An experimental study to evaluate the effect of *Nitya Sevaniya* (daily consumable) and *Nitya Asevaniya* (daily non-consumable) food items on albino rats

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Abstract

Background: As per Ayurveda, *Nitya Sevaniya* (NS) food items are recommended for daily intake while *Nitya Asevaniya* (NAS) food items should be avoided for daily intake due to their systemic wholesome and unwholesome effects after consumption, respectively. **Aim and Objectives:** The present study was conducted to perform *in vivo* safety evaluation of selected *Nitya Sevaniya* and *Nitya Asevaniya* food items. **Materials and Methods:** Thirty rats were randomly divided into five groups-each containing six Charle's Foster strain albino rats. Group 1 served as standard diet group, groups 2 and 3 served as test drug received groups namely NS50 and NS100, in which 50% and 100% mixture of *Nitya Sevaniya* food was administered, respectively. Group 4 and 5 as test drug received groups *Nitya Asevaniya* 50 (NAS50) and *Nitya Asevaniya* 100 (NAS100), in which 50% and 100% *Nitya Asevaniya* food mixtures was administered, respectively. The test diet was administered orally in the form of freshly prepared pellet twice a day *ad libitum* for 90 days. Parameters studied were gross behavior, body and organ weight, food and water intake, fecal and urine output, hematological and biochemical parameters, electrocardiogram and histology of various organs. **Results:** In the NAS100 group, a significant change was observed in 20 of 47 parameters in view of pathological aspect. Among them, three parameters, i.e., platelet count, serum glutamic-oxaloacetic transaminase (SGOT) and indirect bilirubin were above normal limits, while other parameters were within the normal limits. No significant change was observed in any of the parameters in the NS50 and NS100 group after 90 days of administration as compared with the control group. **Conclusion:** Considering findings of this study, it is concluded that selected NS food items are safe while consumption of only selected *Nitya Asevaniya* food items (when administered in 100% dose) for 90 days have the potential of inflammatory changes in the liver, spleen; fat deposition in kidney and impairment of cardiac and renal functions.

Keywords: *Asevaniya*, *Kilaat*, *Kurchika*, *Nitya*, *Sevaniya*

Introduction

According to WHO, in the next 10 years, there will 17% increase in the global burden of noncommunicable diseases.[1] Faulty diet such as high carbohydrate and high-fat diet and lifestyle changes are most important among the causative factors.[2] Hence, it is need of time to understand the wholesomeness and unwholesomeness of daily diet.

A description about wholesomeness and unwholesomeness of food items is available in the texts of Ayurveda along with the details of the proper method of food intake, *Nitya Sevaniya* (daily consumable) and *Nitya Asevaniya Ahara Dravya* (daily non-consumable)[3-5] with its beneficial and harmful effects on the body. Mention date, no scientific evidence is available regarding the concept of *Nitya Sevaniya* and *Nitya Asevaniya* food items. Four food items for each group was selected in the present study and were evaluated for their safety in albino rats based on various objective parameters.

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Materials and Methods

A total of thirty adult and healthy Charle's Foster strain albino rats of either sex weighing 200 ± 20 g were used for the experiments. The animals were obtained from the animal house attached to the institute. The experimental protocols were approved by the Institutional Animal Ethics Committee (IAEC/17/2015/05). The animals were exposed to 12-h light and dark cycle with a relative humidity of 50%–70% and the ambient temperature during the period of experimentation was 22°C ± 03°C. All animals were kept under same husbandry conditions. Animals were fed a standard diet in the control group and a special diet prepared as per the requirement of the study protocol. The drinking water was given *ad libitum* in polypropylene bottles with stainless steel sipper tubes.

Selection of test diet

In NS group-*Mudga* (green gram) (*Vigna radiata* L.), *Godhuma* (wheat) (*Triticum aestivum* L.), *Raktashali* (red rice) (*Oryza sativum* L.) and *Sharkara* (sugar) were selected from the list of NS articles described in Ayurveda texts[6] because they are most commonly used Indian food items. In NAS group *Masha* (*Vigna Mungo* L.), *Dadhi* (curd), *Kurchika* (cheese), *Kilat* (paneer) were selected on the basis of their common property of vitiation of blood.[7] Out of them, green gram, black gram, wheat and sugar were procured from the local market of Jamnagar, Gujarat, while red rice was procured from Kerala. Cheese, paneer and curd were used within 2 days of manufacturing with the maintenance of cold chain.

Grouping and posology

Thirty rats were randomly divided into five groups-each containing six animals. Group 1 served as a control group. Groups 2 and 3 served as NS50 and NS100, in which 50% and100% mixture of NS food items was administered respectively. Group 4 and 5 were NAS50 and NAS100, in which 50% and 100% mixture of *Nitya Asevaniya* food items was administered respectively. The test diet was administered orally in the form of freshly prepared pellet twice a day *ad libitum* for 90 days.

Form of test diet administration

All the grains and sugar were made in powdered form. They were mixed with other ingredients as per the protocol and pellets were made. In NS50 and NAS50 groups, mixture of test diet was mixed with an equal quantity of normal diet and the pellets were made. For the normal control group, Amrut brand rat pellet feed supplied by Pranav Agro Ltd. was provided throughout the study period.

Parameters studied

Gross behavior and body weight was observed on the initial, 45th and 90th days. quantity of food intake, water intake, fecal output and urine output were obtained using separate metabolic cage on 30th, 60th and 90th days. Hematological and biochemical analyses were performed on 45th and 90th days. To estimate hematological parameters, 0.08 ml of blood was mixed with 0.02 ml of ethylene diamine tetra-acetic acid-EDTA (33.33 mg/ml) and fed to auto-analyzer (Sismes KX-21, Trans Asia). The parameters measured were: total white blood cell, neutrophils percentage, lymphocyte percentage, eosinophils percentage, monocyte percentage, hemoglobin gram percentage, packed cell volume, total red blood cell, platelet count, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration. For the estimation of biochemical parameters, serum was separated from collected blood and the requisite quantity of serum was fed to the auto-analyzer (Fully automated Biochemical Random Access Analyzer, BS-200; Lilac Medicare Pvt., Ltd., Mumbai) which was automatically drawn into the instrument. Biochemical parameters measured were blood sugar,[8] serum cholesterol,[9] serum triglycerides,[10] blood urea,[11] serum creatinine,[12] serum glutamic pyruvic transaminase,[13] serum glutamic oxaloacetic transaminase,[14] serum total protein,[14] serum albumin and serum globulin,[15] serum alkaline phosphatase,[16] total bilirubin,[17] direct bilirubin,[13] uric acid[18] and serum calcium.[14] The effect of the test diet on cardiac activity was evaluated by taking an electrocardiogram (ECG) on the 90th day using a portable ECG machine (Cardiofax-Medicaid systems). The speed of the ECG machine was set to 50 mm/s.

All the important internal organs were carefully dissected, namely the heart, liver, kidney, spleen, and thymus on 90th day. After noting signs of gross lesion and ponderal changes of the above-said organs, all were transferred to 10% phosphate-buffered formalin solution for fixation and later on subjected to dehydrating, wax embedding, sectioning and staining with hematoxylin and eosin for histological evaluation. The slides were viewed under trinocular research Carl-Zeiss's microscope at various magnifications to note down the changes in the microscopic features of the tissues.[19]

Statistical analysis

The results were presented as mean ± standard error of the mean for five rats in each group. Statistical comparisons were performed by unpaired Student's *t*-test for comparison with the control group with the level of significance set at $P < 0.05$.

Results

Overall assessment of gross behavior in rats showed sluggish activity in NAS50 and NAS100 groups in comparison to respective initial values and control groups. Bodyweight was nonsignificantly increased in all the test diet groups [Table 1]. The relative weight of the spleen was significantly decreased in the NAS100 group [Table 1]. As compared with the normal control group, significant increase was found in food intake in all the four groups on 30thday and nonsignificant decrease in NAS100 group on the 60thday, while nonsignificant increase was found in NS50, NS100 groups on the 90thday [Table 2]. Fecal output was significantly decreased on the 60th and 90th days in all the test diet groups [Table 2]. Consistency and

Table 1: Effect of test diet on body weight and relative organ weight of albino rats

Groups	Control	NS50	NS100	NAS50	NAS100
Days					
30	256.33±17.70	271.67±20.12	267.2±15.81	273.71±12.32	266.86±12.96
60	287±18.18	319.33±37.19	320.0±26.24	301.14±21.8	287.71±17.03
90	290.00±18.71	323.00±38.51	332.00±29.22	319.17±28.84	305.67±22.60
Body weight (g)					
Liver (g/100 g BW)	3.13±0.22	2.71±0.48	3.03±0.2	2.82±0.18	2.75±0.17
Heart (mg/100 g BW)	267.99±11.8	263.4±13.31	272.96±15.2	261.6±11.8	244.2±12.3
Thymus (mg/100 g BW)	160.93±6.7	158.86±10	178.25±25.6	155.16±7.28	145.46±12.6
Spleen (mg/100 g BW)	214.51±23.3	181.89±14.5	180.73±7.2	193.43±32.5	155.2±14.3*
Kidney (mg/100 g BW)	632.26±39.7	651.57±34	634.18±42.6	628.6±24.2	591.21±25.2

Data are presented as Mean±SEM, *P<0.05, **P<0.01, ***P<0.001 compared to control group (paired t-test). SEM: Standard error of the mean

Table 2: Effect of test diet on relative fecal and urine output, food, and water intake of albino rats

Groups	Control	NS50	NS100	NAS50	NAS100
Days			Relative faecal output (mg/100 g BW)		
30	2242.27±900	1808.2±247	760.51±51	1140.11±134	634.16±141
60	2034.79±118	905.17±103***	816.93±228***	489.25±76.4***	557.48±150***
90	2884.31±541	932.73±162**	758.28±113**	1276.68±162*	1422.25±345*
			Relative urine output (ml/100 g BW)		
30	0.98±0.62	0.18±0.1	0.07±0.04	0.27±0.21	0.63±0.2
60	0.33±0.13	0±0*	0.029±0.02	0.36±0.19	0.27±0.14
90	0.09±0.06	0.15±0.06	0.14±0.06	0.36±0.1*	0.39±0.07*
			Relative food intake (mg/100 g BW)		
30	5.39±0.95	14.4±0.87*	13.74±1.64*	10.41±0.5*	10.58±0.68*
60	9.76±0.61	14.28±2.94	10.47±1.18	10.03±0.79	8.07±1.38
90	8.22±2.08	10.73±0.81	10.57±0.84	8.26±0.82	8.71±0.93
			Relative water intake (ml/100 g BW)		
30	6.56±1.56	2.19±0.23*	1.74±0.43*	5.63±0.99	5.99±1.25
60	9.07±1.45	2.98±0.98**	1.36±0.96**	7.61±2.2	3.91±1.83
90	3.83±1.56	5.3±2.02	6.66±4.08	7.59±2.46	4.34±1.98

Data are presented as mean±SEM, *P<0.05, **P<0.01, ***P<0.001 compared to control group (paired t-test). SEM: Standard error of the mean, BW: Body weight

color of feces in NS50 and NS100 was normal. Clay- and gray-colored feces were observed in NAS100 and NAS50 groups, respectively. Urine output was significantly increased in NAS50 and NAS100 group on the 90th day [Table 2]. There was a significant decrease in MCV and MCH below the normal limit in the NAS100 group on 90th day [Table 3]. Platelet count was significantly increased above the normal limit in the NAS50 group on the 45th day and NAS50 and NAS100 groups on 90th day [Table 3]. Neutrophil count was significantly increased above the normal limit in NAS50, NAS100 groups on the 45th day and in NAS50 group on 90th day [Table 3]. Fasting blood sugar level was significantly increased above the normal limit in the NAS100 group on 90th day [Table 4]. Serum triglycerides and serum very low-density lipoprotein (VLDL)-cholesterol level was significantly decreased below the normal limit in the NAS100 group on the 45th day [Table 4]. Blood Urea level was significantly decreased below the normal limit in NAS50 and NAS100 groups on 90th day [Table 4]. Serum glutamic pyruvic transaminase (SGPT) was insignificantly increased while the SGOT level was significantly increased above the normal limit in NAS50 and NAS100 groups on 90th day [Table 4]. Serum creatinine was significantly increased above the normal limit in NAS100 group on 90th day [Table 4]. The total protein level was significantly increased above the normal limit in NAS50 on 45th day [Table 4]. The indirect bilirubin level was significantly increased above the normal limit in the NAS100 group on 90th day [Table 4]. In ECG, heart rate was significantly decreased in NAS50 and NAS100 groups. PR interval was significantly increased in the NAS100 group. Arrhythmia was present in the NAS100 group [Table 5]. There was no change observed in the histology of the heart [Figure 1,2,3], kideny [Figure 4,5], liver [Figure 7,8], spleen [Figure 10, 11], lymphnode [Figure 13,14] in control & NS group. Histology of various organs showed changes in NAS100 group such as-mild fatty changes in the kidney [Figure 4,6], fatty changes, inflammatory changes such as hypertrophy of liver cells and cellular infiltration in liver [Figure 9] which indicates steatohepatitis, Purple spots in spleen indicates vasodilatation caused by relaxation of smooth muscle cells in

Table 3: Effect of test diet on hematological parameters of albino rats

Relative weight	Control	NS50	NS100	NAS50	NAS100
Days			Total white blood cells (days) (10^3/µl)		
45	9850±934.43	9583.33±571.21	10700±1314.75	9550±1143.61	9750±1293.51
90	8866.67±906.10	8433.33±905.78	9040±919.02	9116.67±655.9	8880±1307.82
			Neutrophil (%)		
45	11.67±1.26	15.5±2.17	13.86±1.99	17.5±1.67*	20±2.77*
90	11.67±1.87	18.17±2.20	15.4±1.96	19±2.71*	17.2±2.35
			Lymphocyte (%)		
45	84.5±1.09	80.67±2.08	82.14±2.23	80.5±1.91	78±3.50
90	85±2.27	77.83±2.50	80.2±2.15	79.83±2.96	78.4±2.44
			Eosinophil (%)		
45	2±0.26	2.33±0.21	2.29±0.29	1.83±0.31	1.67±0.33
90	2±0.25	2.33±0.21	2.4±0.24	2.66±0.21	2.6±0.24
			Monocyte (%)		
45	1.83±0.17	1.5±0.22	1.71±0.29	1.83±0.31	2±0.26
90	1.33±0.21	1.66±0.21	1.8±0.2	1.83±0.30	1.8±0.2
			Hemoglobin (g/dl)		
45	14.13±0.4	14.73±0.29	14.76±0.12	14.73±0.26	14.75±0.24
90	14.73±0.59	14±0.42	14.78±0.29	14.6±0.21	14.06±0.28
			Packed cell volume (%)		
45	43.03±1.2	44.75±1.15	46.2±0.66*	43.98±1.03	44.18±0.83
90	44.92±1.52	45.25±1.08	47.82±0.83	44.88±0.58	46.02±1.72
			Red blood cells (days) (10^6/mm^3)		
45	7.85±0.28	8.01±0.27	8.44±0.18	7.91±0.23	8.11±0.21
90	8.08±0.35	7.97±0.22	8.52±0.16	8±0.16	8.62±0.40
			Mean corpuscular volume (fl)		
45	54.95±0.80	55.93±0.65	54.84±0.46	55.67±0.63	54.57±0.63
90	55.65±0.57	56.76±0.83	56.14±0.63	56.15±0.65	53.5±0.57*
			Mean corpuscular hemoglobin (pg)		
45	18.07±0.48	18.45±0.37	17.53±0.29	18.67±0.69	18.27±0.33
90	18.25±0.34	17.58±0.54	17.36±0.31	18.27±0.27	16.84±0.46*
			Mean corpuscular hemoglobin concentration (g/dl)		
45	32.85±0.44	32.95±0.31	31.96±0.36	33.52±0.3	33.43±0.23
90	32.38±0.34	31.27±0.68	31.12±0.48	32.53±0.16	31.46±0.48
			Platelets (days) (10^3/µl)		
45	1088±59.89	1072.17±64.5	1220.29±38.76	1344.5±43.74**	1244.33±115.02
90	1125.83±29.58	1127.17±218.32	1200.6±29.58	1312.67±41.78**	1561.4±44.57***

Data are presented as mean±SEM, *P<0.05, **P<0.01, ***P<0.001 compared to control group (paired t-test). SEM: Standard error of the mean

arteries [Figure 12] and mild decrease in cellularity in lymph node [Figure 15]. Rats of NS test diet group had normal cytoarchitecture in all organs.

Overall, significant changes were observed in 20 out of 47 parameters in the NAS100 group, three parameters, i.e., platelet count, SGOT and indirect bilirubin were above normal limit, while others were within the normal limits. Biochemical and histological changes reported inflammatory changes in the liver and diminished splenic function.

Discussion

Sluggish activity in NAS50 and NAS100 groups may be due to *Kaphaprakopai* (vitiation of *Kapha Dosha*)[20] and *Rasavaha Srotodushti*[21] (vitiation of circulatory channels) which is presented as *Gaurava* (heaviness in body), *Alasya* (unwillingness to perform the task) as all the contents of NAS group are *Guru* i.e., heavy to digest. Decrease in the relative weight of spleen in NAS100 group is indicative of its hypo-functioning, which may suggest the immunosuppressive effect of the test diet. Increased food intake in NS50 and NS100 groups maybe because most of the ingredients of these groups diet are *Laghu,* i.e., easily digestible while decreased food intake in the NAS100 group maybe because most of the ingredients of diet in these group are *Guru,* i.e., not easily digestible. Despite increased food intake, decrease in fecal output was found in NS50 and NS100 groups. It may be because of the production of less bulk of stool by easily digestible food items. Clay color stool in the NAS100 group indicates steatorrhea. Administration of *Asaveniya* diet itself has a very rich fat diet, which may cause indigestion and hence, the color of the stool might have changed. Further, it can be

Table 4: Effect of test diets on serum biochemical parameters

Parameters	Control	NS50	NS100	NAS50	NAS100
Days			Fasting blood sugar (mg/dl)		
45	73.0±5.12	86.0±6.53	81.43±8.55	87.5±6.86	85.33±5.01
90	67.17±1.74	63.83±2.36	62.8±5.12	70.17±4.43	74±5.122*
			Serum cholesterol (mg/dl)		
45	49.33±4.08	51.17±2.8	47.86±3.66	53.33±5.12	46.5±3.93
90	57.17±3.46	59.83±5.9	56.2±4.67	55.5±3.84	66.8±4.67
			Triglycerides (mg/dl)		
45	208.67±29.13	220.0±19.41	185.14±19.54	130.67±24.22	88.17±20.68*
90	69±5.70	74.17±3.31	87.6±8.76	68.67±11.33	80±8.76
			High-density lipoprotein (HDL) (mg/dl)		
45	28.5±2.60	29.5±1.48	32.14±2.59	31.17±3.98	24.17±1.35
90	36.83±2.07	33.83±3.3	32.6±2.90	40.67±4.08	42.8±4.06
			Very low-density lipoprotein (LDL) (mg/dl)		
45	41.83±5.79	43.83±4.00	37±3.87	26.17±4.83	17.67±4.13*
90	13.77±1.13	15.67±1.45	17.4±3.41	13.83±2.30	12±3.41
			Serum glutamic pyruvic transaminase (SGPT) (IU/L)		
45	55.67±4.77	43.33±5.8	57.71±4.53	62.5±3.65	57.67±6.04
90	56±7.93	46.33±4.82	35.8±3.87	75.5±15.69	61.2±3.87
			Serum glutamic oxaloacetic transaminase (SGOT) (IU/L)		
45	125.17±7.24	120.33±6.83	129.14±5.53	136.17±5.21	142.17±29.37
90	118±4.47	137.17±11.59	110.4±9.64	150.67±8.90**	161.6±9.64***
			Total bilirubin (mg/dl)		
45	0.27±0.04	0.35±0.02	0.34±0.03	0.4±0.06	0.38±0.05
90	0.52±0.07	0.4±0.05	0.44±0.07	0.65±0.07	1.14±0.24*
			Direct bilirubin (mg/dl)		
45	0.12±0.02	0.15±0.02	0.16±0.02	0.12±0.02	0.13±0.02
90	0.21±0.03	0.17±0.03	0.28±0.10	0.25±0.05	0.2±0.10
			Blood urea (mg/dl)		
45	29.67±2.499	35±1.9	36.14±2.04	33.17±3.439	33.67±1.256
90	48.67±2.84	42±2.30	45.8±3.12	40.67±0.80*	40.2±3.12*
			Serum creatinine (mg/dl)		
45	0.72±0.12	0.98±0.05	1.07±0.29	0.88±0.05	0.93±0.02
90	0.7±0.04	0.6±0.06	0.82±0.07	0.77±0.05	0.84±0.04*
			Total protein (g/dl)		
45	6.08±0.21	6.13±0.14	6.59±0.29	6.88±0.18*	6.32±0.15
90	6.11±0.28	5.85±0.28	5.62±0.18	6.78±0.44	6.44±0.18
			Albumin (g/dl)		
45	3.3±0.19	3.72±0.17	3.57±0.11	3.82±0.21	3.03±0.08
90	3.23±0.13	3.18±0.18	3.08±0.224	3.43±0.17	3.54±0.22
			Globulin (g/dl)		
45	2.78±0.16	2.42±0.22	2.59±0.21	3.07±0.09	3.28±0.16*
90	2.36±0.24	2.67±0.12	2.54±0.12	2.95±0.54	2.9±0.12
			Uric acid (mg/dl)		
45	0.87±0.19	0.8±0.16	0.86±0.07	0.95±0.11	1.23±0.14
90	0.9±0.08	0.93±0.03	1±0.05	0.77±0.08	1.2±0.05
			Serum calcium (mg/dl)		
45	8.4±0.29	9.13±0.31	9.19±0.21	8.48±0.28	7.75±0.24
90	9.38±0.53	9.81±0.18	9.82±0.22	9.9±0.15	9.6±0.22

Data are presented as mean±SEM, *P<0.05, **P<0.01, ***P<0.001 compared to control group (paired t-test). SEM: Standard error of the mean

due to bile salt mal-absorption due to ileitis.[22] The ileum is the last part of the small intestine, which can be correlated with *Grahani* in Ayurved.[23] *Sara-Kitta Vibhajana* (separation of nutrients and waste products of digested food) occurs in *Grahani*.[24] Abnormality of *Agni* (digestive power) and *Grahani* can lead to *Sama Mala Pravritti* (feces containing undigested food particles). In the present study, color and texture of fecal matter can be correlated with symptoms of *Kaphaja Grahani* (a diseased condition in which *Grahani* is vitiated by *Kapha Dosha*)[25] which is represented as the passage

Table 5: Effect of test diet on electrocardiogram of albino rats

Groups	Control	NS50	NS100	NAS50	NAS100
Heart rate	345±13.57	345.75±18.18	335.42±15.36	307.5±14.36*	277.5±18.88*
PR interval	0.05±0.003	0.05±0.01	0.05±0.01	0.05±0.01	0.08±0.01*
QRS interval	0.04±0.003	0.035±0.01	0.035±0.01	0.04±0	0.04±0
QT interval	0.08±0.01	0.07±0.01	0.07±0.01	0.075±0.01	0.08±0
Rhythm	Normal	Normal	Normal	Normal	Arrhythmia

Data are presented as mean±SEM, *P<0.05, **P<0.01, ***P<0.001 compared to control group (paired t-test). SEM: Standard error of the mean

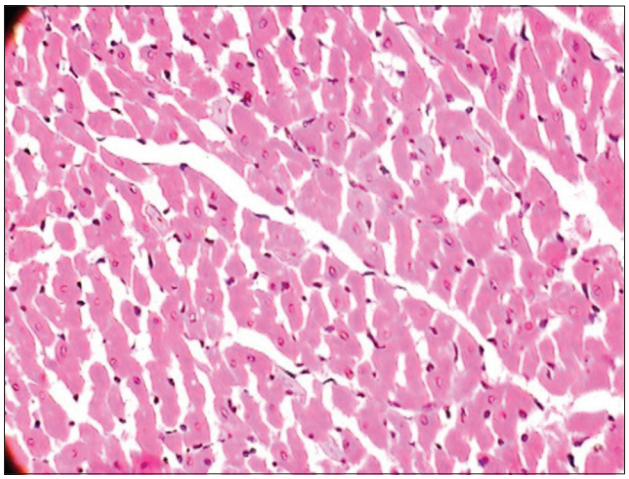

Figure 1: Photomicrographs of sections of heart taken at ×400 magnification - Normal cytoarchitecture (control group)

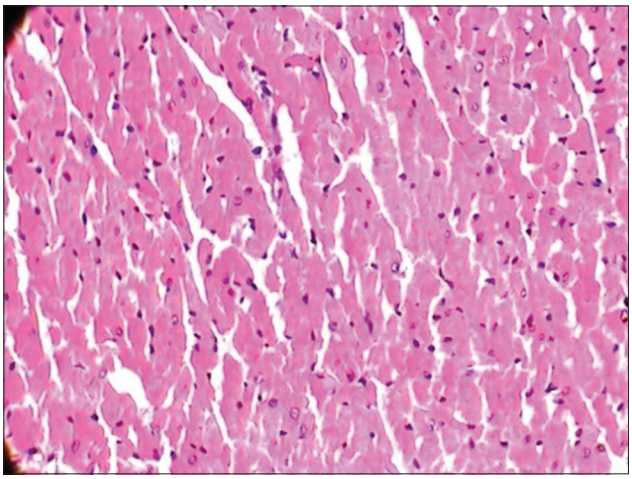

Figure 2: Photomicrographs of sections of heart taken at ×400 magnification - Normal cytoarchitecture (NS100)

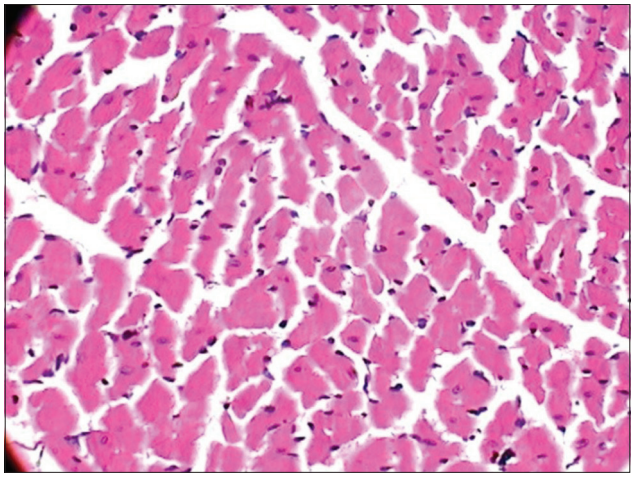

Figure 3: Photomicrographs of sections of heart taken at ×400 magnification - Normal cytoarchitecture (NAS100)

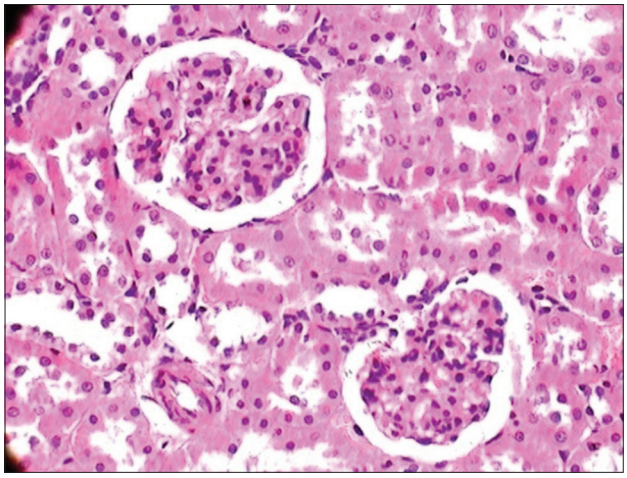

Figure 4: Photomicrographs of sections of kidney taken at ×400 magnification - Normal cytoarchitecture (control group)

of unformed stool (*Bhinna Mala Pravritti*), *Ama* (mixed with undigested food particles), *Shleshma Sansrushta* (mixed with mucous). Increase in urine output found in the NAS100 group is a symptom of *Ama*.[26]

The low level of MCV and MCH in the NAS100 group indicates iron deficiency anemia. This group of rats were administered dairy products such as cheese, paneer and curd. Dairy products have been proved to inhibit iron absorption, which takes place in the duodenum.[27] Increased platelets found in the NAS100 group is a risk factor for atherosclerosis.[28] The function of platelet is the coagulation of blood, which can be correlated with the process of *Rakta-Skandana* in Ayurveda, which occurs faster in *Kapha* vitiated *Rakta*.[29] Increase in neutrophil count in NAS50 and NAS100 groups indicates infection and inflammation in the body.[30] Increased fasting blood sugar level was found in the NAS100 group. Hyperglycemia may be due to several reasons like – decreased secretion of insulin, decreased sensitivity of the insulin receptors to blood sugar level,[31] enhanced gluconeogenesis.[32] In spite of high

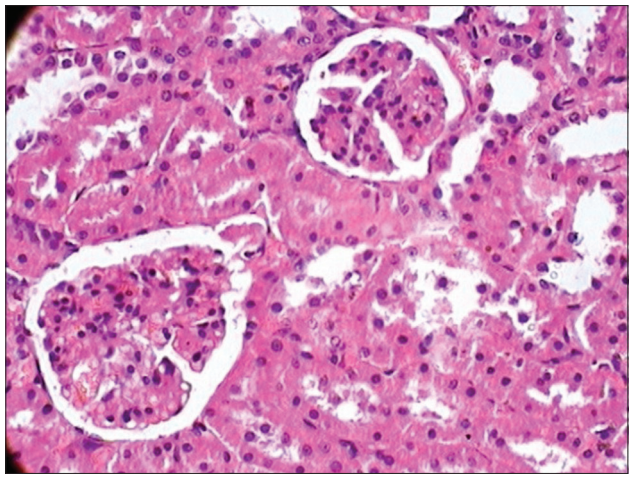

Figure 5: Photomicrographs of sections of kidney taken at ×400 magnification - Normal cytoarchitecture (NS100)

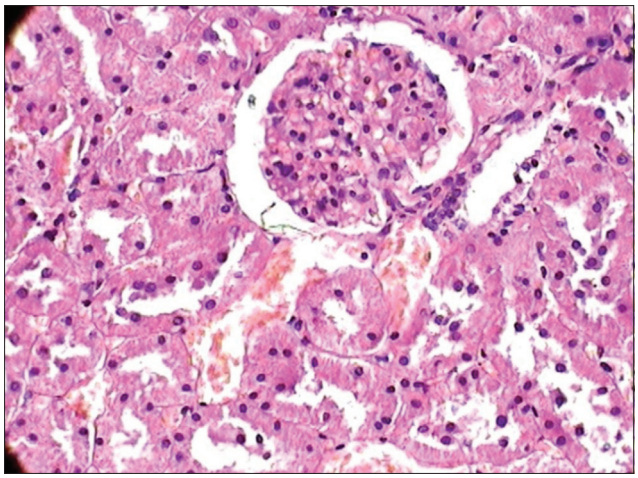

Figure 6: Photomicrographs of sections of kidney taken at ×400 magnification - Blood effusion and mild fatty changes (NAS100)

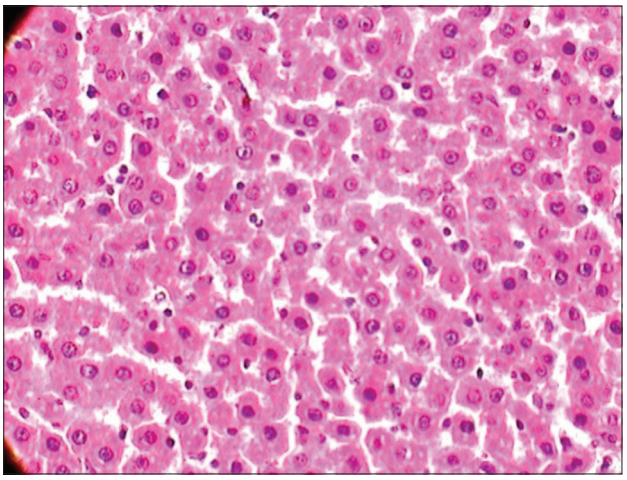

Figure 7: Photomicrographs of sections of liver taken at ×400 magnification - Normal cytoarchitecture (control group)

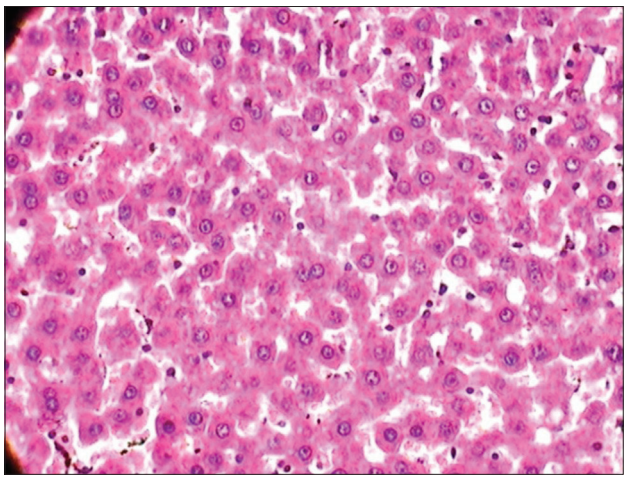

Figure 8: Photomicrographs of sections of liver taken at ×400 magnification - Normal cytoarchitecture (NS100)

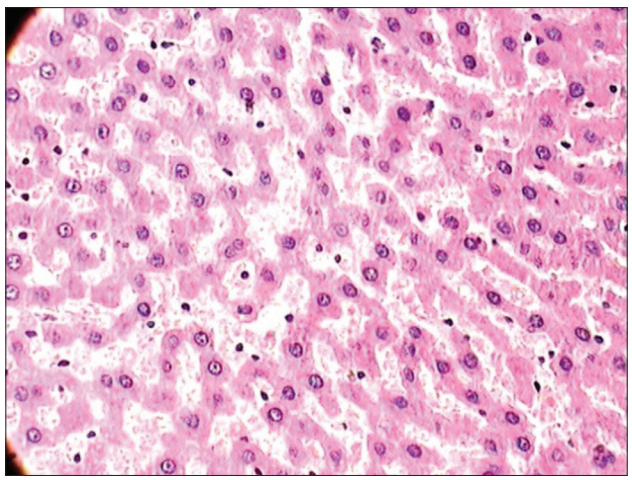

Figure 9: Photomicrographs of sections of liver taken at ×400 magnification - Fatty changes, inflammatory changes like hypertrophy of liver cells and cellular infiltration (NAS100)

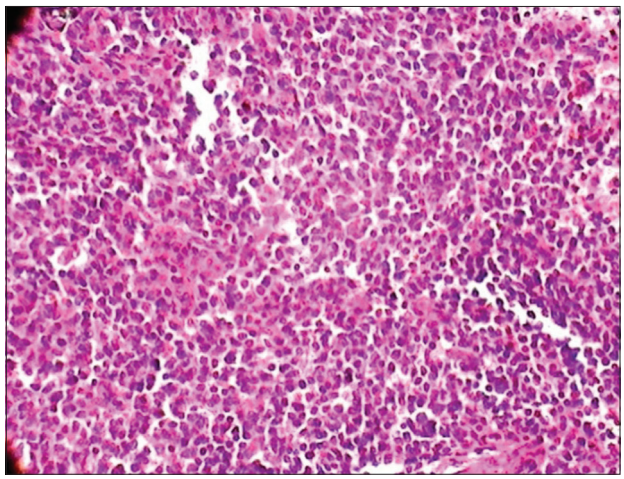

Figure 10: Photomicrographs of sections of spleen taken at ×400 magnification - Normal cytoarchitecture (control group)

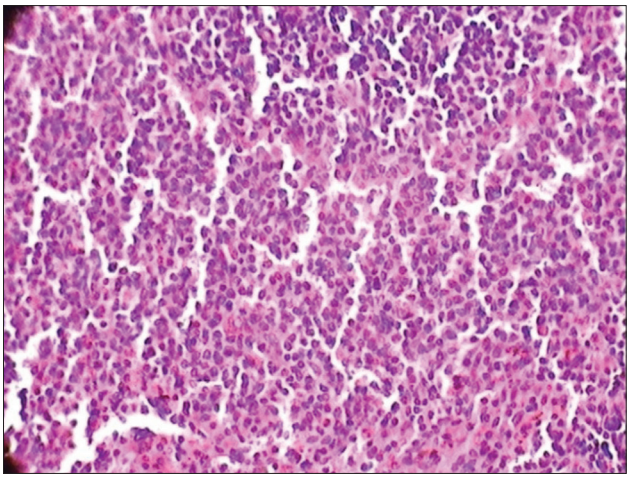

Figure 11: Photomicrographs of sections of spleen taken at ×400 magnification - Normal cytoarchitecture (NS100)

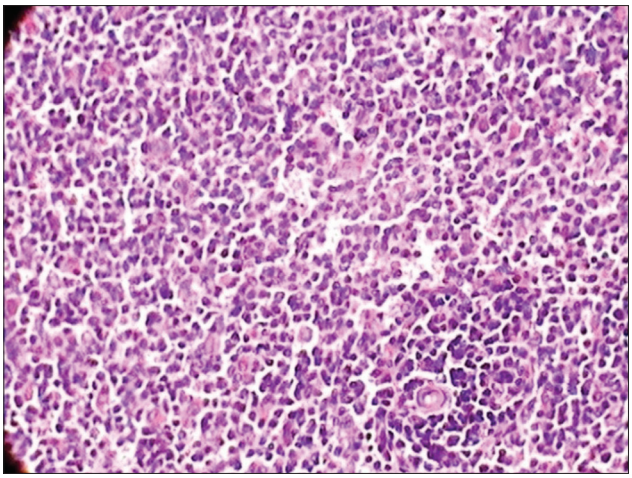

Figure 12: Photomicrographs of sections of spleen taken at ×400 magnification - Purple spots (NAS100)

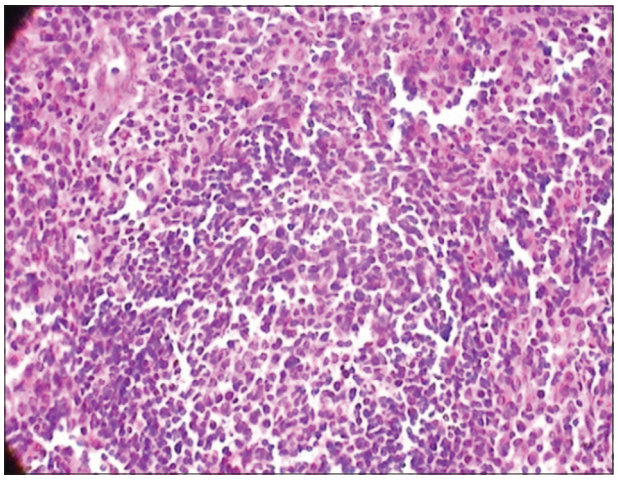

Figure 13: Photomicrographs of sections of lymph node taken at ×400 magnification - Normal cytoarchitecture (control group)

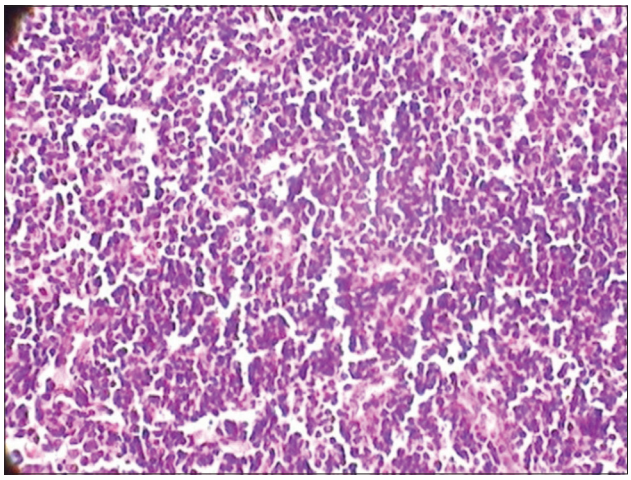

Figure 14: Photomicrographs of sections of lymph node taken at ×400 magnification - Normal cytoarchitecture (NS100)

fatty food administration, low triglycerides level has been found in the NAS100 group on 45th day in the present study. This may be due to the total cutoff of sugar from the diet. In this condition, the glycerol component of triglycerides gets converted into glucose to maintain blood glucose level by the process of gluconeogenesis.[33] Serum VLDL-cholesterol was also significantly decreased in the NAS100 group on 45th day because the core of the VLDL particles consists mostly of S. triglycerides (50% of the particle),[34] hence its level is dependent on serum triglycerides level.

Urea is the main product of protein metabolism in the body and synthesized in the liver. In the NAS100 group, due to high-protein content ingredients food, elevation in SGPT, SGOT level and decrease in serum urea level indicates the possibility of hepatitis.[35] Creatinine blood level depends on its production and excretion. Further, the creatinine level increases due to impaired kidney function or a high protein diet.[36] In the present study, serum creatinine was significantly increased in the NAS group without an increase in blood urea level. It may be due to high protein diet content of NAS groups. Elevation in indirect bilirubin in the NAS100 group may be due to its less uptake by liver cells because of inflammation of liver cells.[37]

In ECG, prolonged PR interval with arrhythmia is indicative of first degree atrio-ventricular (AV) block.[38] Decreased conduction of impulse due to affected AV node and vasodilatation leads to a decrease in heart rate.

Conclusion

From the present study, it can be concluded that administration of selected *Nitya Sevaniya* food items like green gram, wheat, *Raktashali*, suger is safe while selected *Nitya Asevaniya* food items like black gram [*Vigna mungo* (L.) Hepper], curd, cheese, paneer, when administered in 100% dose for 90 days have the potential of inflammatory changes in liver, spleen, fat deposition in kidney and impairment of cardiac, renal functions.

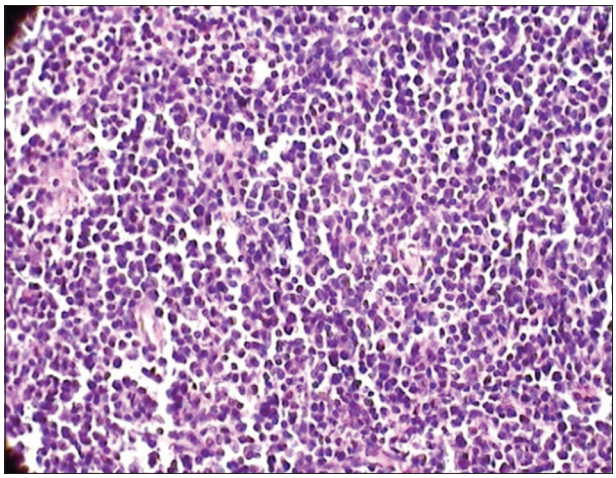

Figure 15: Photomicrographs of sections of lymph node taken at ×400 magnification - Mild decrease in cellularity (NAS100)

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Conflicts of interest

There are no conflicts of interest.

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