

## EFFECTS OF *NIGELLA SATIVA* SEED POWDER ON ANTHROPOMETRICAL PARAMETERS AND APPETITE

Nousseiba ABED<sup>1\*</sup>, Belkis BOUKEBBOUS<sup>2</sup>, Meriem FELOUAT<sup>2</sup>,  
Abdelkader ROUABAH<sup>1</sup> and Leila ROUABAH<sup>1</sup>

<sup>1</sup>Laboratory of Cellular and Molecular Biology,  
Faculty of Nature and Life Sciences, University of Brothers Mentouri,  
Constantine, Algeria.

<sup>2</sup>Department of Biochemistry and Biological Cellular and Molecular,  
Faculty of Nature and Life Sciences, University of Brothers Mentouri,  
Constantine, Algeria.

### ABSTRACT

This study aims to investigate the appetizer activity of *Nigella sativa* seeds. To investigate appetizer effect of oral administration of *Nigella sativa* seeds, 36 adult healthy volunteers of either sex, of age 28, 44 ± 10, 53 years and mean BMI 24, 242 ± 3,107 kg/m<sup>2</sup>, were divided into four groups. The subjects were administered orally respectively at 1 Tablet based on Fenugreek (600 mg), 1g, 2g and 3g of *Nigella sativa* seeds powder. Anthropometric indices were evaluated at baseline and at the end of the trial. After 20 min of treatments, the subjective appetite of study participants using a visual analog scale. The results show that oral administration of powder of *Nigella sativa* seeds significantly increased subjective appetite and weight gain. These results may explain the rational uses of this seeds as appetizer agent in the traditional medicine.

**Keywords:** *Nigella Sativa*, anthropometrical parameters, appetite, anorexia.

### INTRODUCTION

*Nigella Sativa* Linn belongs to family Ranulaceae. The herb is widely known in different parts of the world and its seeds are used as condiment<sup>1</sup>. *Nigella sativa* is one the most revered medicinal seeds in history. In Arabic it is called as Habba sawada. The best seeds come from Egypt where they grow under almost perfect conditions. Black cumin seeds were found in the tomb of Tutankhamun. It is narrated by Abu hurairah, the Prophet MOHAMMAD (Peace be Upon Him) said: "Use this Black seed; it has a cure for every disease except death"(Sahih Bukhari)<sup>2</sup>. The ripe seeds of *N. sativa* are known to have a wide range of medicinal uses<sup>3, 4</sup>. In addition, this seeds is used in traditional medicine to treat loss of appetite<sup>5</sup>.

Anorexia is defined as involuntary loss of appetite that is associated with decreased oral intake<sup>6</sup>. It is common in patients of advanced age and can lead to drastic weight loss. Anorexia and weight loss also complicate diseases such as cancer, AIDS, and cardiac

failure, regardless of age. Consequences of weight loss associated with anorexia can be devastating in all age groups and constitute a special problem in older adults<sup>7, 8</sup>. Anorexia is today perceived by health professionals as a highly dangerous condition, by social scientists and feminists as a reaction to Western cultural preoccupations or to patriarchy, but by some of those in its embrace as a source of security and predictability<sup>9</sup>.

Early detection and treatment of anorexia may prevent weight loss, improve health outcomes, and reduce mortality<sup>10</sup>. Hence, the present study was under taken to evaluate the appetizer effect in healthy human subjected to its traditional claims.

### PROCEDURE AND METHODS

The study was conducted on 42 adult, healthy of normal weight, volunteers of either sex. They were divided into five groups. The first was served as control. The second was administered with *Trigonella foenum-graecum* (Fenugreek) at 3g which increases the

appetite for food<sup>18,19</sup>. The *Nigella sativa* seeds powder was administered orally at 1g, 2g and 3g to third fourth and fifth group respectively. At baseline and at the end of the trial, anthropometric indices and appetite were evaluated. 20 min after the above treatments the spontaneous food consumption and the subjective appetite of study participants were evaluated. They were assessed using a visual analog scale (VAS)<sup>20</sup>. Which is a very sensitive and reliable tool designed to determine subjective appetite<sup>21</sup>. Appetite was assessed subjectively on a ten-point scale. Mean appetite scores were calculated for each treatment. The intervention continued for 21 days.

### Statistical Analysis

SPSS ver20 (SPSS, Chicago, IL, USA) was used for the statistical analyses. Descriptive data are presented as frequencies, mean values and standard deviations. t-test and analysis of variance were used to identify the difference between the groups. A *p* value of 0.05 was considered significant.

### RESULTS

The sample consists of 90,5 % women. The mean age of the subjects was  $22,04 \pm 3,17$  years with a body mass index of  $20,45 \pm 2,34$  kg/m<sup>2</sup>. 52,62% of women their waist-to-hip ratio (WHR) above 0,80, and 100% of the men their ratio was less than one.

The results show that oral administration of powder of *Nigella sativa* seeds, at all doses, significantly ( $p < 0,001$ ) increases slightly the average BMI value (Table. 1). Furthermore, at the dose of 3g of *Nigella sativa* and 3g of Fenugreek the treatment increase the WHR. This result was no significant (Table. 2). Mean appetite scores were significantly ( $p < 0,001$ ) increased comparing with control. At all doses *Nigella sativa* seeds effect was lower than which of fenugreek seeds (Table. 3). Mean frequency of improvement of appetite recorded at all doses of *Nigella sativa* were higher compared with control group. *Nigella sativa* was significantly better than control ( $p < 0,001$ ) in improving appetite. The dose of 2g seems to have the most important effect but remains lower than that of fenugreek. These results are statistically insignificant (Table. 4).

**Table 1: The average BMI value for each treatment**

	Control	1g N.S	2g N.S	3g N.S	3g Fenugreek
Baseline	19,56±3,08	22,07± 2,11	21,51± 1,32	20,15± 1,96	19,22± 2,01
After treatment	20,22±2,83	22,31± 2,18	21,91± 1,47	20,59± 1,96	19,99± 2,31
p-value <sup>a</sup>	0,000***	0,000***	0,000***	0,000***	0,000***

<sup>a</sup>: Friedman test: \*\*\*  $p < 0,001$  vs control.

**Table 2: Mean WHR for each treatment**

	Témoïn	1g N.S	2g N.S	3g N.S	3g Fenugreek
Baseline	0,81± 0,12	0,82± 0,06	0,76± 0,11	0,81± 0,05	0,75± 0,07
After treatment	0,82± 0,13	0,82± 0,06	0,76± 0,11	0,82± 0,04	0,77± 0,05
p-value <sup>a</sup>	0,267 NS	0,267 NS	0,267 NS	0,267 NS	0,201 NS

<sup>a</sup>: Friedman test: \*\*\*  $p < 0,001$  vs control.

**Table 3: Mean appetite scores for each treatment**

	Control	1g N.S	2g N.S	3g N.S	3g Fenugreek
Baseline	4,50±1,92	4,87±1,94	3,93±1,23	3,87±1,35	3,63±1,71
After treatment	4,50±1,92	6,18±1,75	5,72±2,27	5,65±1,49	7,60±1,62
p-value <sup>a</sup>	0,000***	0,000***	0,000***	0,000***	0,000***

<sup>a</sup>: Friedman test: \*\*\*  $p < 0,001$  vs control.

**Table 4: Mean frequency of improvement of appetite scores for each treatment**

	Control	1g N.S	2g N.S	3g N.S	3g Fenugreek	p-value <sup>a</sup>
Mean appetite scores	10,00±0,00	13,75±10,60	18,75±3,53	17,50±4,62	20,00±0,00	0,002**

<sup>a</sup>: Anova test: \*\*  $p < 0,01$  vs control.

## DISCUSSION

Anorexia has been variously theorized by medical, social science and feminist scholarship. While the biomedical model evaluates anorexia as a disease with an underlying organic cause to be treated and cured<sup>11</sup>, other models have emerged that have concluded that the condition has psychological, social or cultural roots. Psychological models locate anorexia as a problem in identity development or familial relations and cultural models in which a societal bias towards slimness leads to extreme eating behavior<sup>12-15</sup>. Feminist-cultural models conceive anorexia either as an inscription by culture of the gendered body, or as a resistance by women to these sociocultural forces<sup>16-20</sup>.

Anorexia is a fairly common symptom in many diseases. It is a common complaint of patients with cancer at all stages of their disease<sup>22, 23</sup>. Age-related homeostatic compromise increases the likelihood of subsequent weight loss and death in older anorectic patients. Anorexia-related weight loss can have devastating consequences on quality-of-life, morbidity, and mortality<sup>10</sup>. It is today perceived by health professionals as a highly dangerous condition, by social scientists and feminists as a reaction to Western cultural preoccupations or to patriarchy, but by some of those in its embrace as a source of security and predictability<sup>9</sup>. Anorexia is notoriously difficult to treat and has the highest mortality rate of all the psychiatric illnesses<sup>20</sup>.

Appetite stimulants, along with provision of adequate calories, may aid in overcoming nutritional deficits, allowing a better prognosis<sup>21</sup>.

The seeds of *Nigella sativa* L. have been used in traditional medicine by many Asian, Middle Eastern and Far Eastern Countries to treat headache, coughs, abdominal pain, asthma, rheumatism and other diseases<sup>5</sup>. These seeds have been widely used as antidiarrheal, digestive and appetite stimulant. They are used in indigestion, dyspepsia and sour belching<sup>24, 25, 5</sup>.

We previously studied the effects of *Nigella sativa* immediately on appetite with good results compared to Fenugreek<sup>26</sup>. In this study, we sought to determine the effects of *Nigella sativa* in a short-term (3 week) on anthropometrical parameters and appetite. We examined the effect of *Nigella sativa* seeds per oral in healthy volunteers of normal weight. After administration of *Nigella sativa* seeds significantly ( $p < 0,001$ ) increases of the motivation to eat and subjective appetite was noted, consequently it increase food intake. As

well as the effect on weight gain. The average BMI value increased significantly ( $p < 0,001$ ). However, other study conducted on petroleum ether extract of *Nigella sativa* seeds in the normal rat show that a 4-week intragastric gavage with the extract caused a 25% reduction in food intake that translated into a transient weight loss. This study suggests that the petroleum ether extract of *Nigella sativa* has a slight anorexic effect<sup>27</sup>.

On the other hand, *Nigella sativa* seeds are very rich and diverse in chemical composition. They contain amino acids, proteins, carbohydrates, fixed and volatile oils<sup>28</sup>. Tee et al.<sup>29</sup> reported the following proximate nutrient composition of *Nigella sativa* seeds per 100 g edible portion was reported as: water 13 g, energy 349 kcal, protein 12.7 g, fat 14.8 g, carbohydrate 41.3 g, fibre 12.5 g, ash 5.7 g, Ca 664 mg, P 704 mg, Fe 29.9 mg, Na 21 mg, K 929 mg vitamin B1 0.63 mg, vitamin B2 0.20 mg and niacin 5.9 mg. The results of protein quality evaluation and those of the nutrient composition suggested black cumin to be of relatively good nutritional value (30). The nutritional value of *Nigella sativa* seeds especially its richness in vitamin and minerals therefore gives this seeds the qualification of being used as a complementary treatment in anorexia. Our results suggest the appetizing effect of *Nigella sativa*, which can be the effects of vitamin B1, besides vitamin B1 is qualified as antiasthenic, anti-neurotic and aperitif<sup>31</sup>.

In the present study, the effects of *Nigella sativa* seeds were compared with which of fenugreek. This plant (*Trigonella foenum-graecum* L.) is an erect annual herb of the leguminous family<sup>32</sup>. It increases the appetite for food<sup>33</sup>. Fenugreek seeds are traditionally assumed to have restorative properties. It was shown that the treatment with steroid saponins, extracted and purified from the seeds of fenugreek, significantly increased food consumption and induced hypocholesterolemia in normal rats<sup>34</sup>. Many saponins were determined from *Nigella sativa* seeds<sup>35-41</sup>. These data suggest that the content of black seed in saponins may be responsible for its appetizer effect.

Furthermore, *Nigella sativa* seeds have odor slightly aromatic and taste bitter<sup>42</sup>. Bitter substances form a very diverse group of components whose common point is the bitterness of their taste. This bitterness stimulates the secretions of the salivary glands and digestive organs. These secretions increase appetite and improve digestion<sup>43</sup>.

The present study provided a support for the traditional use of *Nigella sativa* seeds as an

appetite stimulant. Further studies will be necessary to isolate, fractionate and purify the extracts and characterize the active principles which are responsible for the appetizer effect and to understand exact its mechanisms of actions.

### CONCLUSIONS

As in the present study beneficial increase in the average BMI value as well as Mean appetite scores is seen. These results suggest that the administration of *Nigella sativa* seeds enhances motivation to eat and appetite in healthy human. *Nigella sativa* appears to be an effective appetite stimulant. These results support the traditional use of *Nigella sativa* seeds as appetizer. *Nigella sativa* seeds can be accepted as one of the herbal preparation for treating anorexia. Further study is needed for exploring the mechanism of its appetizer effect.

### REFERENCES

- Sibghatullah Sangi, Shahida P. Ahmed, Muhammad Aslam Channa, Muhammad, et Ashfaq, Shah Murad Mastoi. "A new and novel treatment of opioid dependence: nigella sativa 500 mg". *J Ayub Med Coll Abbottabad*. 2008; n<sup>o</sup> 20 (2).
- Hajra Naz. Nigella sativa: the miraculous herb. *Pak. J. Biochem. Mol. Biol.* 2011; 44(1): 44-48.
- Chopra RN, Chopra IC, Handa KL and Kapur LD. *Indigenous Drugs of India*, Academic Publishers; Calcutta, India. 1982
- Kirtikar KR and Basu BD. *Indian Medicinal Plants, Vol. I*, editors Bishen Singh and Mahendra Pal Singh, Dehra Dun, India. 1982
- Gilani, A. H., Q. Jabeen and M. A. U. Khan. "A Review of Medicinal Uses and Pharmacological Activities of *Nigella sativa*". *Pakistan J. Biol. Sci.* 2004; 7:441-451.
- Adams I.A, Shepard N, Caruso RA, Norling MJ, Belansky H, Cunningham RS. Putting. "Evidence into practice: evidence-based interventions to prevent and manage anorexia". *Clin J Oncol Nuts*. 2009; 13 (1): 95-102.
- Roubenoff R, Roubenoff RA, Ward LM, Holland SM, Hellmann DB. "Rheumatoid cachexia: depletion of lean body mass in rheumatoid arthritis. Possible association with tumor necrosis factor". *J Rheumatol*. 1992; 19:1505-10.
- Martignoni ME, Kunze P, Friess H. "Cancer cachexia". *Mol Cancer*. 2003; 2:36-8 (editorial).
- Shelley, R. 1997. *Anorexics on Anorexia*. London: Jessica Kingsley Publishers.
- Margaret-Mary G Wilson, David R Thomas, Laurence Z Rubenstein, John T Chibnall, Stephanie Anderson, Amy Baxi, Marilyn R Diebold, and John E Morley. "Appetite assessment: simple appetite questionnaire predicts weight loss in community-dwelling adults and nursing home residents". *Am J Clin Nutr*. 2005; 82:1074-81.
- Urwin, R.E., Bennetts, B., Wilcken, B. et al. 2002. Anorexia nervosa (restrictive subtype) is associated with a polymorphism in the novel norepinephrine transporter gene promoter polymorphic region, *Molecular Psychiatry*, 7, 6, 652-7.
- Berg, K.M., Hurley, D.J., McSherry, J.A. and Strange, N.E. 2002. *Eating Disorders: a Patient-Centered Approach*. Abingdon: Radcliffe Medical Press.
- Bruch, H. 1973. *Eating Disorders: Obesity, Anorexia and the Person Within*. New York: Basic Books.
- Gordon, R.A. 2000. *Eating Disorders: Anatomy of a Social Epidemic*. Oxford: Blackwell.
- Grogan, S. 1999. *Body Image*. London: Routledge.
- Bordo, S. 1993. *Unbearable Weight: Feminism, Western Culture and the Body*. Berkeley, CA: University of California Press.
- Orbach, S. 1993. *Hunger Strike: the Anorectic's Struggle as a Metaphor of our Age*. London: Penguin.
- Malson, H. 1998. *The Thin Woman: Feminism, Post-structuralism and the Social Psychology of Anorexia Nervosa*. London: Routledge
- MacSween, M. 1993. *Anorectic Bodies: a Feminist and Sociological Perspective on Anorexia Nervosa*. London: Routledge.
- Gremillion, H. 2003. *Feeding Anorexia: Gender and Power at the Treatment Centre*. Durham, NC: Duke University Press.
- Douglas N. Homnick MD. et al. Cyproheptadine is an effective appetite stimulant in cystic fibrosis. *Pediatric pulmonary*. Volume 38, Issue 2, 2004, Pages 129-134

22. DeWys W. Anorexia as a general effect of cancer. *Cancer* 1979; 43:2013-9.
23. Woodbine G. The care of patients dying from cancer. *Y R Coll Gen Pract* 1982; 32:685-9.
24. Gilani, A. H., N. Aziz, I. M. K hurrām, K. S. Chaudhary and A. Iqbal. "Bronchodilator, spasmolytic and calcium antagonist activities of *Nigella sativa* seeds (Kalonji): a traditional herbal product with multiple medicinal uses". *J. Pak. Med. Assoc.* 2001; 51:115-120.
25. Enomoto S, Asano R, Iwahori Y, Narui T, Okada Y, Singab AN, Okuyama T. "Hematological studies on black cumin oil from the seeds of *Nigella sativa* L". *Biol Pharm Bull.* 2001; 24:307-10.
26. Nousseiba Abed, Asma Benninib, Hadjer Merdacib, Abdelkader Rouabah, Leila Rouabah. Evaluation of anti-diarrhoeal and appetizer effects of *Nigella sativa* seeds. *World Journal of Pharmaceutical Research World Journal of Pharmaceutical Research* . 2017. Volume 6, Issue 4, 163-172.
27. Phuong MaiLe, AliBenhaddou-Andaloussi, AzizElimadi, AbdellatifSettaf, YahiaCherrah, Pierre S.Haddad. The petroleum ether extract of *Nigella sativa* exerts lipid-lowering and insulin-sensitizing actions in the rat. *Journal of Ethnopharmacology.* Volume 94, Issues 2-3, October 2004, Pages 251-259
28. Khan MA. 1999. Chemical composition and medicinal properties of *Nigella sativa* Linn. *Inflammopharmacology* 7:15-35.
29. Tee ES, Noor MI, Azudin MN, Idris K. 1997. Nutrient composition of Malaysian foods, 4th edn. Institute for Medical Research, Kuala Lumpur, p 299
30. Takruri HRH, Dameh MAF (1998) Study of the nutritional value of black cumin seeds (*Nigella sativa* L). *J Sci Food A* 76:404-410
31. Isabelle Roguet., *et al.*, Vidal le dictionnaire 2015. Editeur Vidal.
32. Abdel Moneim E. Sulieman, Ali O. Ali1 & Julia Hemavathy. "Lipid content and fatty acid composition of fenugreek (*Trigonella foenum-graecum* L.) seeds grown in Sudan". *International Journal of Food Science and Technology.* 2008; 43, 380-382
33. Abuzied, A.N. "Al-hilba (fenugreek)". *Al nabatat wa-alaashab al-tibeeya.* (Edited by Beirut Press). 1986; Pp. 224-233. Beirut: Dar Albihar (in Arabic).
34. Petit PR, Sauvaire YD, Hillaire-Buys DM, Leconte OM, Baissac YG, Ponsin GR, Ribes GR. "Steroid saponins from fenugreek seeds: extraction, purification, and pharmacological investigation on feeding behavior and plasma cholesterol". *Steroids.* 1995; 60(10):674-80.
35. Greenish.H. "Contribution to the Chemistry of *Nigella sativa*". *Pharmac J Trans.* 1880; 10: 909-911.
36. Ansari, A., S. Osman., & R. Subbaram. "Component acids of minor seed oils". *J Oil Technol Assoc India.* 1975; 7, 26-27.
37. Abdel-Aal. E. et R. Attia. "Characterization of Black cumin (*Nigella sativa*) seeds." *Alexandria Sci Exch J.* 1993; 14, 497-482.
38. Kumara. S.S., B.T. Huat. "Extraction, isolation and characterization of antitumor principle, alpha-hederin, from the seeds of *Nigella sativa*". *Planta medica.* 2001; 67: 29-32.
39. Taskin, M.k., Alankus Caliskan, O., Anil, H., Abou-gazar, H., A. Khan, I., Bedir, E. "Triterpene saponins from *Nigella sativa* L". *Turkish Journal of Chemistry.* 2005; 29: 561-569.
40. Elbandy, M., O.H Kang., D.Y. Kwon., J.R. Rho. "Two new anti-inflammatory triterpene saponins from the Egyptian medicinal food black cumin (Seeds of *Nigella sativa*)", *Korean Chem.* 2009; Soc 01; 30.
41. Bhupendra. K. M., M. Prabha., M. Gupta. "A new naturally acetylated triterpene saponin from *Nigella sativa*." *Carbohydrate Research.* 2009; 344: 149-151.
42. Duthie JF. "Flora of the Upper Gangetic Plain and of the Adjacent Siwalik and Sub-Himalaya Tracts", Vol. I, *Botanical Survey of India, Calcutta*, 1960, pp. 19-20.
43. Paul Iserin *et al.* "L'encyclopédie des plantes médicinales. Identification, préparations, soins". Pais : Larousse. 2001. 2ème édition. 336 p.