Received: 14.02.2025 | *Accepted: 19.02.2025*

Veterinary Sciences

doi: 10.31210/spi2025.28.01.32
UDC 615.076.9:636.92
ORIGINAL ARTICLE

Scientific Progress & Innovations
https://journals.pdaa.edu.ua/visnyk

28 (1)
2025

The effects of using mint on weight and biochemical blood tests in albino rabbit (*Oryctolagus cuniculus*)

R. S. Al-Kulabi | W. F. Obead

Article info

Correspondence Author
W. F. Obead
E-mail:
walaa.obead@uokerbala.edu.iq

College of Veterinary Medicine, University of Karbala,
56001, Karbala, Iraq

Citation: Al-Kulabi, R. S., & Obead, W. F. (2025). The effects of using mint on weight and biochemical blood tests in albino rabbit (*Oryctolagus cuniculus*). *Scientific Progress & Innovations*, 28 (1), 212–215. doi: 10.31210/spi2025.28.01.32

Medicinal plants are used in place of manufactured medications. We can learn about medicinal plants' biological activities from traditional medicine. Nowadays, the majority of nutraceuticals have gained popularity. Because herbal remedies had few or no negative effects, people began to trust them more than synthetic ones. In addition to being a useful medicinal plant for curing illnesses, mint may be utilized to make raw ingredients for the pharmaceutical sector. One of the main causes of metabolic syndrome, a global public health concern, is obesity. The current study's investigation focused on the anti-obesity properties of a *Mentha spicata* leaf extract, an herb used for centuries as a dietary supplement and traditional phytomedicine. Ten rabbits weighing between 2900 and 3350 g we divided the ten albino rabbits into two groups. for this experiment. The treatment group consisted of five, while the control group had five. For sixty days, the treatment group (TG) is fed only mint (40 mg/kg), while the control group (CG) is fed regular food. 24 hours following the end of therapy. Blood samples were taken, centrifuged (at 3000 g for 30 minutes), and serum was extracted for spectrophotometer measurements of HDL, LDL, triglycerides, and cholesterol using a commercial kit package. We conducted our analysis using standard commercial kits. According to the results, the weights of the white adipose tissue and body were considerably lower in the Mentha-supplemented group than in the CG group. Measurements of HDL, LDL, triglycerides, and cholesterol were made using blood samples in (CG) are 57.03±1.2; 74.63±1.5; 260.13±1.56; 211.71±1.04 respectively while in (TG) 56.53±1.42; 49.03±1.5; 188.02±0.76; 129.14±1.02. These findings imply that Mentha might aid in lowering diet-induced obesity and its associated issues and reducing overall cholesterol, LDL, and triglyceride levels in the treatment group's serum. This is a crucial scientific study to assess the plant's characteristics and determine how it can help prevent weight gain and eliminate fats that lead to numerous dangerous illnesses that cannot be ignored.

Keywords: Obesity, metabolic disorder, Mentha.

Вплив екстракту з листя м’яти на вагу та біохімічні показники сироватки крові кролів (*Oryctolagus cuniculus*)

Р. С. Аль-Кулабі | В. Ф. Обеад

Коледж ветеринарної медицини, Університет Кербела,
провінція Кербела, Ірак

Загальновідомо, що здавна лікарські рослини використовувалися замість готових ліків. Про біологічну активність лікарських рослин відомо з багатьох літературних джерел, у тому числі й з тих, що відносяться до гуманної медицини. На сьогодні великої уваги та популярності набувають нутрицевтики, що пов’язано з тим, що складові таких біологічних добавок містять рослини або їх компоненти. Відповідно до досліджень, останні чинять мінімальний негативний вплив на організм або взагалі його не проявляють. Серед популярних рослин, які повсякчас використовуються людиною, є м’ята – рослина, яка століттями використовувалася як дієтична добавка у традиційній фітотерапії. Вважається, що м’ята є надзвичайно корисною лікарською рослиною та може бути використана для виготовлення сировини для фармацевтичної промисловості, для лікування і профілактики ряду станів, у тому числі й патологій. На сьогодні, однією з головних причин метаболічного синдрому, що викликає занепокоєння у сфері охорони здоров’я, є ожиріння. Тому, поточне дослідження було зосереджено на властивостях екстракту листя *Mentha spicata* проти ожиріння. Дослідження проводилися на кролях (вагою від 2900 до 3350 г), які були розділені на дві групи по 5 голів у кожній. Протягом шістдесяти днів тваринам дослідної групи до раціону додавали м’яту (40 мг/кг). Контрольній групі для харчування використовували традиційний корм. Упродовж 24 годин після закінчення досліду проведене дослідження щодо встановлення показників ваги кролів дослідних та контрольних груп, а також окремих показників сироватки крові (тригліцериди, холестерин, ліпопротеїди високої щільності, ліпопротеїди низької щільності). Відповідно до результатів досліджень встановлено, що вага тіла кролів, які отримували екстракт з листя м’яти була значно нижчою (P<0,05) порівняно з кролями зі звичайним раціоном. Також, у дослідній групі кролів виявилися значно нижчими (P<0,05) показники тригліцеридів (188,02±0,76 мг/дл проти 260,13±1,56 мг/дл), холестерину (129,14±1,02 проти 211,71±1,04 мг/дл) та концентрація ліпопротеїдів низької щільності (49,03±1,5 проти 49,03±1,5 мг/дл). Таким чином, отримані результати розширюють існуючі відомості щодо цілющих властивостей м’яти й дозволяють стверджувати про можливість її використання для боротьби з ожирінням, яке призводять до численних небезпечних захворювань.

Ключові слова: ожиріння, порушення обміну речовин, м’ята.

Бібліографічний опис для цитування: *Аль-Кулабі Р. С., Обеад В. Ф.* Вплив екстракту з листя м’яти на вагу та біохімічні показники сироватки крові кролів (*Oryctolagus cuniculus*). *Scientific Progress & Innovations*. 2025. № 28 (1). С. 212–215.

Introduction

Obesity results from an accumulation of abnormal or excess body fat. The gap between caloric intake and expenditure is obese for the average person. Eating many calories but not exercising causes weight gain and energy imbalance it is common knowledge that when energy intake exceeds EE, body weight increases. The extra energy is then stored as TGs in adipose tissue, which eventually results in overweight or obesity [1–7]. Health conditions are the cause of obesity. Genes, gender, family history, sleep deprivation, medications, tobacco use, unhealthy eating habits, age, pregnancy, and emotional factors. Problems Associated with Obesity Diseases of the nervous system, lungs, gut microbiota, diabetes, heart disease, inflammation, fertility, and cancer; gastrointestinal, musculoskeletal, psychological, immunological, and kidney disease [8–11].

More than half a billion adults worldwide are overweight, according to the World Health Organization [12]. Hepatic steatosis and dyslipidemia are two conditions for which obesity is a significant risk factor [13]. Drug abuse and adverse effects are common with approved medications used to treat obesity [14]. Although a number of anti-obesity medications are useful for reducing body weight, many of them have safety concerns [15].

Natural products made from plants have been utilized as medicines for a long time and have shown promise as a source of future medications. In Asia, the plant species *Mentha canadensis* (MA), which belongs to the Lamiaceae family, is frequently referred to as an East Asian wild mint [16]. The Laminaceae family includes the creeping rhizome *Mentha spicata*. For many years, people have utilized Mentha spicata as a strewing herb [1, 17]. Mint has been utilized for everything since ancient times. In conventional medicine, for fever, headaches, digestive issues, and colic, spearmint has been utilized. Menthol, which can be found in cough syrups and drops, is currently one of the most widely used medicinal applications of spearmint extracts. According to recent research, extracts from mint may be used. as an antiemetic to treat GIT, hirsutism, and cancer [18].

Several hypotheses have been proposed to explain *Mentha spicata* ability to reduce weight, including reducing adipocytes, increasing lipolysis, inhibiting pancreatic lipase activity, and limiting nutrition absorption [18, 19].

Despite the fact that many anti-obesity drugs are effective in helping people lose weight, many of them have safety issues [20, 21]. Brazilians frequently use *Mentha piperita*, a plant in the same genus as Mentha, for medicinal purposes. In addition, Peppermint has biological activities, for example, antioxidant qualities. According to reports, certain mint genera negatively impact the production of oxidative stress [22]. Certain blood biochemical indicators in mice under immobility stress improved when peppermint oil was added to their diet [22–24]. Its application has demonstrated that animals given juice made from its leaves have better lipid profiles and less body weight gain [25]. However, no research has examined the anti-obesity properties of mint or clarified the mechanism behind them. Thus, in diet-induced obese (DIO) rabbits, the current study aim to investigation focused on the anti-obesity properties of a *Mentha spicata* leaf extract. Sought to assess and elucidate the molecular process via which mint extracts have anti-metabolic syndrome benefits.

The aim of the study

Aim to investigation focused on the anti-obesity properties of a *Mentha spicata* leaf extract. sought to assess and elucidate the molecular process via which mint extracts have anti-metabolic syndrome benefits

Materials and methods

Animals

For In this study, ten rabbits weighing between 2900 and 3350 g each were housed in a climate-controlled room with air conditioning at a steady 27±2°C. After the animals had adapted for 30 days, they were divided into two groups of five rabbits each.

Preparation of Herbal Extract

A typical diet was administered to the control group. The treatment group received 40 mg/kg of fresh mint leaves in the form of an aqueous extract. Extracts were produced daily and made available whenever needed for 60 days. After 60 days, cervical dislocation was used to kill the animals.

Analysis of biochemical

24 hours following the end of therapy. Blood samples were taken, centrifuged (at 3000 g for 30 minutes), and serum was extracted for spectrophotometer measurements of HDL, LDL, triglycerides, and cholesterol using a commercial kit package. We conducted our analysis using standard commercial kits.

Analytical statistics

Statistical analysis was conducted using Statistical Software for Social Sciences, a statistical program for Windows. The data is displayed using an average (SEM). With the use of unpaired student's T test analysis, the statistical significance was examined. A probability value less than ($P<0.05$) were used for statistical significance.

Results and discussion

The potential of *Mentha spicata* L. leaf extract to reduce obesity in male albino rabbits was investigated. Following 60 days of therapy with Mentha spicata leaf extract, body weights and biochemical markers were used to assess obesity. The body weight variations for each animal group over both on the first day and when the experiment is finished, the weight of the body was determined and summarized in (***Table 1*** and ***Fig. 1***).

Table 1
Mint extract effect on Body weight in male albino rabbits, Mean, g

Control groups		Treatment groups	
before	after	before	after
3100	3500	3119	1300
3179	3650	3000	1267
3060	3400	3320	1600
3220	3700	3042	1179
2983	3297	2969	1070

Note: Weights of the experimental groups' bodies, the initial and final versions differ statistically significant (P<0.05).

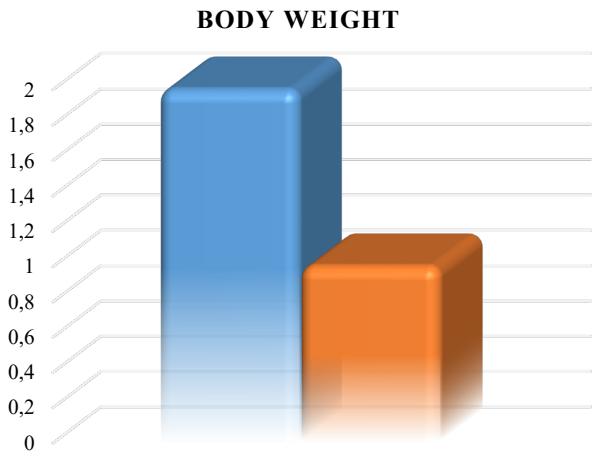

Figure 1. After administering 40 mg/kg of watery mint extract, the body weight of the initial treatment group (blue) and the final treatment group 60 days later (red) demonstrates statistical significance (P<0.05).

In comparison to the treatment group, the normal control group rabbits' body weight was considerably lower after oral supplementation with Mentha (40 mg/kg). The impact of the mint extract is also on the albino rabbit's blood parameters are displayed in (***Table 2***).

Table 2
Rabbit blood parameters (µg/dl) affected by mint extract, M±SE

Groups	Triglycerides	Cholesterol	HDL	LDL
Control	260.13±1.56	211.71±1.04	57.03±1.2	74.63±1.5
Treatment	188.02±0.76*	129.14±1.02*	56.53±1.42	49.03±1.5*

Note: * – significant differences exist in the values (P<0.05).

Plasma serum was used to measure the total cholesterol level, TG, HDL and LDL. In comparison to treatment rabbits, control rabbits had significantly higher amounts of total cholesterol, TGs, HDL and LDL; the impact of the mint extract is also on the albino rabbit's blood parameters.

According to the findings, there were no discernible effects of the mint extract on serum HDL While the rabbit in the treatment group had significantly lower serum levels of LDL, triglycerides, and cholesterol than the rabbit in the control group (P<0.05). These changes were reversed by oral mint delivery in a dose-dependent manner.

Nonetheless, this study's results are in line with those of other investigations. In the standard control group, rats gained significantly more body weight than rats in the obese control group. But, when compared to the obesity control group, oral mint supplementation dramatically decreased body weight, however, a low dose of mint had less of an impact [1]. As, a result of consuming less food and energy, Mentha dietary supplements caused a notable decrease in body weight and weight gain [20]. However, it contradicts that study, which found that rats given extracts of peppermint at 300 and 600 mg/kg put on more weight than the other groups did [22]. Mint extract had no discernible effect on the HDL serum content in this investigation but reduced cholesterol, triglycerides, and LDL levels in the blood. Also, Mesbahzadeh, note that rats' HDL serum levels were not significantly impacted by the peppermint supplements; however, when the mint extract was given to Wistar rats housed at high temperatures, the serum levels of LDL, triglycerides, and cholesterol dropped [22].

Conclusions

This is a crucial scientific study to assess the plant's characteristics and determine how it can help prevent weight gain and eliminate fats that lead to numerous dangerous illnesses that cannot be ignored.

Conflict of interest

The authors state that there is no conflict of interest.

References

1. Kumari, D. V., & Rani, Dr. M. S. (2023). Anti-obesity activity of leaves of methanolic extract of mentha spicata in high fat diet-induced wister rats. *International Journal of Pharmaceutical Sciences Review and Research*, 78 (2). https://doi.org/10.47583/ijpsrr.2023.v78i02.024
2. Hill, J. O., Wyatt, H. R., & Peters, J. C. (2012). Energy balance and obesity. *Circulation*, 126 (1), 126–132. https://doi.org/10.1161/circulationaha.111.087213
3. Ono-Moore, K. D., Rutkowsky, J. M., Pearson, N. A., Williams, D. K., Grobe, J. L., Tolentino, T., Lloyd, K. C. K., & Adams, S. H. (2020). Coupling of energy intake and energy expenditure across a temperature spectrum: impact of diet-induced obesity in mice. *American Journal of Physiology-Endocrinology and Metabolism*, 319 (3), E472–E484. https://doi.org/10.1152/ajpendo.00041.2020
4. Wakil, S. J., & Abu-Elheiga, L. A. (2009). Fatty acid metabolism: target for metabolic syndrome. *Journal of Lipid Research*, 50, S138–S143. https://doi.org/10.1194/jlr.r800079-jlr200
5. Haththotuwa, R. N., Wijeyaratne, C. N., & Senarath, U. (2020). Worldwide epidemic of obesity. *Obesity and Obstetrics*, 3–8. https://doi.org/10.1016/b978-0-12-817921-5.00001-1
6. Gesta, S., Tseng, Y.-H., & Kahn, C. R. (2007). Developmental origin of fat: Tracking obesity to its source. *Cell*, 131 (2), 242–256. https://doi.org/10.1016/j.cell.2007.10.004

7. Choi, M.-S., Kim, Y.-J., Kwon, E.-Y., Ryoo, J. Y., Kim, S. R., & Jung, U. J. (2015). High-fat diet decreases energy expenditure and expression of genes controlling lipid metabolism, mitochondrial function and skeletal system development in the adipose tissue, along with increased expression of extracellular matrix remodelling- and inflammation-related genes. *British Journal of Nutrition*, 113 (6), 867–877. https://doi.org/10.1017/s0007114515000100
8. Kinlen, D., Cody, D., & O'Shea, D. (2017). Complications of obesity. *QJM: An International Journal of Medicine*, 111 (7), 437–443. https://doi.org/10.1093/qjmed/hcx152
9. Otero, M., Lago, R., Lago, F., Casanueva, F. F., Dieguez, C., Gómez-Reino, J. J., & Gualillo, O. (2004). Leptin, from fat to inflammation: old questions and new insights. *FEBS Letters*, 579 (2), 295–301. Portico. https://doi.org/10.1016/j.febslet.2004.11.024
10. Monteiro, R., & Azevedo, I. (2010). Chronic inflammation in obesity and the metabolic syndrome. *Mediators of Inflammation*, 2010, 1–10. https://doi.org/10.1155/2010/289645
11. Piya, M. K., McTernan, P. G., & Kumar, S. (2012). Adipokine inflammation and insulin resistance: the role of glucose, lipids and endotoxin. *Journal of Endocrinology*, 216 (1), T1–T15. https://doi.org/10.1530/joe-12-0498
12. Bhurosy, T., & Jeewon, R. (2014). Overweight and obesity epidemic in developing countries: A problem with diet, physical activity, or socioeconomic status? *The Scientific World Journal*, 2014, 1–7. https://doi.org/10.1155/2014/964236
13. Jung, U., & Choi, M.-S. (2014). Obesity and its metabolic complications: The role of adipokines and the relationship between obesity, inflammation, insulin resistance, dyslipidemia and nonalcoholic fatty liver disease. *International Journal of Molecular Sciences*, 15 (4), 6184–6223. https://doi.org/10.3390/ijms15046184
14. Fabbrini, E., Sullivan, S., & Klein, S. (2010). Obesity and nonalcoholic fatty liver disease: Biochemical, metabolic, and clinical implications. *Hepatology*, 51 (2), 679–689. https://doi.org/10.1002/hep.23280
15. Hasani-Ranjbar, S., Nayebi, N., Larijani, B., & Abdollahi, M. (2009). A systematic review of the efficacy and safety of herbal medicines used in the treatment of obesity. *World Journal of Gastroenterology*, 15 (25), 3073. https://doi.org/10.3748/wjg.15.3073
16. Tucker, A. O., & Chambers, H. L. (2002). *Mentha canadensis* L. (Lamiaceae): a relict amphidiploid from the Lower Tertiary. *Taxon*, 51 (4), 703–718. https://doi.org/10.2307/3647334
17. El Menyiy, N., Mrabti, H. N., El Omari, N., Bakili, A. E., Bakrim, S., Mekkaoui, M., Balahbib, A., Amiri-Ardekani, E., Ullah, R., Alqahtani, A. S., Shahat, A. A., & Bouyahya, A. (2022). Medicinal uses, phytochemistry, pharmacology, and toxicology of mentha spicata. *Evidence-Based Complementary and Alternative Medicine*, 2022, 1–32. https://doi.org/10.1155/2022/7990508
18. Mahendran, G., Verma, S. K., & Rahman, L.-U. (2021). The traditional uses, phytochemistry and pharmacology of spearmint (*Mentha spicata* L.): A review. *Journal of Ethnopharmacology*, 278, 114266. https://doi.org/10.1016/j.jep.2021.114266
19. Jamous, R. M., Abu-Zaitoun, S. Y., Akkawi, R. J., & Ali-Shtayeh, M. S. (2018). Antiobesity and antioxidant potentials of selected palestinian medicinal plants. *Evidence-Based Complementary and Alternative Medicine*, 2018 (1). https://doi.org/10.1155/2018/8426752
20. Han, Y., Choi, J.-Y., & Kwon, E.-Y. (2023). *Mentha canadensis* attenuates adiposity and hepatic steatosis in high-fat diet-induced obese mice. *Nutrition Research and Practice*, 17 (5), 870. https://doi.org/10.4162/nrp.2023.17.5.870
21. Hasani-Ranjbar, S., Nayebi, N., Larijani, B., & Abdollahi, M. (2009). A systematic review of the efficacy and safety of herbal medicines used in the treatment of obesity. *World Journal of Gastroenterology*, 15 (25), 3073. https://doi.org/10.3748/wjg.15.3073
22. Mesbahzadeh, B., Akbari, M., Kor, N. M., & Zadeh, J. B. (2015). The effects of different levels of peppermint alcoholic extract on body-weight gain and blood biochemical parameters of adult male Wistar rats. *Electronic Physician*, 7 (6), 1376–1380. https://doi.org/10.14661/1376
23. Marjani, A., Rahmati, R., Mansourian, A., & Veghary, G. (2012). Effect of peppermint oil on serum lipid peroxidation and hepatic enzymes after immobility stress in mice. *The Open Biochemistry Journal*, 6 (1), 51–55. https://doi.org/10.2174/1874091x01206010051
24. Akbari, M., & Torki, M. (2013). Effects of dietary chromium picolinate and peppermint essential oil on growth performance and blood biochemical parameters of broiler chicks reared under heat stress conditions. *International Journal of Biometeorology*, 58 (6), 1383–1391. https://doi.org/10.1007/s00484-013-0740-1
25. Barbalho, S. M., Spada, A. P. M., Oliveira, E. P. de, Paiva-Filho, M. E., Martuchi, K. A., Leite, N. C., Deus, R. M., Sasaki, V., Braganti, L. S., & Oshiiwa, M. (2009). Mentha piperita effects on wistar rats plasma lipids. *Brazilian Archives of Biology and Technology*, 52 (5), 1137–1143. https://doi.org/10.1590/s1516-89132009000500011

ORCID

R. S. Al-Kulabi https://orcid.org/0009-0009-8372-6715
W. F. Obead https://orcid.org/0000-0001-6934-3667