



**Alexandria University  
High Institute of Public Health  
Department of Nutrition**

# **EFFECT OF TURMERIC CONSUMPTION ON SOME BIOCHEMICAL PARAMETERS OF OBESE RATS**

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## SUMMARY

Obesity is a chronic disease caused partially by the dietary habit of consuming excessive nutrients, especially those with high-fat content. High-fat diet (HFD)-causes many complications, including type 2 diabetes, dyslipidemia, inflammation, cancer and cardiovascular diseases such as hypertension and atherosclerosis. Introduction of the plant as part of diet has been successful despite the fact that new foods are very often difficult to introduce. Turmeric is considered to be one of the most important herbs in the Ayurvedic tradition. In the United States of America, Turmeric has been granted "Generally Recognized as Safe" (GRAS) status by the FDA. Turmeric has been used traditionally as household remedy in curing various diseases such as anorexia, cough, rheumatism and intestine disorder. Using turmeric supposed to decrease the symptoms of obesity related diseases. Nutrients found in turmeric do more than just prevent deficiency diseases. It has a high nutritional status that can be exploited. Nowadays, turmeric is used widely in the food industries, as a coloring agent as well as an additive to impart flavor in curries. Turmeric is a prompt source of bioactive compounds like antioxidants, polyphenols and flavonoids, which may be the substitute antibiotics used in food and food products. The curcumin the active component of turmeric contain vitamins or vitamin precursor which produces vitamin C, beta - carotene as well as polyphenol coupled with fatty acid and essential oil. Studies demonstrated that curcumin has antioxidant, anti-inflammatory, antiapoptotic, anti-proliferative, anticancer, antidepressant, immunomodulatory and neuroprotective effects on humans and laboratory animals. Therefore the purpose of the present study is to investigate the effects of oral administration of different doses of turmeric root powder and curcumin in obese male and female rats on some biochemical parameters.

Forty obese male and forty obese female Wistar rats were used; they were divided randomly into five groups of 8 male and 8 female rats in each group. The control negative group was fed with standard diet and the other four groups were fed the standard diet and added melted animal abdominal fat by 20 % of the weight of rats to make them obese. Both male and female rats groups were control positive (without treatment), treated groups with curcumin (50mg/kg b.wt), turmeric groups (50 and 100 mg/kg bwt) for 30 days. At the end of the 4 weeks experimental period, rats were fasted for 12 hours and sacrificed by cervical decapitation and the fasting blood specimen were collected and the isolated the liver to use it in some tests and used to determine the following measurements:

1. Serum lipid profile.
2. Liver function enzymes.
3. Kidney function tests.
4. Total antioxidant activity.
5. Hormones tests.
6. Inflammatory markers tests.
7. Hematologic markers tests.

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**Our study showed the following results:**

1. Turmeric has a potential role in therapeutic action via inhibiting oxidative stress due to presence of phenolic compounds, polyphenols, and flavonoids compounds which have antioxidant nature.
2. The turmeric and its active component curcumin improved the serum lipid profile in obese rats by decreasing serum CH, TG, LDL-C and increasing serum HDL-C. This finding provides some biochemical basis for the use of rhizomes of turmeric as anti-hyperlipidemic agent.
3. Turmeric roots have high nutritional effect and ability to prevent damage to the kidney and liver cells due to the improvement of liver function (ALT, AST and ALP) and kidney function (urea, and creatinine).
4. Turmeric and its active component curcumin have a potential role as anti-inflammatory agent because they reduce the inflammation markers levels e.g. TNF- $\alpha$  and CRP to become similar to the normal rats.
5. The turmeric treatment on obese male and female rats increase the hematological markers tests e.g Hb, RBC's and WBC's count to become similar to the normal rats.
6. Rats fed on normal diet were healthier than those fed on high fat diet, as their biochemical parameters were within the normal range. While rats fed on high fat diet shows the highest lipid, liver, and kidney parameters, and the lowest total antioxidant capacity.
7. The treatment with curcumin on female rats improve the percentage of weight gain to become similar to the weight gain of normal rats and followed by the lower dose of turmeric.
8. The lower dose of turmeric treatment on obese male rats showed highly improvement on the percentages of weight gain after the 1st, 2nd and 3rd weeks.
9. Turmeric intake improves the health state of the obese rats to become similar to normal rats comparing to obese rats which didn't take treatment.

From the results of this study, we were able to come to the following recommendations:

1. Increase awareness of peoples about the beneficial effect of this golden herb (Turmeric).
2. Consumption of turmeric in our daily life style as an herb or even as a spice should be increased.
3. Fortification of several types of food including biscuits, breads, even cakes with turmeric powder should be applied.
4. Regular intake of balanced diet as possible and avoid high fat diet due to its adverse health effects.
5. 0.1g/kg bwt of turmeric or 0.05g/kg bwt of curcumin can be used safely for obese male and female patients for helping them to lose weight and reduce the adverse health effects of obesity.
6. Usage of turmeric as a part of our daily meals to save our health against obesity, hyperlipidemia, inflammation and oxidative stress as a preventable step is recommended.
7. Further human and laboratory animal's studies on the effect of different doses of turmeric on obese persons using weight loss therapy are recommended.
8. Turmeric should be used by healthy people due to its good effects on their health.
9. Further studies on curcumin as a preventable effect are recommended.