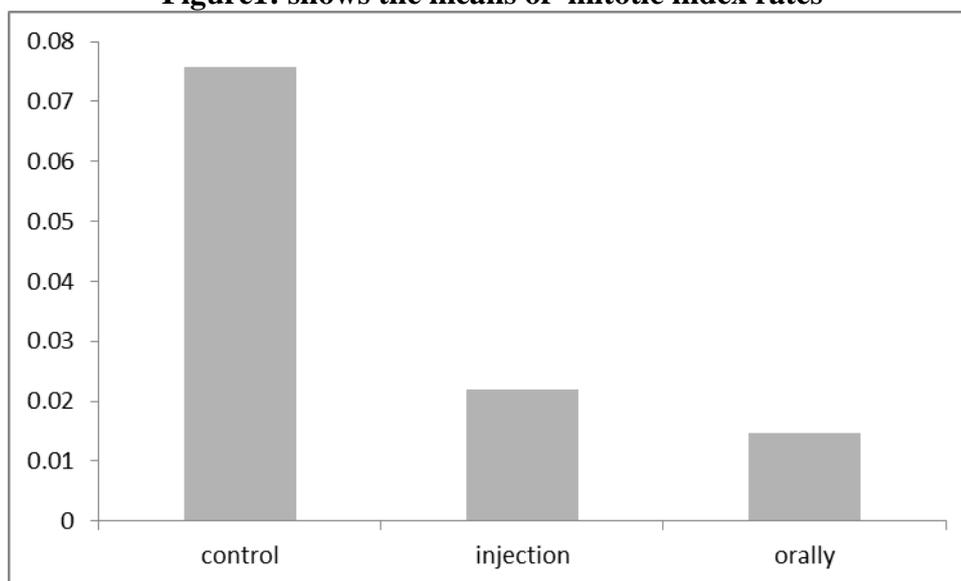
One –way , ANOVA (Minitab 16) was used to analyze the experiment data.

## Results

### Mitotic index

The present study showed that the mitotic index decreased in both treatment whether injection  $0.01404 \pm 0.01192$  or oral administration  $0.02923 \pm 0.01242$  in a significant difference with control  $0.07437 \pm 0.02777$  Figure 1.

**Figure1: shows the means of mitotic index rates**



### Chromosomal aberrations

The present study showed that chromosomal anomalies in control was 4% , which on the contrary it was found in both the oral administration 24% and injection 33%, in which chromosomes looked entangled chromosomes , deletion and addition , while in injection treatment , a ring chromosome and fusion occurred.



Figure 2: shows the rates of chromosome aberrations in 3 treatments.

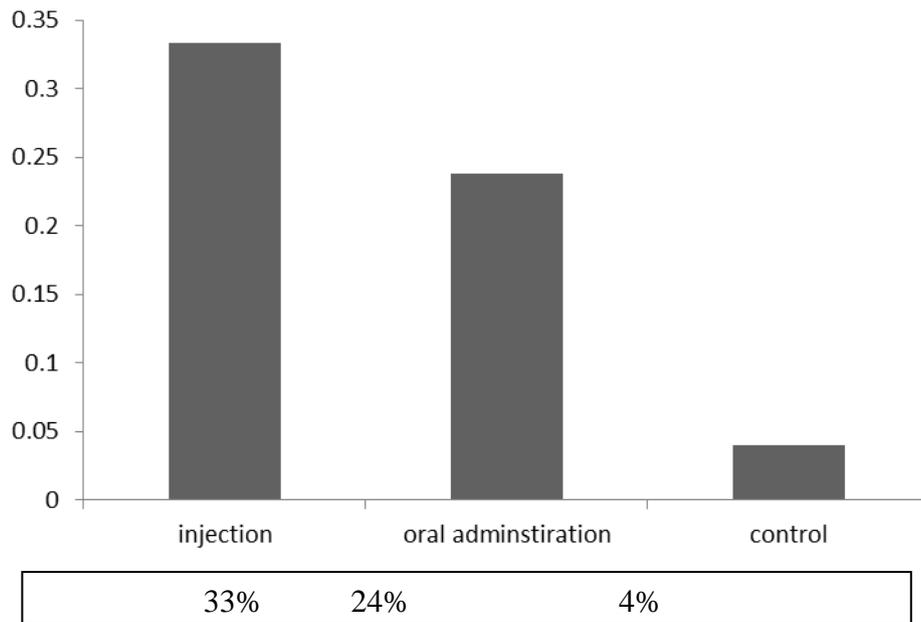
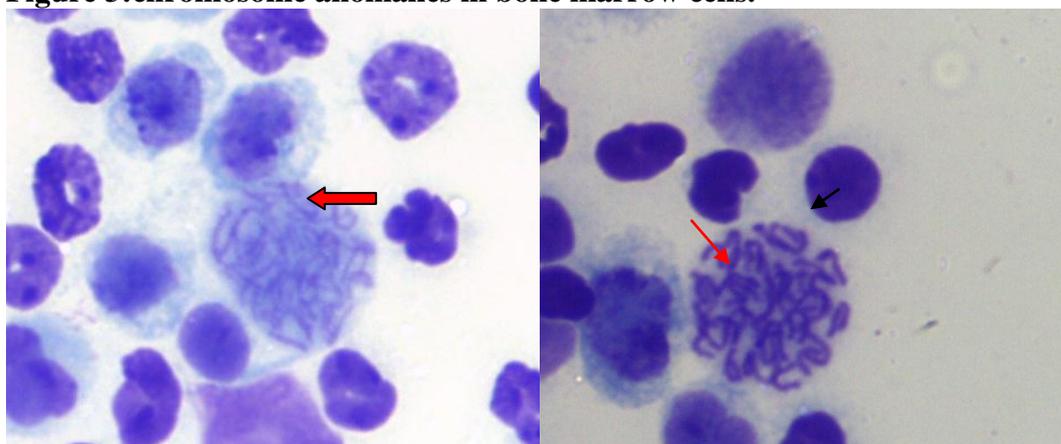
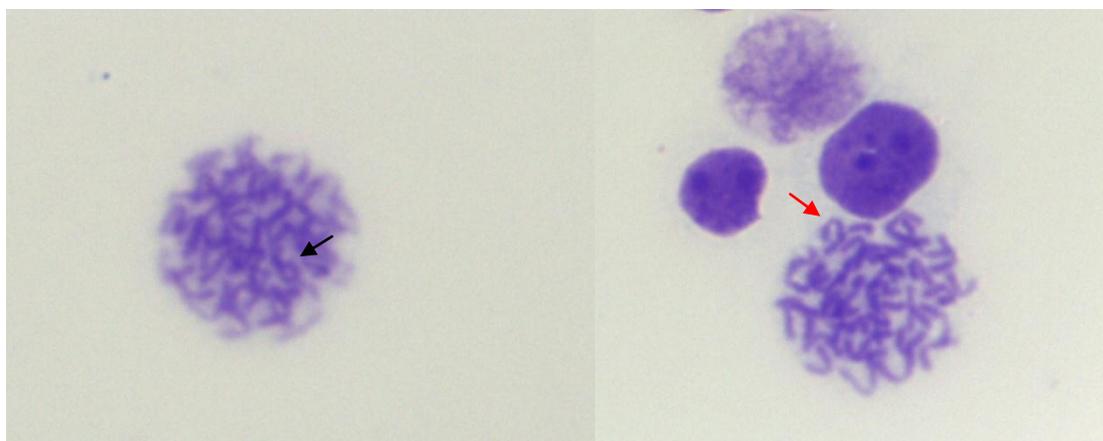


Figure 3: chromosome anomalies in bone marrow cells.



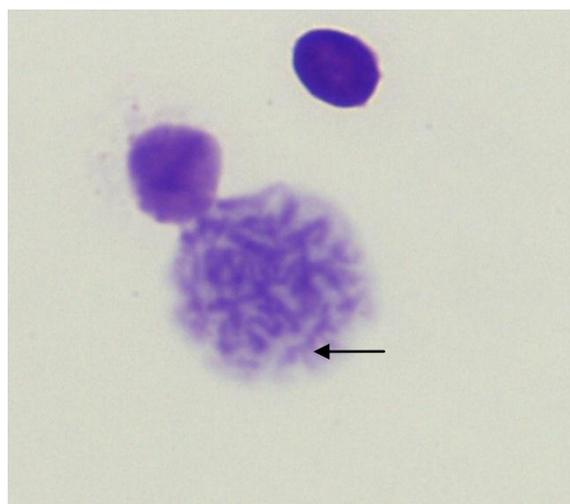
Entangled chromosomes

Deletion → addition  
( Oral administration) 1000X.



Ring chromosome . 1000X

chromosome fusion → 1000X

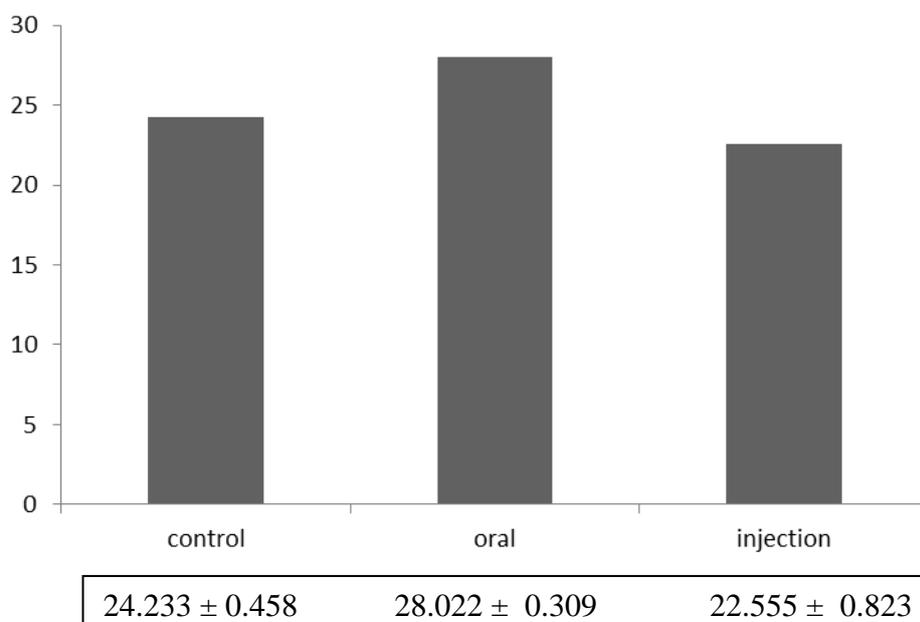


**Fusion of chromosomes** →  
( Injection treatment) 1000X.

### The effect of curcumin on weights

The present study shows significant effect of curcumin on animal weights when compared the three groups according to the treatment in which the control group was  $24.233 \pm 0.458$  g , the group that was injected through vein weight average was  $22.555 \pm 0.823$  g and the oral administrated group was  $28.022 \pm 0.309$  g Figure 4 . It was found that the weights of the mice that were treated orally increased in average 0.2g , on the contrary the weights of mice that were injected decreased in average 1g .

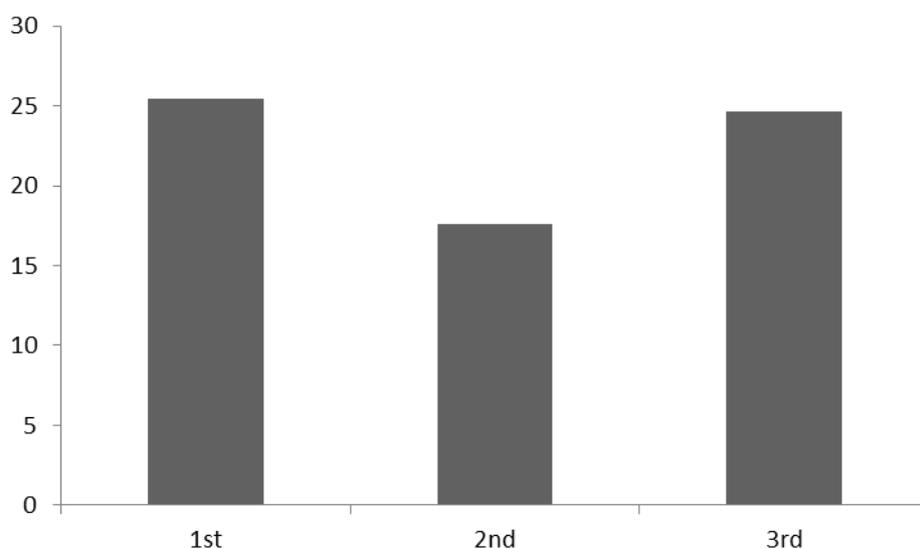
**Figure 4 :** shows the average of weight among the control , the oral administration and injection .



On the level of the days of measurement it was also found no significant difference , it was found that 1<sup>st</sup> day average was  $25.450 \pm 2.443$  , 2<sup>nd</sup> it was  $17.600 \pm 13.166$  and the 3<sup>rd</sup> was  $24.636 \pm 3.283$  Figure 5 .



**Figure 5:** shows the average of weight according to the day of treatment.



**Discu** 25.450 ± 2.443      17.600 ± 13.166      24.636 ± 3.283

The present study found that curcumin leads to decrease the mitotic index resulted from treatment by injection and oral administration

The low rates of mitotic index might be due to the fact that turmeric has led to arrest cells at the prophase which was proved by Blakemore *et al.*, (2013).

The chromosomal anomalies increased in treated animals where the occurred align on the equator incorrectly and in entangled appearance (Holy, 2002; Wolanin *et al.* 2006).

Many researches were made on curcumin to find out its action against obesity. In the present study was reported that the weights of the mice treated orally increased that agreed with Dance-Barnes *et al.*, (2009), The increase was ascribed to the conversion the curcumin to the active ingredients by the action of the enzymes of stomach which made the body gain some weights. On the other side the weights of the injected mice decreased that agreed with Ejaz *et al.*, (2009) refer that Turmeric reduces body fat who ascribed that to the prevention of Adipogenesis.

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