

Southern Illinois University Carbondale  
**OpenSIUC**

---

Research Papers

Graduate School

---

2016

THE POTENTIAL FOR NIGELLA SATIVA IN  
TREATING IN RISK FACTORS RELATED TO  
THE METABOLIC SYNDROME

Danielle L. Vaughn

*Southern Illinois University Carbondale*, [all4god35@gmail.com](mailto:all4god35@gmail.com)

Follow this and additional works at: [http://opensiuc.lib.siu.edu/gs\\_rp](http://opensiuc.lib.siu.edu/gs_rp)

---

**Recommended Citation**

Vaughn, Danielle L. "THE POTENTIAL FOR NIGELLA SATIVA IN TREATING IN RISK FACTORS RELATED TO THE METABOLIC SYNDROME." (Jan 2016).

This Article is brought to you for free and open access by the Graduate School at OpenSIUC. It has been accepted for inclusion in Research Papers by an authorized administrator of OpenSIUC. For more information, please contact [opensiuc@lib.siu.edu](mailto:opensiuc@lib.siu.edu).

THE POTENTIAL FOR NIGELLA SATIVA IN TREATING IN RISK FACTORS  
RELATED TO THE METABOLIC SYNDROMES

by

Danielle Louise Vaughn  
B.S., Southern Illinois University, 2013

A Research Paper  
Submitted in Partial Fulfillment of the Requirements for the  
Master of Science

Department of Animal Science, Food and Nutrition  
in the Graduate School  
Southern Illinois University Carbondale  
August 2016

RESEARCH PAPER APPROVAL

THE POTENTIAL for NIGELLA SATIVA in TREATING RISK FACTORS  
RELATED TO THE METABOLIC SYNDROMES

by

Danielle L. Vaughn

A Research Paper Submitted in Partial  
Fulfillment of the Requirements  
For the Degree of  
Master in Science  
In the field of Food and Nutrition

Approved by:

William Banz, Chair, PhD, RDN

Jeremy Davis, PhD, RDN

Brenda Green, MS, RDN

Graduate School

Southern Illinois University Carbondale

June 30, 2016

AN ABSTRACT OF THE RESEARCH PAPER OF

DANIELLE L. VAUGHN for the Master of Science degree in FOOD AND NUTRITION, presented on JUNE 30, 2016, At Southern Illinois University Carbondale.

TITLE: THE POTENTIAL FOR NIGELLA SATIVA IN TREATING RISK FACTORS RELATD TO THE METABOLIC SYNDROMES

MAJOR PROFESSOR: William Banz, PhD, RDN.

Diabetes is one of the fastest growing metabolic conditions (disease) that affects millions of individuals all around the world. Past research has been conducted to find a potential cure, and ways to reduce the rate of diabetes diagnosed in the United States. Nigella Sativa/black cumin was used to treat chronic diseases in early medicine before modern medicine was developed. It has been announced to have protecting and preventing properties, and giving adequate treatment to chronic disease to keep the risk of developing more serious medical complications due to diabetes as a low risk. This paper is to review current evidence on the potential Nigella sativa in treating risk factors related to metabolic syndrome.

## ACKNOWLEDGMENTS

I would like to acknowledge God first and foremost for allowing me to see this opportunity of higher education. I would like to thank my husband (Joseph) and my children (Pj, Khilan, Kayla, and Jackie) for pushing me through this endeavor, when I did not think I could get through this. I would like to thank my parents (Jacquelyn and James Weston), pastor (Stephen Robinson), my sister-in-law's (Ericka and Lynette) for their support and my beautiful cousin (Sheree) for praying, advising, and counseling me through some very tough times. Last but not least, I would like to thank my advisors Mrs. Brenda Green, Dr. Jeremy Davis, and Dr. Banz for all of their help and consideration through my entire academic career.

## TABLE OF CONTENTS

<u>CHAPTER</u>	<u>PAGE</u>
ABSTRACT .....	i
ACKNOWLEDGMENTS.....	ii
TABLE.....	iii
CHAPTERS	
CHAPTER 1 – Introduction.....	1
CHAPTER 2 –Literature Review .....	4
CHAPTER 3 – Summary, Conclusion, Recommendation.....	17
REFERENCES.....	20
VITA .....	23

## CHAPTER 1

### INTRODUCTION

Metabolic syndrome has individual and numerous components arrangements on type 2 diabetes mellitus (T2DM), hypertension, and cardiovascular disease.<sup>27</sup> Diabetes is one of fastest growing metabolic conditions (disease) that affects millions of individuals all around the world.<sup>1</sup> Past research has been conducted to find a potential cure, and ways to reduce the rate of Diabetes diagnosed in the United States. In addition, these studies seek to provide methods to improve symptoms and information needed to effectively manage the disease. Diabetes Mellitus is classified as a metabolic syndrome that interferes with the making of insulin in the body. This disease causes the body to have no production of insulin or not enough insulin to help control blood glucose levels in the body.<sup>24</sup> This chronic disease affects the way glucose is processed in the body, and the amount of glucose circulating in the blood. The pancreas is an organ that is responsible for making the hormone called Insulin.<sup>24</sup> Insulin helps to reduce the amount of glucose and aids it to get it into the cells. Diabetes is classified into two categories diabetes type 1 and Diabetes type 2.<sup>8</sup>

Diabetes type 1 is a life threatening auto immune disease and not a metabolic syndrome that affects children and adults. There are no prevention methods or cures for the condition. People who are diagnosed with diabetes type 1 are dependent on insulin. Diabetes type 1 is often more common in childhood, but the condition often affects people well into adulthood. The development of diabetes type 2 is triggered by obesity or hereditary risk factors that contribute to the disease. Dietary habits and

lifestyle choices also play a significant part in managing and controlling the levels of glucose in the blood. The majority of the food that is consumed is broken down into glucose and is converted into energy to fuel the body. This process also helps the central nervous system, brain, and other major systems in the body to perform correctly. Uncontrolled glucose levels that are either too high or too low in the blood stream can have negative effects that can be potentially detrimental to a person's health. It can damage the kidneys, increase thirst, trouble concentrating, changes in vision, frequent urination, fatigue, and weight loss.

Uncontrolled diabetes can also be a precursor for other metabolic disorders that can develop without proper treatment. The lack of intervention can cause serious health problems and complications such as cardiovascular disease, hypertension, and dyslipidemia are some of the metabolic disorders that will be discussed in this paper. However, these conditions are not solely precursors for diabetes; these conditions can also be precursors for other underlying conditions. Controlling and keeping blood glucose levels within normal parameters have a positive effect on reducing the risk of more serious complications. For example, a way of controlling blood glucose is through a healthy diet, exercise, and medication that may be prescribed. The modern treatment of hyperglycemia (high blood sugar) is taking oral medication and insulin injections, traditional treatments is using natural foods such as herbs, spices, and plants. The one spice that was used as an anti-diabetic or to treat diabetes before modern medication was created is *Nigella sativa* black cumin in Arabian countries.<sup>2</sup>

According to Swantson-Flatt et al. before modern medicine came into existence, herbs and spices were used as an anti-diabetic treatment.<sup>25</sup> In previous and current



research, there is a claim that *Nigella sativa* has preventative and protective benefits in metabolic syndrome disorders. With this information, prevention and treatment could possibly reduce the number of individuals that suffer from these diseases. This paper is to review current evidence on the potential *Nigella sativa* in treating risk factors related to metabolic syndrome.

### **Background of *Nigella Sativa***

*Nigella sativa* is known as black cumin or black seed. *Nigella sativa* is utilized as a prevention or treatment methods for multiple diseases.<sup>18</sup> *Nigella* is found in the Middle Eastern and Indian cultures. It is a spice that is grown in sandy soil and a hot climate. This plant only takes 4 months before it is ready to be used. *Nigella sativa* is in the Apiaceae family in East Mediterranean to India and it comes in a whole seed form. *Nigella* is used as a spice and for medical purposes, according to Naz, despite the modern medicine there are new drugs that developed from natural materials.<sup>18</sup> With the assessment of the new drugs that are created from natural materials such as *Nigella sativa* has sparked more research to be conducted and searching for more information to support the claim that *Nigella sativa* has protecting, preventing, and treatment to some of the most devastating diseases that have a high mortality rate.

## CHAPTER 2

### LITERATURE REVIEW

Past and current research suggested that *Nigella sativa* has benefits in treating the risk factors of metabolic syndromes and for being the number one anti-diabetic agent, and has benefits to other health illnesses such as cancers. Current research has been looking into *Nigella sativa* as being beneficial to treating and the use of it as a preventative measure of diabetes to lower blood glucose, as well as other health problems and its complications from diabetes along with modern medicine. The discussion of this paper will see if the benefits are enough to make a difference in using *Nigella sativa* along with insulin or oral medications for better results, and to aid reducing complications of other health-related diseases that are associated with diabetes.

#### **Chemical Composition**

According to Ahmad et al. several active compounds of *Nigella sativa* has been isolated, recognized and stated so far in different assortments of black seeds.<sup>1</sup> The most important active compounds are thymoquinone (30%-48%), thymohydroquinone, dithymoquinone, p-cymene (7%-15%), carvacrol (6%-12%), 4-terpineol (2%-7%), t-anethol (1%-4%), sesquiterpene longifolene (1%-8%)  $\alpha$ -pinene and thymol. Black seeds also contain some other compounds in trace amounts. Seeds contain two different types of alkaloids; *i.e.* isoquinoline alkaloids *e.g.* nigellicimine and nigellicimine-N-oxide, and pyrazol alkaloids or indazole ring bearing alkaloids which include nigellidine and nigellicine.<sup>1</sup> The seeds of *Nigella sativa* has protein (26.7%), fat

(28.5%), carbohydrates (24.9%), crude fiber (8.4%) and total ash (4.8 %). The seeds are also contain good quantity of numerous vitamins and minerals like Cu, P, Zn and Fe etc. In addition, the seed contain carotene which is transformed by the liver to vitamin A. Understanding the biochemical composition gives greater insight to how it influences the toxicity levels of Nigella Sativa.

### **Toxicity**

The Food and Drug Administration (FDA) has a list of plants that are or possibly can be poisonous and can be viewed by other researchers as a scientific exchange. On this FDA list is Nigella Sativa black cumin as being a poisonous plant or plant parts. Nigella sativa according to the information from a list of researchers on the FDA website has a possibility of inducing carcinogenesis prematurely, cause hepatotoxicity and hepatic toxicity in mice, and have some kind of dermatitis allergic reaction from the Nigella sativa seed. There is not enough evidence to support the claim of toxicity of Nigella sativa more scientific evidence is needed.

### **Clinical trials in Diabetic induced rats and Human subjects and Metabolic**

#### **Syndromes**

El-Bahr et al. Biochemical Parameter study investigated the effects of Turmeric and Cumin on certain biochemical parameters of diabetic rats when combined.<sup>11</sup> In this study, twenty one male albino rats (3 months of age) with the weight of 185-200g were placed in three groups for six weeks, and monitored everyday intensively, looking at weight, blood glucose levels, water intake, and food intake. The groups of 7 each were as follows:

Group 1: non diabetic control rats (negative)

Group 2: Diabetic control rats (positive control)

Group 3: Diabetic rats treated with the black seed cumin (1g/kg b.wt. per day) combined with turmeric (0.5g/kg b.wt. per day) in a water solution by mouth for six weeks.

For the feeding of the rats, the food was weighed on a daily basis to decide the food intake daily. The rats were induced with diabetes with the solution of STZ. Group 1 body weight increased by 60g, group 2 untreated diabetic rats lost on average 30g after the six weeks, and group 3 with the turmeric combination with black seed cumin gained 20g body weight which is 33.3% of increased weight in a non-diabetic control. This study revealed the results of water intake in untreated diabetic (group 2) increased 100% which is a significant reaction more than the normal control group.<sup>11</sup> The rats that were treated with the combination of turmeric and cumin 30% was reduced in the diabetic induced rats. The food intake results in this study showed significance outcomes in the untreated diabetic group of an increase of 153% more than (Group 1) the control.<sup>11</sup> Group 3 (treated diabetic with the combination of turmeric and cumin) 39.5% feed intake was reduced in group 3 throughout the whole study. In this research the blood glucose levels results showed no significant differences or outcomes in group 1, but in group 2 glucose levels were above 350mg/dl, and in group 3 with the combination of the turmeric was reduced by 28.6% (250mg/dl).<sup>11</sup> There were some results of some biochemical parameters that had some significant values in this research. There were effects on lipid profile, protein patterns, liver, and kidney functions and electrolytes. The increase of total cholesterol values 31.3% with the induction of STZ and TAG by 9% ( $142 \pm 3.4$ mg/dl) than that of normal non-diabetic rats ( $130 \pm 4.1$ mg/dl). TAG and

Cholesterol with the raise in body weight which is the same results that were founded in previous studies. Also, with the combination of turmeric and cumin group was lower than the control group ( $76 \pm 4.1$ mg/dl).<sup>11</sup> According to El-Bahr et al. the herb plants of turmeric and cumin combination in diabetic rats were beneficial to reducing blood glucose, water and food intake.<sup>11</sup> Blood glucose levels also impact the level of risks associated with developing secondary health concerns such as hypoglycemia, and hepatic gluconeogenesis.

According to Alimohammadi et al. this study examined the mechanisms of hypoglycemic effect of *Nigella Sativa* hydroalcoholic extract, with hepatic gluconeogenesis, and to study the possible effects Streptozotocin (STZ) effects in diabetic rats.<sup>2</sup> The 25 albino rats of females and males with the weight of 160-200g, and averaged the age of 32 days old. *Nigella Sativa* (NS) seeds 20g were grounded into a powder and mixed into 400ml of distilled water, and through steam distillation the abstraction was obtained and continued three times with chloroform until 200ml of distilled was collected. The albino rats were placed in groups of five (n=5 in every group), and diabetes was given to each group except the control group with one injection of Streptozotocin (60mg/kg) with citrate buffer (pH 4.5). The rats were tested after 24 hours to see if they in fact had the glucose levels of 250mg/dL to be classified as having diabetes with a one touch glucometer with blood testing from the tail of the rat. In this study, the rats were grouped from A-E. Group A was given an equal portion of citrate buffer (control); Group B is the non-treated STZ-diabetic (60mg/kg); Group C, D, and E is the treated STZ-diabetic with hydroalcoholic extraction of NS (5, 10, and 20mg/kg).<sup>2</sup> Then evaluations in 32 days were conducted to measure the effects of the

fasting blood glucose and the other groups and the body weight were examined and measured at (1,16, and 32 days). This investigation of body weight changes, and fasting blood glucose were that a group A, B, and C at the 16th day was 201, 182.4, and 192.2. On the 32nd day of this study was 204.4, 168.8, and 185.2 with the groups of (2, 4, and 5) .<sup>2</sup> The results in this study, significant loss of weight in the *Nigella sativa* treated (5mg/kg) related to group B which was lower than the control group, and weight loss was not detected in any of the higher doses of hydroalcoholic *Nigella sativa*.<sup>2</sup> In the STZ-induced had lower fasting blood glucose and by the 32<sup>nd</sup> day of treatment, more reduction had occurred. The Streptozotocin is also considered to be a protective factor of *Nigella Sativa*.

The current study of Kanter et al. examines the protecting effects of *Nigella sativa* against damage of the  $\beta$ -cell from the Streptozotocin induced rats and to investigate if the pancreas was exposed to oxidative stress injury for the period of diabetes.<sup>15</sup> This study uses 30 Wistar albino rats that were at the age of 4 months of age and the weight of 150- 250g. Their house was consisting of the macrolon cage with the conditions of a standardized laboratory. This study had three groups of 10 (A=control, B=diabetic, and C= diabetic with treatment of NS), and all groups was injected with the same amount of isotonic NaCl. The *Nigella sativa* therapy group was given the *Nigella sativa* extract of 0.2ml/kg/day and the treatment went throughout the entire 4 weeks. The results that came to be were some weight loss that took place in the diabetic rats at the end of the experiment, and there was no difference between the control group and the *Nigella sativa* treated group. In conclusion on this study, the *Nigella sativa* treated group experienced a reduction in raised serum glucose and a small increase of the lowered

serum insulin. According to this study the results have reason to support the protective benefits of diabetes of decreasing oxidative stress and maintaining the  $\beta$ -cell pancreatic reliability.<sup>15</sup> Controlling or not controlling blood glucose levels does not only affect how much glucose in the body with the increase risk of injury, but increase the risk of developing high cholesterol and triglycerides levels.

According to Burio & Tayyab Nigella a sativa seed in the diet has a positive effect on lipid profile in the albino rats of lowering the triglyceride, total cholesterol and LDL and raising HDL.<sup>7</sup> The purpose of this of study was to examine if the effects was beneficial of lowering the lipid profile. This study used 84 albino rats that was placed in six different groups, control, groups 1,3, and 5 had a reduced fat diet of 3% of sunflower oil, high fat diet of sunflower 20%, and a high fat diet of 1% colic acid, and 05% propylthiouracil. The groups of experiment 2, 4, and 6 received Nigella sativa seeds with the lipid levels were assessed at 0, 12, and 24 weeks.<sup>7</sup> Burio & Tayyab results were the rats that were given 3% sunflower oil with Nigella sativa had a great decrease in total cholesterol and LDL and an increase in HDL. The high fat diet with the 20% sunflower and Nigella sativa had a large reduction in triglycerides and LDL levels and increased HDL levels. With the last treated high fat diet with the colic acid reported a reduction considerably in total cholesterol and LDL and an increase in HDL.<sup>7</sup> This study reports that more studies are needed to gain factual evidence of Nigella sativa having benefits in humans. Also, high fat and caloric diets can increase the risk of developing obesity and complications.

According to Namazi et al. the current study of the effects of Nigella sativa with a low calorie diet in obese women, which the study was randomized and double blinded

finds there are benefits to *Nigella sativa* in obesity and the complications that could possibly develop from it.<sup>17</sup> Researchers are in fact asking for more studies to be implemented to see if the results are the same. Previous studies suggest that *Nigella sativa* has effects of antioxidative that can change the metabolism through many pathway signals. This study was based repeated after the study done by Datau et al., and in conclusion the findings that were presented that NS oil with the calorie restricted diet actually decrease weight and raised the serum level of SOD of RBC's in the obese participants.<sup>9</sup> Even with these results, researchers are suggesting more studies to be completed to gain more factual knowledge and scientific evidence. However, decreasing bodyweight lowers the risk for obesity and helps to reduce the risk of elevated blood glucose and improves insulin regulations and promotes better glycemic control.

*Nigella Sativa* has been used as treatment for diabetes.<sup>8</sup> Also, in rodents it has been proven to lower glucose levels and to be an antidiabetic alternative.<sup>26</sup> *Nigella sativa* can be just as efficient as metformin for giving a better tolerance of glucose. According to a previous study done by Alsaif et al. this study investigated *Nigella sativa* oil and the effects on glucose acceptance and insulin insensitivity with the induction of a high fat diet.<sup>3</sup> So, in type 2 diabetes patients, there is an reduction in glucose sensitivity. This study was trying to prove that *Nigella sativa* oil diet theory has protectant properties in diabetic patients with type 2 diabetes after a trauma. When there is trauma involved there is an increase with hyperglycemia that is linked to insulin resistance after a surgical procedure. The conclusion of this particular study



proved to be beneficial to patients after surgery to be a protector against the adverse effects in diabetes individuals.

In the current study Bamosa the purpose of this study was to investigate the three different doses of *Nigella sativa* and glycemic control in patients with type 2 diabetes.<sup>5</sup> This study had 94 patients ( 43 males and 51 females) with diabetes that wasn't controlled . The diagnosis of the diabetic patients were measured by the standards of the American Diabetes Association.<sup>5</sup> All patients had more than 7% in their HbA1c, treated with only oral medications, and had to be non-complaint.

This was a 12 week study that was conducted with three groups unsystematically with three different doses ( 1gm, 2gm, and 3gm per day for the 12 weeks) of *nigella satvia* by mouth. The patients were also asked to do self- monitored blood glucose checks and fasting blood glucose for baseline blood samples before the therapy of the doses of *nigella sativa* was commenced. The results are as follows, the first dose of 1gm of *Nigella sativa* had a modest reduction in the fasting blood glucose after 4 four weeks and the decrease was not enough to make a difference according to the baseline readings. Group 2 that was given 2gm per day had a great decrease in the fasting blood glucose during the course of the 12 weeks that was 45, 62, and 56mg/dl by 4, 8, and 12 weeks. In group 3 there was an even greater reduction in the fasting blood glucose levels and the HbA1c was reduced significantly by 2% according to Bamosa (2010). Also, in the conclusion of this study the significant increase in the Beta cell function which is to store and then release insulin when there is a sudden spike in glucose levels. In the conclusion of this study, *Nigella sativa* having a hypoglycemic effect beneficial to type 2 diabetes that showed efficient change in fasting blood

glucose with the dose with the most promising effects of 2gm everyday of *Nigella sativa* in powder form.<sup>5</sup>

In the current study of Kaatabi et al. the purpose of this research is to evaluate the effectiveness of *Nigella sativa* related to the glycemic control and oxidant antioxidant in type 2 diabetic patients that is being treated with oral medications.<sup>14</sup> In this research, the patients had to acquire two labs of HbA1c of greater than 7%, be between the age of 18-60, and utilizing the oral medications for treatment of diabetes. The drug that was used during the experiment was *Nigella sativa* powder in a capsule of 500mg with the dose of 2g per day. This study used 114 type 2 diabetic patients with 63 males and 51 females that were placed unsystematically into groups for a continuous year. Both groups contained 57 individuals in each group with the control group having 30 males and the NS had 33 males in it. The participants in the control received placebo along with the oral medication of metformin. The participants in the NS group was treated with NS and oral medication.<sup>14</sup> The control group had a substantial increase in HbA1c and insulin resistance at the 24 and 36 weeks and the C-peptide had more of an increase at 36 weeks matched to the baseline. The results for the NS group was significantly reduced in FBG, HbA1c, and in insulin resistance, and  $\beta$ -cell action was increased compared to baseline readings.<sup>14</sup> The conclusion that was presented in this study is that previous studies prove to have a beneficial outcome on glucose homeostasis in a year time and that NS benefits of increasing glycemic control and ameliorates stress with patients that are diagnosed as type 2 diabetes. *Nigella Sativa* may have beneficial results on glucose control however; it is a possibility of hypertension benefitting from *Nigella Sativa* of lowering blood pressure.

As mentioned in Dehkordi & Kamkhah, this research supports the benefits of *Nigella sativa* and its claim of having an antihypertension effect.<sup>10</sup> The investigation of patients with minor hypertension benefitted from using the *Nigella* seed extract for 8 weeks and it lowered the blood pressure of patients that had hypertension on the slight side. This study examined with a double-blind, randomized, and a placebo-controlled treatment of an oral supplement of the seed extract of *Nigella sativa*. There was a placebo group and two test groups that took 100 and 200mg two times a day of *Nigella sativa*. Dehkordi & Kamkhah stated that after the 8th week of the trial there were considerably results of the systolic blood pressure values in the two treated groups against the baseline values, and LDL and total cholesterol was also reduced.<sup>10</sup> In their conclusion, *Nigella sativa* proved to have an antihypertension effect in individuals with mild-cases of hypertension.

The research of blood pressure lowering effects of *Nigella sativa* oil reviewed by Huseini et al. examine the blood pressure in healthy individuals. This study was performed double-blinded, randomized, and placebo controlled clinical trial.<sup>13</sup> The purpose was to look at healthy individuals between the ages of 34 to 63 years with a blood pressure 110 to 140mmHg (systolic) and 60 to 90mmHg Diastolic and the assigned group was given 2.5mL of the *Nigella sativa* oil or placebo twice a day for 2 months. The were beginning and end levels of BMI, blood pressure, blood levels of BUN, creatinine, alkaline phosphate, asparate transaminase, alanine transaminase. According to this research the results were that the individuals blood pressure were considerably lower against the baseline levels, with no opposing effects. In conclusion of this study it was founded that the oral dose *Nigella sativa* oil of 5mL for 8 weeks

lowered the blood pressure in healthy individuals. Present studies agrees with previous studies with *Nigella sativa* oil reducing arterial pressure that indicates there maybe some increase risk for cardiovascular and dyslipidemia however, *Nigella Sativa* in current research show a protecting and preventing properties to reduce the risk of complications.

The Cardiovascular system and the effect of *Nigella sativa* being a protectant against it has shown yet to be proven through previous studies that have been investigated according to the research review that Shabana et al.<sup>21</sup> There were studies done previously that showed some potential with the effects of *Nigella sativa* with lipid profile, which is an indicator for developing cardiovascular disease. Also, in other previous research showed that *Nigella sativa* oil with oral medication that is used to treat cholesterol prove to reduce cholesterol serum along with triglycerides (TAG), this was in rats only. According to Shabana et al., there are some benefit of *Nigella sativa* seed and oil that provide some protection to the cardiovascular system.

According to Bamosa et al. the investigation that was performed on type 2 patients with the HbA1c greater than 7%, and with 2 groups of thirty subjects.<sup>6</sup> One group was the control group and received charocal placebo and the second was the placebo that was given 2g of *nigella sativa* powder. This research study did an echocardiogram on the participants for a baseline and for progress evidence through the examination and was performed before, at 6, and 12 months. The results that were found in this study was not significant and didn't have any effects in the entire year the experiment was taking place. According to Bamosa et al. the authors of this research indicates that maybe the newly diagnosed diabetic patients had a significant enhancement of cardiac

utility and showed some promising results in type 2 diabetics after the year treatment of protecting the cardio-system.<sup>6</sup>

Dyslipidemia is connected with type 2 diabetes which has an impact on cardiovascular health. According to Kaatabi et al. in this investigation and purpose of this study has probable protective benefits in cardiovascular problems with atherosclerosis.<sup>4</sup> This study was conducted with 94 type 2 diabetic patients that were split into 3 group of different doses 1g, 2g, and 3g of capsule containing of *Nigella sativa* for 12weeks. The investigation of the effect of *Nigella sativa* and the lipid profile was the target for this study. The findings reported in this study was the 2g/day revealed a substantial reduction in Triglycerides, total cholesterol, LDL, and HDL in group 2 and a great substantial increase of LDL/HDL were of no significance in the other two groups.

The reports of Shah et al. of *Nigella sativa* being responsible for defending against metabolic syndrome was found to be useful in patients with dyslipidemia and hyperglycemia.<sup>23</sup> The standard drugs were used such as statins and hyperglycemia medications, drugs for lowering cholesterol and controlling blood glucose. This study was explored because of current case diagnoses of metabolic disorder with a total of 159 subjects (patients) that were in the study, 113 were males and 46 females. This looked at some clinical and biochemical parameters such as BMI, circumference of abdomen and hip, body weight, waist hip ratio, blood pressure, blood sugar, total cholesterol, triglycerides, and HDL/LDL. The current research expands on the traditional uses, efficiencies, and strength of *Nigella sativa* as reported in this study. The conclusion reported by Shah et al. was reached while examining the effects of

Nigella sativa as a protector against metabolic syndrome had beneficial effects of the parameters all five with emphasis on blood sugar, LDL, and HDL.<sup>23</sup> There was a positive benefit in metabolic disorders in patients of progresses in blood sugar, blood pressure, HDL and LDL.<sup>23</sup>

## CHAPTER 3

### SUMMARY AND CONCLUSION

In summary, diabetes is rapidly increasing in the number of individuals it is affecting around the world. So many efforts in providing preventative care, finding a cure and giving adequate treatment to this chronic disease to keep the risk of developing more serious medical complications due to diabetes. Diabetes can lead to other metabolic syndrome disorders that can lead to fatality such as Cardiovascular disease, Dyslipidemia, Cancer, and Obesity just to list a few. Modern medicine, before it came into the picture was being used as an anti-diabetic treatment medication to help lower blood glucose levels.

Nigella Sativa black cumin a natural herbal plant that comes from the Mediterranean was used as a spice and to treat various diseases and a few minor illnesses. Nigella Sativa was the one treatment that had an impact on treating diabetes and other chronic diseases in the earlier medical treatment practices without the modern medicine treatments of Insulin and/or oral medications. Individuals who still practice holistic medicine are still pushing Nigella sativa as an anti-diabetic herbal medicine to be a treatment of diabetes. Nigella sativa carries the name anti-diabetic because of some evidence that has been brought out through research over the years.

Research has been conducted to prove that Nigella sativa has protecting and preventing properties against metabolic diseases. Research that was performed on diabetic rats on lowering blood glucose against streptozotocin induced rats that had effects on lowering FBG and weight loss with lower doses of hydroalcoholic Nigella

sativa but, in the higher doses of hydroalcoholic *Nigella sativa* was none existent changes in fasting blood glucose or weight loss. The rats treated with *Nigella sativa* was more receptive to the treatment than the non treated. The results of the treated group had a significant outcome in weight loss than any of the other groups after 32 days of the experiment. Furthermore, other research that was discussed with rat subjects had results that were significant in lowering lipids, blood glucose levels, and showing potential protecting values.

In human subjects, with Cardiovascular, Diabetes, Dyslipidemia, and Obesity all had some protecting and preventing assets with *Nigella sativa*. Obesity combined with *Nigella Sativa* and a low caloric diet had promising results in the decreasing body weight. Obesity increase the risk of diabetes, cardiovascular disease, hypertension and having high lipid levels. In the studies that were mentioned, reducing body weight with *Nigella Sativa* had significant outcomes in lowering blood glucose levels, helping insulin regulations, and aiding in glycemic control.

There were significant results in lowering Blood glucose, Total Cholesterol, Triglycerides, HDL and LDL, and being an anti-hypertension protectant. In the article of Bamosa, a study was performed with type 2 diabetic patients with a HbA1c of 7% or greater that had 2 groups of 30 participants. The researchers tracked progress evidence through examinations before for a baseline, at 6 months, and at 12 months. The results were not significant throughout the whole year, but stated that possibly newly diagnosed diabetic patients had significant enhancement of cardiac utility and showed some promising results in type 2 diabetics after the year treatment of protecting the cardio-system.



Research has yet to prove that *Nigella Sativa* has protectant properties against cardiovascular system. There were previous studies done showed some potential effects with *Nigella Sativa* and the lipid profile and with medication reduced cholesterol serum and triglycerides in rats not proven in humans. It shows there are some protectant properties using *Nigella Sativa*. Current article reviews has been established that potential protection of the cardiovascular system, but not enough evidence to support that it prevents cardiovascular disease.

In conclusion, with all the research and reviews that have been done there is still a gap in research and lacking pertinent information to prove or have concrete evidence of *Nigella sativa* claims of having protecting and preventing beneficial properties. The possibilities of being anti-hypertension, anti-diabetic, and lowering and reduce other metabolic syndrome still needs more research reviews and experiments conducted to prove or disapprove the findings. Research suggest that *Nigella sativa* could be use a therapeutic treatments for certain diseases, but however it is still not convincing enough to start implementing such treatments in place of the modern treatments used today.

## REFERENCES

1. Ahmad A, Husain A, Mujeeb M, Khan SA, Najmi AK, Siddique NA, Damanhour Z, Anwar F. A review on therapeutic potential of *Nigella sativa*: A Miracle herb. *Asian Pacific of Tropical Biomedicine*. 2013;3:337-52.
2. Alimohammadi S, Hobbenaghi R, Javanbakht J, Kheradmand D, Mortezaee R, Tavakoli M, Khadivar F, et al. Protective and antidiabetic effects of extract from *Nigella sativa* on blood glucose concentrations against streptozocin(STZ)-induced diabetic in rats: an experimental study with histopathological evaluation. *Alimohammadi et al. Diagnostic Pathology*. 2013;8:137.
3. Alsaif M. Effect of *N. sativa* Oil on impaired glucose tolerance and insulin insensitivity induced by high-fat-diet and turpentine-induced trauma. *Pakistan Journal of Biological Sciences*. 2008;11(8):1093-1099.
4. Arafa E-SA, Zhu Q, Shah ZI, Wani G, Barakat BM, Racoma I, El-Mahdy MA, Wani AA. Thymoquinone up-regulates PTEN expression and induces apoptosis in doxorubicin-resistant human breast cancer cells. *Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*. 2011;706:28–35.
5. Bamosa AO, Kaatabi H, Lebda FM, Al Elq A, Al Sutan A. Effect of *Nigella sativa* seeds on the glycemic control of patients with type diabetes mellitus. *Indian Journal Pharmacology* 2010; 54(4):344-354.
6. Bamosa A, Kaatabi H, Badar A, Al-Khadra1 A, Al Elq A, Abou-Hozaiifa B, Lebda F, Al-Almaie S. *Nigella sativa*: A potential natural protective agent against cardiac dysfunction in patients with type 2 diabetes mellitus *Journal of Family and Community Medicine*.2015;2:88-95.
7. Burio MA, Tayyab M. Effect of *Nigella sativa* on lipid profile in albino rats. *Gomal Journal of Medical Sciences*. 2007;5:1.
8. Benhaddou-Andaloussi A, Martineau LC, Vallerand D, Haddad Y, Afshar A, Settaf A, Haddad PS. Multiple molecular targets underlie the antidiabetic effect of *Nigella sativa* seed extract in the skeletal muscle, adipocyte and liver cells. *Diabetes Obesity and Metabolism*. 2010;12:148-57.
9. Datau EA, Surachmanto E, Pandelaki K, Langi JA. Efficacy of *Nigella sativa* on serum free testosterone and metabolic disturbances in central obese male. *Acta Medicine Indonesian*. 2010;42(3):130-136.
10. Dehkordi FR, Kamkhah AF. Antihypertensive effect of *Nigella sativa* seed extract in patients with mild hypertension. *Fundamental and clinical Pharmacology*. 2008;22:447-452

11. El bahr S, Taha N, Korshom M, Mandour A, Lebda M. Influence of combined administration of Turmeric and Black seed on selected biochemical parameters of diabetic rat. *Alexandria Journal of Veterinary Sciences AJVS*. 2014;41:19-27.
12. El-Sayed EM, Abo-Salem OM, Aly HA, Mansour AM, Potential antidiabetic and hypolipidemic effects of propolis extract in streptozocin-induced diabetic rats. *Pakistan Pharmacology Sciences*. 2009;22:168-174.
13. Huseini HF, Mohtashami AR, Ghamarchehre ME, Sadeqhi Z, Kianbakht S, Huseini AF. Blood pressure lowering effect of *Nigella sativa* L. seed oil in healthy Volunteers: A randomized double-blind, placebo-controlled clinical trial. *Phytotherapy Research*. 2013;27:1849-1853.
14. Kaatabi H, Bamosa AO, Badar A, Al-Elq A, Abou-Hozaifa B, Lebda F, et al. *Nigella sativa* improves glycemic control and ameliorates oxidative stress in patients with type 2 diabetes mellitus: Placebo controlled participant blinded clinical trial. *Plos One Journal*. 2015;10:2.
15. Kanter M, Coskun O, Korkmaz A, Oter S. Effects of *Nigella sativa* on oxidative stress and beta-cell damage in Streptozotocin-induced diabetic rats. *Anat Rec The Anatomical Record*. 2004;279A:685-91.
16. Khan A MD, Chen H, Tania M, Zhang D. Anticancer activities of *Nigella sativa* (Black Cumin). *African Journal Traditional Complementary Alternative Medicine*. 2011;8(s):226-232.
17. Namazi N, Mahdavi R, Alizadeh M, Farajnia S. Oxidative stress responses to *Nigella sativa* oil concurrent with a low calorie diet in obese women: A randomized, double-blind controlled clinical trial. *Phytotherapy Research*. 2015;29:1722-1728.
18. Naz H. *Nigella sativa*: the miraculous herb. *Pakistan Journal Biochemistry Molecular Biology*. 2011;44(1):44-48.
19. Rahmani AH, Alzohairy MA, Khan MA, Aly SM. Therapeutic implications of black seed and its constituent thymoquinone in the prevention of cancer through inactivation and activation of molecular pathways. *Evidence-Based Complementary and Alternative Medicine*. 2014:1-13.
20. Sayed MD. Traditional medicine in health care. *Journal of Ethnopharmacology*. 1980;2:19-22.
21. Shabana A, El-Menyar A, Asim M, Al-Azzeh H, Al-Thani H. Cardiovascular Benefits of Black Cumin. *Cardiovascular Toxicology*. 2013;13:9-21.
22. Shafiq H, Ahmad A, Masud T, Kaleem M. Cardio-protective and anti-cancer therapeutic potential of NS. *Basic Medical Sciences*. 2014;17:967-979.

23. Shah AS, Khan GM, Badshah A, Shah SU, Shah KU, Mirza SA, et al. *Nigella sativa* provides protection against metabolic syndrome. *African Journal of Biotechnology*. 2012;11:48:10919-10925.
24. Srinivasan K, Plant foods in the management of diabetes mellitus: Spices as beneficial antidiabetic food adjuncts. *International Journal of Food Sciences and Nutrition*. 2005;56:6:399-414.
25. Swanston-Flatt SK, Flatt PR, Day C, Bailey CJ. Traditional dietary adjuncts for the treatment of diabetes mellitus. *Proc. Nutrition Social*. 1991;50:641-651.
26. WHO.2006.Fact sheet N 312.
27. Zhixia L, Zhirong Y, Shengfeng W, Siyan Z, Feng S. Epidemiology, Preventive and Control: Epidemiology of Cardiovascular Disease. *J AM Coll Cardiol*. 2005;66(16\_S):

## VITA

Graduate School  
Southern Illinois University

Danielle L. Vaughn

all4god35@gmail.com

Southern Illinois University Carbondale  
Bachelor of Science, Nutrition, May 2013

Special Honors and Awards:

National Honors and Leadership Award  
Black Graduate Association Honors Award

Research Paper Title:

The Potential for Nigella Sativa in Treating Risk Factors Related to the  
Metabolic Syndromes

Major Professor: William Banz, PhD, RDN